
**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION**
Washington, D.C. 20549

**FORM S-3
REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933**

Personalis, Inc.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

27-5411038
(I.R.S. Employer
Identification Number)

**1330 O'Brien Drive
Menlo Park, California 94025
(650) 752-1300**

(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

**John West
President and Chief Executive Officer
Personalis, Inc.
1330 O'Brien Drive
Menlo Park, CA 94025
(650) 752-1300**

(Name, address, including zip code, and telephone number, including area code, of agent for service)

Copies to:

**Michael E. Tenta
Cooley LLP
3175 Hanover Street
Palo Alto, California 94304
(650) 843-5000**

Approximate date of commencement of proposed sale to the public: From time to time after the effective date of this Registration Statement.

If the only securities being registered on this Form are being offered pursuant to dividend or interest reinvestment plans, please check the following box.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, as amended, other than securities offered only in connection with dividend or interest reinvestment plans, check the following box.

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this Form is a registration statement pursuant to General Instruction I.D. or a post-effective amendment thereto that shall become effective upon filing with the Commission pursuant to Rule 462(e) under the Securities Act, check the following box.

If this Form is a post-effective amendment to a registration statement filed pursuant to General Instruction I.D. filed to register additional securities or additional classes of securities pursuant to Rule 413(b) under the Securities Act, check the following box.

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer
Non-accelerated filer

Accelerated filer
Smaller reporting company
Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 7(a)(2)(B) of the Securities Act.

CALCULATION OF REGISTRATION FEE

Title of Each Class of Securities to be Registered	Amount to be Registered	Proposed Maximum Offering Price Per Unit	Proposed Maximum Aggregate Offering Price	Amount of Registration Fee (1)
Primary Offering: Common Stock, par value \$0.0001 per share	(2)	(3)	(3)	—
Primary Offering: Preferred Stock, par value \$0.0001 per share	(2)	(3)	(3)	—
Primary Offering: Debt Securities	(2)	(3)	(3)	—
Primary Offering: Warrants	(2)	(3)	(3)	—
Primary Offering: Total	(2)	(3)	\$300,000,000.00	\$32,730.00
Secondary Offering (4): Common Stock, par value \$0.0001 per share	1,774,240	\$38.37	\$68,077,588.80	\$7,427.26
Total				\$40,157.26

- (1) The proposed maximum offering price per unit, proposed maximum aggregate offering price and amount of registration fee have been calculated pursuant to (a) Rule 457(o) under the Securities Act of 1933, as amended, or the Securities Act, with respect to the primary offering of shares of common stock, preferred stock, debt securities and warrants, and (b) Rule 457(c) of the Securities Act with respect to the secondary offering of shares of common stock based on the average of the high and low prices reported for the Registrant's common stock traded on the Nasdaq Global Market on December 29, 2020.
- (2) With respect to the primary offering, there are being registered hereunder such indeterminate number of shares of common stock and preferred stock, such indeterminate principal amount of debt securities and such indeterminate number of warrants to purchase common stock, preferred stock or debt securities as may be sold by the Registrant from time to time, which together shall have an aggregate initial offering price not to exceed \$300,000,000. If any debt securities are issued at an original issue discount, then the principal amount of such debt securities shall be in such greater principal amount as shall result in an aggregate offering price not to exceed \$300,000,000, less the aggregate dollar amount of all securities previously issued hereunder. Any securities registered hereunder may be sold separately or in combination with other securities registered hereunder. The proposed maximum offering price of the securities will be determined, from time to time, by the Registrant in connection with the issuance by the Registrant of the securities registered hereunder. The securities registered hereunder also include such indeterminate number of shares of common stock and preferred stock and amount of debt securities as may be issued upon conversion of or exchange for preferred stock or debt securities that provide for conversion or exchange, upon exercise of warrants or pursuant to the antidilution provisions of any such securities. In addition, pursuant to Rule 416 under the Securities Act, the shares being registered hereunder include such indeterminate number of shares of common stock and preferred stock as may be issuable with respect to the shares being registered hereunder as a result of stock splits, stock dividends or similar transactions.
- (3) The proposed maximum aggregate offering price per class of security will be determined from time to time by the Registrant in connection with the issuance by the Registrant of the securities registered hereunder and is not specified as to each class of security pursuant to General Instruction II.D. of Form S-3 under the Securities Act.
- (4) Pursuant to Rule 416 under the Securities Act, the shares being registered hereunder include such indeterminate number of shares of common stock as may be issuable with respect to the shares being registered hereunder as a result of stock splits, stock dividends or similar transactions.

The Registrant hereby amends this registration statement on such date or dates as may be necessary to delay its effective date until the Registrant shall file a further amendment that specifically states that this registration statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933, as amended, or until this registration statement shall become effective on such date as the Securities and Exchange Commission, acting pursuant to said Section 8(a), may determine.

The information contained in this preliminary prospectus is not complete and may be changed. We may not sell these securities or accept an offer to buy these securities until the registration statement filed with the Securities and Exchange Commission is effective. This preliminary prospectus is not an offer to sell these securities and it is not soliciting offers to buy these securities in any state where such offer or sale is not permitted.

SUBJECT TO COMPLETION, DATED DECEMBER 30, 2020

PROSPECTUS



\$300,000,000

**Common Stock
Preferred Stock
Debt Securities
Warrants
and**

**1,774,240 Shares of
Common Stock**

Offered by the Selling Stockholder

We may, from time to time, offer and sell up to \$300,000,000 of any combination of the securities described in this prospectus, either individually or in combination, at prices and on terms described in one or more supplements to this prospectus. We may also offer common stock or preferred stock upon conversion of debt securities, or common stock upon conversion of preferred stock, or common stock, preferred stock or debt securities upon exercise of warrants. In addition, the selling stockholder to be named in the applicable prospectus supplement may offer and sell up to an aggregate of 1,774,240 shares of our common stock, from time to time, on the terms described in this prospectus or in an applicable prospectus supplement. We will not receive any of the proceeds from the sale of the shares offered by the selling stockholder hereunder. To the extent that any selling stockholder resells any securities, the selling stockholder may be required to provide you with this prospectus and a prospectus supplement identifying and containing specific information about the selling stockholder and the terms of the securities being offered.

This prospectus describes some of the general terms that may apply to an offering of our securities. We will provide the specific terms of these offerings and securities in one or more supplements to this prospectus. We may also authorize one or more free writing prospectuses to be provided to you in connection with these offerings. The prospectus supplement and any related free writing prospectus may also add, update or change information contained in this prospectus. You should carefully read this prospectus, the applicable prospectus supplement and any related free writing prospectus, as well as the documents incorporated by reference, before buying any of the securities being offered.

This prospectus may not be used to consummate a sale of securities unless accompanied by a prospectus supplement.

We and the selling stockholder may sell the securities through underwriters or dealers, directly to purchasers or through agents designated from time to time. For additional information on the methods of sale, you should refer to the section entitled "[Plan of Distribution](#)" in this prospectus on page 78 and in the applicable prospectus supplement. If any underwriters are involved in the sale of any securities with respect to which this prospectus is being delivered, the names of such underwriters and any applicable discounts or commissions and over-allotment options will be set forth in a prospectus supplement. The price to the public of such securities and the net proceeds we expect to receive from such sale will also be set forth in a prospectus supplement.

Our common stock is listed on the Nasdaq Global Market under the symbol "PSNL." On December 29, 2020, the last reported sale price of our common stock on the Nasdaq Global Market was \$38.52 per share. The applicable prospectus supplement will contain information, where applicable, as to other listings, if any, on the Nasdaq Global Market or other securities exchange of the securities covered by the prospectus supplement.

Investing in our securities involves a high degree of risk. You should review carefully the risks and uncertainties described under the heading "[Risk Factors](#)" contained in this prospectus on page 7, in our most recent [Annual Report on Form 10-K](#) and [Quarterly Report on Form 10-Q](#) incorporated by reference into this prospectus, in the applicable prospectus supplement and in any free writing prospectuses we have authorized for use in connection with a specific offering, and under similar headings in the other documents that are incorporated by reference into this prospectus.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

We are an "emerging growth company" under the federal securities laws and are subject to reduced public company reporting requirements.

The date of this prospectus is _____, 2020.

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You should rely only on the information contained in, or incorporated by reference into, this prospectus and the applicable prospectus supplement, along with the information contained in any free writing prospectuses we have authorized for use in connection with a specific offering. We have not authorized anyone to provide you with different information. We are not making an offer to sell or seeking an offer to buy securities under this prospectus or the applicable prospectus supplement and any related free writing prospectus in any jurisdiction where the offer or sale is not permitted. The information contained in this prospectus, the applicable prospectus supplement or any related free writing prospectus, and the documents incorporated by reference herein and therein, are accurate only as of their respective dates, regardless of the time of delivery of this prospectus, the applicable prospectus supplement or any related free writing prospectus, or any sale of a security.

ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement on Form S-3 that we filed with the Securities and Exchange Commission, or SEC, using a “shelf” registration process under the Securities Act of 1933, as amended, or the Securities Act. Under this shelf registration statement, we may sell from time to time in one or more offerings up to a total dollar amount of \$300,000,000 of common stock and preferred stock, various series of debt securities and/or warrants to purchase any of such securities, either individually or in combination with other securities as described in this prospectus. In addition, under this shelf process, the selling stockholder to be named in a supplement to this prospectus may, from time to time, offer and sell up to 1,774,240 shares of our common stock, as described in this prospectus, in one or more offerings. This prospectus provides you with a general description of the securities we and the selling stockholder may offer.

Each time we or the selling stockholder sell any type or series of securities under this prospectus, we will provide a prospectus supplement that will contain more specific information about the terms of that offering. We may also authorize one or more free writing prospectuses to be provided to you that may contain material information

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relating to these offerings. We may also add, update or change in a prospectus supplement or free writing prospectus any of the information contained in this prospectus or in the documents we have incorporated by reference into this prospectus. This prospectus, together with the applicable prospectus supplement, any related free writing prospectus and the documents incorporated by reference into this prospectus and the applicable prospectus supplement, will include all material information relating to the applicable offering. You should carefully read both this prospectus and the applicable prospectus supplement and any related free writing prospectus, together with the additional information described under “Where You Can Find More Information,” before buying any of the securities being offered.

This prospectus may not be used to consummate a sale of securities unless accompanied by a prospectus supplement.

Neither we nor the selling stockholder have authorized anyone to provide you with any information other than contained in, or incorporated by reference into, this prospectus and the applicable prospectus supplement, along with the information contained in any free writing prospectuses we or the selling stockholder have authorized for use in connection with a specific offering. We take no responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. This prospectus is an offer to sell only the securities offered hereby, but only under circumstances and in jurisdictions where it is lawful to do so. You should not assume that the information contained in or incorporated by reference in this prospectus or any prospectus supplement or in any such free writing prospectus is accurate as of any date other than their respective dates. Our business, financial condition, results of operations and prospects may have changed since those dates.

This prospectus contains and incorporates by reference market data and industry statistics and forecasts that are based on independent industry publications and other publicly available information. Although we believe that these sources are reliable, we do not guarantee the accuracy or completeness of this information and we have not independently verified this information. Although we are not aware of any misstatements regarding the market and industry data presented in this prospectus and the documents incorporated herein by reference, these estimates involve risks and uncertainties and are subject to change based on various factors, including those discussed under the heading “Risk Factors” contained in the applicable prospectus supplement and any related free writing prospectus, and under similar headings in the other documents that are incorporated by reference into this prospectus. Accordingly, investors should not place undue reliance on this information.

This prospectus contains summaries of certain provisions contained in some of the documents described herein, but reference is made to the actual documents for complete information. All of the summaries are qualified in their entirety by the actual documents. Copies of some of the documents referred to herein have been filed, will be filed or will be incorporated by reference as exhibits to the registration statement of which this prospectus is a part, and you may obtain copies of those documents as described below under the section entitled “Where You Can Find More Information.”

Except as otherwise indicated herein or as the context otherwise requires, references in this prospectus to “Personalis,” “the company,” “we,” “us,” “our” and similar references refer to Personalis, Inc., a corporation under the laws of the State of Delaware.

This prospectus and the information incorporated herein by reference include trademarks, service marks and trade names owned by us or other companies. All trademarks, service marks and trade names included or incorporated by reference into this prospectus, any applicable prospectus supplement or any related free writing prospectus are the property of their respective owners.

PROSPECTUS SUMMARY

This summary highlights selected information contained elsewhere in this prospectus or incorporated by reference herein and does not contain all of the information that you need to consider in making your investment decision. You should carefully read the entire prospectus, the applicable prospectus supplement and any related free writing prospectus, including the risks of investing in our securities discussed under the heading “Risk Factors” contained in this prospectus, the applicable prospectus supplement and any related free writing prospectus, and under similar headings in the other documents that are incorporated by reference into this prospectus. You should also carefully read the information incorporated by reference into this prospectus, including our financial statements and related notes, and the exhibits to the registration statement of which this prospectus is a part, before making your investment decision.

PERSONALIS, INC.

Overview

We are a growing cancer genomics company transforming the development of next-generation therapies by providing more comprehensive molecular data about each patient’s cancer and immune response. We designed our NeXT Platform to adapt to the complex and evolving understanding of cancer, providing our biopharmaceutical customers with information on all of the approximately 20,000 human genes, together with the immune system, in contrast to many cancer panels that cover roughly 50 to 500 genes. In parallel with the development of our platform technology, we have also pursued business within the population sequencing market, and we have provided whole genome sequencing services under contract with the U.S. Department of Veterans Affairs (the “VA”) Million Veteran Program (the “VA MVP”), which has enabled us to innovate, scale our operational infrastructure, and achieve greater efficiencies in our lab. In September 2020, we announced receipt of a new task order from the VA MVP with an approximate value of up to \$31 million. The cumulative value of task orders received to date from the VA MVP has increased to approximately \$175 million.

In August 2020, we launched a liquid biopsy assay that analyzes all of the approximately 20,000 human genes versus the more narrowly focused liquid biopsy assays that are currently available. By combining technological innovation, operational scale, and regulatory differentiation, our NeXT Platform is designed to help our customers obtain new insights into the mechanisms of response and resistance to therapy as well as new potential therapeutic targets. Our platform enhances the ability of biopharmaceutical companies to unlock the potential of conducting translational research in the clinic rather than with pre-clinical animal models or cancer cell lines. We also announced in January 2020 a diagnostic based on our NeXT Platform that we envision being used initially by both leading clinical cancer centers as well as biopharmaceutical companies.

Company Information

We were incorporated under the laws of the state of Delaware in February 2011 under the name Personalis, Inc. Our principal executive offices are located at 1330 O’Brien Drive, Menlo Park, California 94025. Our telephone number is (650) 752-1300. Our website address is <https://www.personalis.com>. The information contained in, or accessible through, our website does not constitute part of this prospectus, should not be relied on in determining whether to make an investment decision, and the inclusion of our website address in this prospectus is an inactive textual reference only.

The Personalis logo and other trademarks or service marks of Personalis, Inc. appearing in this prospectus are the property of Personalis, Inc. Other trademarks, service marks or trade names appearing in this prospectus are the property of their respective owners. We do not intend our use or display of other companies’ trade names, trademarks or service marks to imply a relationship with, or endorsement or sponsorship of us by, these other companies.

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Risks Associated with our Business

Our business is subject to numerous risks, as described under the heading “Risk Factors” contained in the applicable prospectus supplement and in any free writing prospectuses we have authorized for use in connection with a specific offering, and under similar headings in the documents that are incorporated by reference into this prospectus.

Description of Securities We May Offer

We may offer shares of our common stock and preferred stock, various series of debt securities and/or warrants to purchase any of such securities, either individually or in combination, with a total dollar amount up to \$300,000,000 from time to time under this prospectus, together with the applicable prospectus supplement and any related free writing prospectus, at prices and on terms to be determined at the time of any offering. We may also offer common stock, preferred stock and/or debt securities upon the exercise of warrants. In addition, the selling stockholder to be named in a supplement to this prospectus may offer or sell, from time to time, up to 1,774,240 shares of our common stock. This prospectus provides you with a general description of the securities we may offer. Each time we or the selling stockholder offer a type or series of securities under this prospectus, we will provide a prospectus supplement that will describe the specific amounts, prices and other important terms of the securities, including, to the extent applicable:

- designation or classification;
- aggregate principal amount or aggregate offering price;
- maturity;
- original issue discount;
- rates and times of payment of interest or dividends;
- redemption, conversion, exercise, exchange or sinking fund terms;
- ranking;
- restrictive covenants;
- voting or other rights;
- conversion or exchange prices or rates and, if applicable, any provisions for changes to or adjustments in the conversion or exchange prices or rates and in the securities or other property receivable upon conversion or exchange; and
- a discussion of material United States federal income tax considerations, if any.

The applicable prospectus supplement and any related free writing prospectus that we may authorize to be provided to you may also add, update or change any of the information contained in this prospectus or in the documents we have incorporated by reference. However, no prospectus supplement or free writing prospectus will offer a security that is not registered and described in this prospectus at the time of the effectiveness of the registration statement of which this prospectus is a part.

This prospectus may not be used to consummate a sale of securities unless it is accompanied by a prospectus supplement.

We or the selling stockholder may sell the securities directly to investors or to or through agents, underwriters or dealers. We and the selling stockholder, and our or their agents, underwriters or dealers reserve the right to accept or reject all or part of any proposed purchase of securities. If we do offer securities to or through agents, underwriters or dealers, we will include in the applicable prospectus supplement:

- the names of those agents, underwriters or dealers;
- applicable fees, discounts and commissions to be paid to them;

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- details regarding over-allotment options, if any; and
- the net proceeds to us, if any.

Common Stock

We may issue shares of our common stock from time to time. The selling stockholder may offer shares of our common stock to the extent such shares were issued and outstanding, or issuable upon exercise or conversion of securities issued and outstanding, prior to the original date of filing of the registration statement to which this prospectus relates. Each holder of our common stock is entitled to one vote for each share on all matters submitted to a vote of the stockholders, including the election of directors. Under our amended and restated certificate of incorporation, or certificate of incorporation, and amended and restated bylaws, or bylaws, our stockholders do not have cumulative voting rights. Because of this, the holders of a majority of the shares of common stock entitled to vote in any election of directors can elect all of the directors standing for election, if they should so choose. Subject to preferences that may be applicable to any then-outstanding preferred stock, holders of common stock are entitled to receive ratably those dividends, if any, as may be declared from time to time by our board of directors out of legally available funds. In the event of our liquidation, dissolution or winding up, holders of common stock are entitled to share ratably in the net assets legally available for distribution to stockholders after the payment of all of our debts and other liabilities and the satisfaction of any liquidation preference granted to the holders of any then-outstanding shares of preferred stock. Holders of common stock have no preemptive, conversion or subscription rights and there are no redemption or sinking fund provisions applicable to the common stock. The rights, preferences and privileges of the holders of common stock are subject to, and may be adversely affected by, the rights of the holders of shares of any series of preferred stock that we may designate in the future. In this prospectus, we have summarized certain general features of the common stock under “Description of Capital Stock—Common Stock.” We urge you, however, to read the applicable prospectus supplement (and any related free writing prospectus that we may authorize to be provided to you) related to any common stock being offered.

Preferred Stock

We may issue shares of our preferred stock from time to time, in one or more series. Our board of directors will determine the designations, voting powers, preferences and rights of the preferred stock, as well as the qualifications, limitations or restrictions thereof, including dividend rights, conversion rights, preemptive rights, terms of redemption or repurchase, liquidation preferences, sinking fund terms and the number of shares constituting any series or the designation of any series, or the designation of such series, any or all of which may be greater than the rights of our common stock. Convertible preferred stock will be convertible into our common stock or exchangeable for other securities. Conversion may be mandatory or at your option and would be at prescribed conversion rates.

If we sell any series of preferred stock under this prospectus, we will fix the designations, voting powers, preferences and rights of such series of preferred stock, as well as the qualifications, limitations or restrictions thereof, in the certificate of designation relating to that series. We will file as an exhibit to the registration statement of which this prospectus is a part, or will incorporate by reference from reports that we file with the SEC, the form of any certificate of designation that describes the terms of the series of preferred stock that we are offering before the issuance of the related series of preferred stock. In this prospectus, we have summarized certain general features of the preferred stock under “Description of Capital Stock—Preferred Stock.” We urge you to read the applicable prospectus supplement (and any free writing prospectus that we may authorize to be provided to you) related to the series of preferred stock being offered, as well as the complete certificate of designation that contains the terms of the applicable series of preferred stock.

Debt Securities

We may issue debt securities from time to time, in one or more series, as either senior or subordinated debt or as senior or subordinated convertible debt. The senior debt securities will rank equally with any other unsecured and

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unsubordinated debt. The subordinated debt securities will be subordinate and junior in right of payment, to the extent and in the manner described in the instrument governing the debt, to all of our senior indebtedness. Convertible or exchangeable debt securities will be convertible into or exchangeable for our common stock or our other securities. Conversion or exchange may be mandatory or optional (at our option or the holders' option) and would be at prescribed conversion or exchange rates.

Any debt securities issued under this prospectus will be issued under one or more documents called indentures, which are contracts between us and a national banking association or other eligible party, as trustee. In this prospectus, we have summarized certain general features of the debt securities under "Description of Debt Securities." We urge you, however, to read the applicable prospectus supplement (and any free writing prospectus that we may authorize to be provided to you) related to the series of debt securities being offered, as well as the complete indenture and any supplemental indentures that contain the terms of the debt securities. A form of indenture has been filed as an exhibit to the registration statement of which this prospectus is a part, and supplemental indentures and forms of debt securities containing the terms of the debt securities being offered will be filed as exhibits to the registration statement of which this prospectus is a part or will be incorporated by reference from reports that we file with the SEC.

Warrants

We may issue warrants for the purchase of common stock, preferred stock and/or debt securities in one or more series. We may issue warrants independently or in combination with common stock, preferred stock and/or debt securities offered by any prospectus supplement. In this prospectus, we have summarized certain general features of the warrants under "Description of Warrants." We urge you, however, to read the applicable prospectus supplement (and any related free writing prospectus that we may authorize to be provided to you) related to the particular series of warrants being offered, as well as any warrant agreements and warrant certificates, as applicable, that contain the terms of the warrants. We have filed forms of the warrant agreements and forms of warrant certificates containing the terms of the warrants that may be offered as exhibits to the registration statement of which this prospectus is a part. We will file as exhibits to the registration statement of which this prospectus is a part, or will incorporate by reference from reports that we file with the SEC, the form of warrant and/or the warrant agreement and warrant certificate, as applicable, that contain the terms of the particular series of warrants we are offering, and any supplemental agreements, before the issuance of such warrants.

Any warrants issued under this prospectus may be evidenced by warrant certificates. Warrants also may be issued under an applicable warrant agreement that we enter into with a warrant agent. We will indicate the name and address of the warrant agent, if applicable, in the prospectus supplement relating to the particular series of warrants being offered.

Use of Proceeds

Except as described in any applicable prospectus supplement or in any free writing prospectus we have authorized for use in connection with a specific offering, we currently intend to use the net proceeds from the sale of our securities offered by us hereunder, if any, for working capital, capital expenditures and other general corporate purposes. See the section entitled "[Use of Proceeds](#)" on page 58 of this prospectus.

We will not receive any proceeds from the sale of shares of our common stock by any selling stockholder.

Selling Stockholder

The selling stockholder is an entity that acquired shares of our common stock in open market transactions in June 2020 and in our public offering in August 2020. See the section entitled "[Selling Stockholder](#)" on page 77 of this prospectus.

SUMMARY OF RISK FACTORS

Investing in our securities involves a high degree of risk. The following is a summary of the principal risks and uncertainties that could materially adversely affect our business, financial condition, or results of operations. You should read this summary together with the more detailed description of risk factors contained under the heading “Risk Factors” in this prospectus on page 7, as well as in the applicable prospectus supplement and in any free writing prospectuses we have authorized for use in connection with a specific offering.

Operational, Strategic and Business Risks

- We have a history of losses and we expect to incur significant losses for the foreseeable future and may not be able to generate sufficient revenues to achieve or sustain profitability.
- If we are unable to increase sales of our current services or successfully develop and commercialize other services or products, or are unable to successfully compete with our competitors, we may fail to generate sufficient revenues to achieve profitability and sustain our business.
- Our operations and employees face risks related to health crises, such as the ongoing COVID-19 pandemic, that could adversely affect our operations and the business or operations of our customers or other third parties with whom we conduct business, our financial condition, and our operating results.
- A limited number of customers account for a substantial portion of our revenues and accounts receivable; in particular, we derive a substantial portion of our revenues from our largest customer, the VA MVP.
- We rely on a limited number of suppliers, or in some cases, a sole supplier, for some laboratory instruments and materials, and we may not be able to replace or immediately transition to alternative suppliers if necessary.
- We will need to invest in our infrastructure in advance of increased demand for our services; our failure to accurately forecast demand would negatively impact our business and ability to achieve or sustain profitability.
- If our facilities become damaged or inoperable, or we are required to vacate the facilities, our ability to sell and provide our services and pursue our research and development efforts may be jeopardized.
- If we cannot continue timely developing and improving our services and products to keep pace with rapid advances in technology, medicine, and science our operating results and competitive position could be harmed.
- Personalized cancer therapies represent new therapeutic approaches that could result in heightened regulatory scrutiny, delays in clinical development, or delays in or inability to achieve regulatory approval, commercialization, or payor coverage, any of which could adversely affect our business.
- The loss of key members of our executive management team or the inability to hire, retain, or motivate highly skilled personnel could adversely affect our business.
- We may not be able to manage our growth effectively, which could prevent execution of our business strategy.
- We may acquire businesses or assets, form joint ventures, or make investments in other companies or technologies that could harm our operating results, dilute stockholders’ ownership, or cause us to incur debt or significant expense.
- Expansion into China and other international markets will subject us to increased regulatory oversight and regulatory, economic, social, health and political uncertainties.

Regulatory, Legal and Cybersecurity Risks

- Complying with numerous statutes and regulations pertaining to our business is an expensive and time-consuming process, and we may be subject to regulatory action if we or our service or product offerings do not comply with applicable requirements.
- Our internal information technology systems, or those of our third-party vendors, contractors, or consultants, may fail or suffer security breaches, loss or leakage of data, and other disruptions, which could adversely affect our business.

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- Our employees may engage in misconduct or other improper activities, such as noncompliance with regulatory standards and requirements, including the Foreign Corrupt Practices Act of 1977 and other anti-bribery laws, which could cause significant liability for us and harm our reputation.
- Changes in health care policy could increase our costs, decrease our revenues, and impact sales of and reimbursement for our tests. If we decide to grow our business by developing in vitro diagnostic tests, we may be subject to reimbursement challenges.

Intellectual Property Risks

- Litigation or other proceedings or claims of intellectual property infringement, misappropriation, breach of license terms or other violations may require us to spend significant time and money, including damages, and could prevent us from selling our tests.
- If we cannot license rights to use necessary technologies on reasonable terms, we may not be able to commercialize new products.
- If we are not able to obtain, maintain and enforce patent protection for our products, services or technologies, our competitors and other third parties could develop and commercialize products, services and technologies similar or identical to ours, and our ability to successfully commercialize our products, services, and technologies may be adversely affected.
- If we are unable to protect the confidentiality of our trade secrets and know-how, our business would be harmed.
- Our use of “open source” software could subject our proprietary software to general release, adversely affect our ability to sell our products and services, and subject us to possible litigation.
- If our trademarks and trade names are not adequately protected, then we may not be able to build name recognition in our markets of interest and our business may be adversely affected.

Financial and Market Risks and Risks Related to Owning Our Common Stock

- Certain of our customers prepay us for a portion of the future services that they expect to order and we may be required to refund some or all of those prepayments in the event of a cancellation or a reduction of services.
- Our inability to raise additional capital on acceptable terms may adversely affect operations or expansion.
- The market price of our common stock may be volatile or may decline steeply or suddenly regardless of our operating performance, we may not be able to meet investor or analyst expectations, and you may lose all or part of your investment.
- Our quarterly results may fluctuate significantly, which could adversely impact our common stock’s value.
- Insiders may exercise significant control over our company and will be able to influence corporate matters.
- Sales of shares by existing stockholders, the perception that such sales could occur, or future sales and issuances by us of our common stock or rights to purchase common stock could cause the stock price of our common stock to decline.
- Achieving a return on your investment will depend on appreciation of the value of our common stock.
- If securities or industry analysts do not publish research or reports about our business, or publish inaccurate or unfavorable research about our business, our stock price and trading volume could decline.
- Our ability to use net operating losses to offset future taxable income may be subject to limitations.
- Delaware law and provisions in our amended and restated certificate of incorporation and amended and restated bylaws could make a merger, tender offer, or proxy contest difficult, thereby depressing the trading price of our common stock; our amended and restated certificate of incorporation has an exclusive forum provision, which could limit our stockholders’ ability to obtain a favorable judicial forum for disputes with us or our directors, officers, or employees.
- Material weaknesses in our internal control over financial reporting may cause us to fail to timely and accurately report our financial results or result in a material misstatement of our financial statements. Our disclosure controls and procedures may not prevent or detect all errors or acts of fraud.

RISK FACTORS

Investing in our securities involves a high degree of risk. Before deciding whether to invest in our securities, you should consider carefully the risks and uncertainties described below, under the heading “Risk Factors” contained in the applicable prospectus supplement and any related free writing prospectuses we have authorized for use in connection with a specific offering, and discussed under the section entitled “Risk Factors” contained in our most recent Annual Report on Form 10-K and in our most recent Quarterly Report on Form 10-Q, as well as any amendments thereto reflected in subsequent filings with the SEC, which are incorporated by reference into this prospectus in their entirety, together with other information in this prospectus, the documents incorporated by reference and any free writing prospectus that we may authorize for use in connection with this offering.

The risks described in these documents are not the only ones we face, but those that we consider to be material. There may be other unknown or unpredictable economic, business, competitive, regulatory or other factors that could have material adverse effects on our future results. Past financial performance may not be a reliable indicator of future performance, and historical trends should not be used to anticipate results or trends in future periods. If any of these risks actually occurs, our business, financial condition, results of operations or cash flow could be seriously harmed. This could cause the trading price of our common stock to decline, resulting in a loss of all or part of your investment. Please also read carefully the section below entitled “Forward-Looking Statements.”

Operational, Strategic and Business Risks

We have a history of losses, and as our costs increase, we expect to incur significant losses for the foreseeable future and may not be able to generate sufficient revenues to achieve or sustain profitability.

We have incurred net losses since our inception. For the nine months ended September 30, 2020 we had a net loss of \$27.9 million, and for the years ended December 31, 2019, 2018, and 2017 we had net losses of \$25.1 million, \$19.9 million, and \$23.6 million, respectively. As of September 30, 2020, we had an accumulated deficit of \$168.5 million. To date, we have not generated sufficient revenues to achieve profitability, and we may never achieve or sustain profitability. In addition, we expect to continue to incur net losses for the foreseeable future, and we expect our accumulated deficit to continue to increase as we focus on scaling our business and operations. Our efforts to sustain and grow our business may be more costly than we expect, and we may not be able to increase our revenues sufficiently to offset our higher operating expenses. Our prior losses and expected future losses have had and will continue to have an adverse effect on our stockholders’ equity and working capital. Our failure to achieve and sustain profitability in the future would negatively affect our business, financial condition, results of operations, and cash flows, and could cause the market price of our common stock to decline.

If we are unable to increase sales of our current services or successfully develop and commercialize other services or products, or if we are unable to execute our sales and marketing strategy for our services or unable to gain sufficient acceptance in the market, we may fail to generate sufficient revenues to achieve profitability and sustain our business.

We currently derive substantially all of our revenues from sales of our services. We began offering our services through our Clinical Laboratory Improvement Amendments of 1988 (“CLIA”)-certified, College of American Pathologists (“CAP”)-accredited, and state-licensed laboratory in 2013. We are in varying stages of research and development for other services and products that we may offer. If we are unable to increase sales of our existing services or successfully develop and commercialize other services and products, we will not generate sufficient revenues to become profitable.

In addition, as a growing genomics company, we have engaged in targeted sales and marketing activities for our services. Although we have had revenues from sales of our services since 2013, our services may never gain

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significant acceptance in the marketplace and therefore may never generate substantial revenues or permit us to become profitable. We will need to further establish and grow the market for our services through the expansion of our current relationships and development of new relationships with biopharmaceutical customers. Gaining acceptance in medical communities can be supported by, among other things, publications in leading peer-reviewed journals of results from studies using our services. The process of publication in leading medical journals is subject to a peer review process and peer reviewers may not consider the results of our studies sufficiently novel or worthy of publication. Failure to have our studies published in peer-reviewed journals would limit the adoption of our services.

Our ability to successfully market our services that we have developed, and may develop in the future, will depend on numerous factors, including:

- our ability to demonstrate the utility and value of our services to our customers;
- the success of our commercial team, including sales and business development personnel;
- the recruitment, hiring, and retention of our commercial team personnel;
- whether biopharmaceutical companies accept that our services are sufficiently sensitive and specific;
- our ability to convince biopharmaceutical companies of the utility of the comprehensiveness of our services and of testing patients at multiple time points;
- our ability to continue to fund sales and marketing activities;
- whether our services are considered superior to those of our competitors;
- any negative publicity regarding our or our competitors' services resulting from defects or errors;
- our success obtaining and maintaining patent and trade secret protection for our services and technologies; and
- our success enforcing and defending intellectual property rights and claims.

Failure to achieve broad market acceptance of our services would materially harm our business, financial condition, and results of operations.

Our operations and employees face risks related to health crises, such as the ongoing COVID-19 pandemic, that could adversely affect our financial condition and operating results. The COVID-19 pandemic could materially affect our operations, including at our headquarters in the San Francisco Bay Area, which is currently subject to shelter-in-place orders, and the business or operations of our customers or other third parties with whom we conduct business.

Our business could be adversely impacted by the effects of a health crisis, such as the ongoing COVID-19 pandemic, that could cause significant disruption in the operations of our customers and third-party suppliers upon whom we rely. Our laboratory facilities, executive team, and most of our employees are located in the San Francisco Bay Area. In the event of a health crisis that becomes widespread in or around the San Francisco Bay Area, we may proactively, or be ordered by government officials to, take precautionary measures such as suspending our lab operations, implementing alternative work arrangements for our employees, and limiting our employees' travel activities.

Our operations have been impacted by the ongoing COVID-19 pandemic. While the state and county reopening and health orders applicable to us allow for continued operation of so-called Essential Businesses, which includes certain critical healthcare operations and services, we have substantially closed our office facilities and limited access to our laboratory facilities, to protect our employees and to comply with the provisions described within the orders. We provided temporary increased pay to certain laboratory personnel in the second quarter for their work during the COVID-19 pandemic. Such increased pay was not provided in the

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third or fourth quarters, but we may decide to resume increased pay in the future. The previous shelter-in-place order and current reopening and health orders have negatively impacted productivity, disrupted our business, and slowed research and development activities due to us limiting access to our laboratory space that would otherwise be used by our research and development group, and, to the extent such orders remain in place, they may continue to cause such effects on our operations. The reopening and health orders may disrupt the ability of our suppliers to fulfill our purchase orders in a timely manner or at all. Additionally, we are aware of increased demand in the market for certain consumables used in COVID-19 test kits. We use such consumables in our operations, and we may face difficulties in acquiring such consumables if our suppliers prioritize orders related to COVID-19. Several of our customers were delayed in sending us samples in the second and third quarters due to the inability to collect or ship samples during the COVID-19 pandemic, and these and additional customers may be disrupted from sending purchase orders and samples to us in the future. Many of our customers, potential customers and potential partners have also put in place policies restricting visitors from other companies, and therefore our sales team and members of management have been unable to meet such parties in person, which may result in reduced acquisition of new customers, fewer orders from existing customers, and fewer potential partnering opportunities. If our laboratory employees were to contract COVID-19, we may significantly curtail our laboratory operations or pause operations altogether until the imminent health risk to our employees subsided. Such disruptions in our operations, and our customers' and suppliers' operations, may continue to adversely affect revenues and operating results.

The global COVID-19 pandemic continues to rapidly evolve and to present serious health risks. While authorities in some areas have lifted or relaxed certain of the restrictions described above, in some cases they have subsequently re-imposed various restrictions after observing an increased rate of COVID-19 cases; for example, in December 2020, state and local authorities in California reinstated shelter-in-place orders in light of the increasing rate of COVID-19 cases and shortage of intensive care unit beds across the state. Furthermore, there is no guarantee when or if all such restrictions will be eliminated, such that we and our customers, manufacturers and suppliers will be able to safely resume operations consistent with our pre-COVID-19 operations. Vaccines against COVID-19 have been approved by the FDA and other regulatory authorities, but there is uncertainty as to when these vaccines will be widely available to our employees and the population at large and how quickly and to what extent the vaccines will impact the COVID-19 pandemic.

While the extent of the impact of the current COVID-19 pandemic on our business and financial results is uncertain, a continued and prolonged public health crisis such as the COVID-19 pandemic could have a material negative impact on our business, financial condition, and operating results.

If we cannot compete successfully with our competitors, we may be unable to increase or sustain our revenues or achieve and sustain profitability.

Our principal competition comes from commercial and academic organizations using established and new laboratory tests to produce information that is similar to the information that we generate for our customers. These commercial and academic organizations may not utilize our services or may not believe them to be superior to those tests that they currently use or others that are developed. Further, it may be difficult to convince our customers to use our comprehensive test rather than simpler panels provided by our competitors. For example, the information that we provide may be more challenging or require additional resources for our customers to interpret than the information provided by our competitors' less comprehensive assays.

Some of our present or potential competitors, including Adaptive Biotechnologies Corporation, C2i Genomics, Inc., Caris Life Sciences, Inc., Covance Inc., which was acquired by Laboratory Corporation of America Holdings in February 2015, Foundation Medicine, Inc., which was acquired by Roche Holdings, Inc. in July 2018, Freenome, Inc., Genosity, Inc., Guardant Health, Inc., Inivata Limited, Invitae Corporation, Mount Sinai Genomics, Inc. which does business under the name Sema4, Natera, Inc., NanoString Technologies, Inc., NeoGenomics, Inc., Personal Genome Diagnostics, Inc., Roche Molecular Systems, Inc., and Tempus, Inc., may have more widespread brand recognition or substantially greater financial or technical resources, development or

production capacities, or marketing capabilities than we do. They may be able to devote greater resources to the development, promotion and sale of their products and services than we do or sell their products and services at prices designed to win more significant levels of market share. In addition, our present or potential competitors may be acquired by, receive investments from, or enter into other commercial relationships with larger, more well-established and well-financed companies. For example, in September 2020, Illumina, Inc. (“Illumina”) announced it had entered into an agreement to acquire GRAIL, Inc. (“GRAIL”), a company focused on early cancer detection and potentially other forms of cancer analysis using next-generation sequencing technology, which we view as a potential competitor. Others may develop lower-priced, less complex products and services that pharmaceutical companies could view as functionally equivalent to our current or planned future services, which could force us to lower the price of our services and impact our operating margins and our ability to achieve and maintain profitability. In addition, companies or governments that control access to genetic testing and related services through umbrella contracts or regional preferences could promote our competitors or prevent us from performing certain services. In addition, technological innovations that result in the creation of enhanced products or diagnostic tools that are more sensitive or specific than ours may enable other clinical laboratories, hospitals, physicians, or medical providers to provide specialized products or services similar to ours in a more patient-friendly, efficient, or cost-effective manner than is currently possible. If we cannot compete successfully against current or future competitors, we may be unable to ensure or increase market acceptance and sales of our current or planned future services, which could prevent us from increasing or sustaining our revenues or achieving or sustaining profitability.

We expect that biopharmaceutical companies will increasingly focus attention and resources on the targeted and personalized cancer diagnostic sector as the potential and prevalence of molecularly targeted oncology therapies approved by the U.S. Food and Drug Administration (the “FDA”) along with companion diagnostics increases. For example, the FDA has approved several such targeted oncology therapies that use companion diagnostics, including the anaplastic lymphoma kinase FISH test from Abbott Laboratories, Inc. for use with Xalkori® from Pfizer Inc., the BRAF kinase V600 mutation test from Roche Molecular Systems, Inc. for use with Zelboraf® from Daiichi-Sankyo/Genentech/Roche, and the BRAF kinase V600 mutation test from bioMerieux for use with Tafenlar® from GlaxoSmithKline. Since companion diagnostic tests are part of FDA labeling, non-FDA cleared tests, such as the ones we currently offer as part of our services, would be considered an off-label use and this may limit our access to this market segment. Our customers and potential customers may request, or in some cases have requested, that we consider developing and seeking FDA approval for companion diagnostic tests to accompany those customers’ therapeutic product candidates, and it may be necessary for us to do so in order to successfully compete for the business of these customers. If we do not successfully develop FDA-approved companion diagnostics, we may be at a competitive disadvantage and may be unable to increase market acceptance and sales of our other product offerings, which would prevent us from increasing or sustaining our revenues or achieving or sustaining profitability. If we were to develop one or more FDA-approved companion diagnostics, we would incur increased research and development expenses, and such activities may also divert our resources or the attention of our management and may create competing internal priorities for us.

Additionally, projects related to cancer diagnostics and particularly genomics have received increased government funding, both in the United States and internationally. As more information regarding cancer genomics becomes available to the public, we anticipate that more products and services aimed at identifying treatment options will be developed and that these products and services may compete with our services. In addition, competitors may develop their own versions of our current or planned future services in countries where we did not apply for or receive patents and compete with us in those countries, including encouraging the use of their products or services by biopharmaceutical companies in other countries.

We have substantial customer concentration, with a limited number of customers accounting for a substantial portion of our revenues and accounts receivable.

Like other genomic profiling companies that sell to the pharmaceutical industry, we have substantial customer concentration. We currently derive a significant portion of our revenues from the U.S. Department of Veterans Affairs (the “VA”) Million Veteran Program (the “VA MVP”), which accounted for 71% and 75% of our revenues for the three and nine months ended September 30, 2020. Our top five customers, including the VA MVP, accounted for 85% and 88% of our revenues for the three and nine months ended September 30, 2020, respectively. There are inherent risks whenever a large percentage of revenues are concentrated with a limited number of customers. Our predictions regarding the future level of demand for our services that will be generated by these customers may be wrong. In addition, revenues from our larger customers have historically fluctuated and may continue to fluctuate based on the commencement and completion of clinical trials or other projects, the timing of which may be affected by market conditions or other factors, some of which may be outside of our control. Further, while we have long-term contractual arrangements with certain of our customers, these customers are not required to purchase a minimum number of analyses. Some of our customers have in the past suspended or terminated clinical trials or projects, received less funding than expected, experienced declining or delayed sales, or otherwise decided to reduce or eliminate their use of our services, and these and other customers may also do so in the future. As a result, we could be pressured to reduce the prices we charge for our services, which would have an adverse effect on our margins and financial position, and which would likely negatively affect our revenues and results of operations. In particular, if the VA MVP terminates our services for convenience, which it is permitted to do, such termination would have a material adverse effect on our revenues, cash position, and results of operations. Similarly, if the VA MVP was eliminated, awarded its contract to one of our competitors, further reduced the size of our contract or failed to renew our contract in the future, then our revenues, cash position, and results of operations would be materially adversely impacted. Further, if any of our other significant customers were to cease using or stop payment for our services, it would have a material adverse effect on our accounts receivable, increasing our credit risk. The failure of these customers to pay their balances, or any customer to pay future outstanding balances, would result in an operating expense and reduce our cash flows.

We currently derive a substantial portion of our revenues from DNA sequencing and data analysis services that we provide to our largest customer, the VA MVP. If the VA MVP’s demand for and/or funding for our DNA sequencing and data analysis services is substantially reduced or if the VA MVP conducts a competitive bid process for the next contract and we do not win, our business, financial condition, operating results, and cash flows would be materially harmed.

We derive a substantial portion of our current and expected future revenues from sales of our DNA sequencing and data analysis services to the VA MVP. In September 2017, we entered into a one-year contract with three one-year option renewal periods with the VA for the VA MVP, pursuant to which we received contracted orders from the VA MVP in September 2017, 2018, 2019, and 2020. The VA MVP may initiate a competitive bidding process for its next DNA sequencing and data analysis services contract. We may not win any potential new contract in such bidding process, the value of such contract or the VA MVP contracted orders thereunder may be lower than our current contract and historical contracted orders from the VA MVP, and/or the scope or nature of the services required under such new contract may change such that we are unable to serve the VA MVP in the future.

The VA MVP’s contracted orders for DNA sequencing and data analysis services have fluctuated in value over time and are subject to the availability of funding, enrollment of veterans in the VA MVP study, and the VA MVP’s continued demand for our services among other factors. For example, the VA MVP contracted order received in September 2020 has a value of up to approximately \$31 million, whereas the VA MVP contracted order received in September 2019 had a value of up to approximately \$38.1 million. We have no certainty that funding will be made available for our services, or that the VA MVP will award any future contracts, contract renewals or contracted orders to us. If the priorities of the VA, the VA MVP, or the U.S. government change, including in response to the COVID-19 pandemic for example, funding for our services may be limited or not available, and our business, financial condition, and operating results and cash flows would be materially

harm. Similarly, if we do not win future VA MVP contracts and renewals (whether due to being outbid by a competitor or the VA MVP's decision to terminate for convenience or failure to renew for whatever reason), our business, financial condition, and operating results and cash flows would be materially harmed. The success of our business and our future operating results are significantly dependent on the VA MVP's receipt of funding for use of our services and the terms of our sales to the VA MVP, including the price per sample, the number of samples and the timing of the VA MVP's deliveries of samples. Furthermore, we only recognize revenue under our VA MVP contract upon the receipt and processing of samples, and the timing and number of VA MVP samples we receive has been and could in the future be negatively affected by factors beyond our control, which has resulted, and may result in the future, in delaying our ability to process and recognize revenue for such samples. For example, the revenue we recognized during the contract year that began in September 2019 significantly exceeded the value of the VA MVP contracted order we received in September 2019 because we continued to receive after such date, and subsequently processed, samples under VA MVP contracted orders that remained unfulfilled as of September 2019 due to the time required for the VA to select optimal samples from its collection for research and then provide us those samples. Therefore, period-to-period comparisons of our operating results relating to VA MVP contracted orders may not be meaningful and, even if we win a potential new VA MVP contract and order with a value comparable to that of the September 2019 contracted order, the revenue we recognize under such potential new contract and order may be less than the revenue we recognized during the 2019-2020 contract year, and may also be less than the revenue we expect to recognize during the 2020-2021 contract year because we expect during the current contract year to finish processing most or all of the samples under VA MVP contracted orders that remained unfulfilled as of September 2020, in addition to samples received under the September 2020 contracted order. The timing and number of VA MVP samples may also have been or be negatively affected by the current COVID-19 pandemic. In addition, we believe the COVID-19 pandemic may have been a contributing factor to the reduction in value of the September 2020 VA MVP contracted order compared to the September 2019 contracted order, as the VA MVP delayed new enrollment and also may have needed to divert resources to respond to the pandemic, and the COVID-19 pandemic may also negatively impact the value of any potential new VA MVP contract or order.

If we cannot maintain our current customer relationships, or fail to acquire new customers, our revenue prospects will be reduced. Many of our customers are biopharmaceutical companies engaged in clinical trials of new drug candidates, which trials are expensive, can take many years to complete, and have inherently uncertain outcomes.

Our customers other than the VA MVP are primarily biopharmaceutical companies that use our services to support clinical trials. Our future success is substantially dependent on our ability to maintain our customer relationships and to establish new ones. Many factors have the potential to impact our customer relations, including the type of support our customers and potential customers require and our ability to deliver it, our customers' satisfaction with our services, and other factors that may be beyond our control. Furthermore, our customers may decide to decrease or discontinue their use of our services due to changes in research and product development plans (including as a result of the COVID-19 pandemic), failures in their clinical trials, financial constraints, or utilization of internal testing resources or tests performed by other parties, or other circumstances outside of our control.

We engage in conversations with customers regarding potential commercial opportunities on an ongoing basis in the event that one of these customers' drug candidates is approved. There is no assurance that any of these conversations will result in a commercial agreement, or if an agreement is reached, that the resulting relationship will be successful or that clinical studies conducted as part of the engagement will produce successful outcomes. Speculation in the industry about our existing or potential relationships with biopharmaceutical companies could be a catalyst for adverse speculation about us, our services, and our technology, which can adversely affect our reputation and our business. In addition, the termination of these relationships could result in a temporary or permanent loss of revenue.

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Our customers' clinical trials are expensive, can take many years to complete, and their outcome is inherently uncertain. Failure can occur at any time during the clinical trial process. Product candidates in later stages of clinical trials may fail to show the desired safety and efficacy traits despite having progressed through pre-clinical studies and early clinical trials. Many of the biopharmaceutical companies that are our customers do not have products approved for commercial sale and are not profitable. These customers must continue to raise capital in order to continue their development programs and to potentially continue as our customers. If our customers' clinical trials fail or they are unable to raise sufficient capital to continue investing in their clinical programs, our revenues from these customers may decrease or cease entirely, and our business may be harmed. Furthermore, even if these customers have a drug approved for commercial sale, they may not choose to use our services as a companion diagnostic with their drug, thereby limiting our potential revenues.

We rely on a limited number of suppliers, or in some cases, a sole supplier, for some of our laboratory instruments and materials, and we may not be able to find replacements or immediately transition to alternative suppliers should we need to do so.

We rely on a limited number of suppliers for sequencers and other equipment and materials that we use in our laboratory operations. For example, we rely on Illumina as the sole supplier of sequencers and various associated reagents, and as the sole provider of maintenance and repair services for these sequencers. Our master subcontractor agreement with Illumina is set to expire in August 2021, and our various pricing agreements with Illumina are set to expire on various dates up to December 2022. In September 2020, Illumina announced it had entered into an agreement to acquire GRAIL, a company focused on early cancer detection and potentially other forms of cancer analysis using next-generation sequencing technology. Any disruption in Illumina's operations, or our inability to negotiate an extension to our agreements with Illumina on acceptable terms, or at all, or any competitive pressure resulting from Illumina's anticipated acquisition of GRAIL, could negatively impact our supply chain and laboratory operations and our ability to conduct our business and generate revenue. Our suppliers could cease supplying these materials, reagents, and equipment at any time, or fail to provide us with sufficient quantities of materials or materials that meet our specifications. Our laboratory operations could be interrupted if we encounter delays or difficulties in securing equipment, materials, reagents, or sequencers, or if we cannot obtain an acceptable substitute. Any such interruption could significantly affect our business, financial condition, results of operations, and reputation.

We believe that there are only a few manufacturers other than Illumina that are currently capable of supplying and servicing the equipment necessary for our laboratory operations, including sequencers and various associated reagents. The use of equipment or materials provided by these replacement suppliers would require us to alter our laboratory operations. Transitioning to a new supplier would be time-consuming and expensive, would likely result in interruptions in our laboratory operations, could affect the performance specifications of our laboratory operations, or could require that we revalidate our tests. We cannot assure you that, if we were forced to replace Illumina or another supplier on which we rely, we would be able to secure alternative equipment, reagents, and other materials, and bring such equipment, reagents, and materials on line and revalidate them without experiencing interruptions in our workflow. If we encounter delays or difficulties in securing, reconfiguring, or revalidating the equipment and reagents we require for our services, our business, financial condition, results of operations, and reputation could be adversely affected.

In addition, the Device Master File that we have filed with the FDA, which is focused on the technology, quality management, and validation of our platform, specifically on its use for the development of personalized immunotherapies, is predicated on our use of specified equipment and processes, including Illumina sequencers and related equipment. The detailed information in the Device Master File is not shared with our customers, but with our permission they can reference our FDA file number in their Investigational New Drug filings with the FDA. If we were required to transition to a new supplier of sequencers or certain other equipment or processes in our laboratory, our Device Master File would need to be replaced or updated, and until such time as that occurred, customers for which we deliver services after the transition would not be able to reference our Device Master File, which would cause us to lose a competitive advantage.

We will need to invest in our infrastructure in advance of increased demand for our services, and our failure to accurately forecast demand would have a negative impact on our business and our ability to achieve and sustain profitability.

In order to execute our business model, we need to invest in scaling our infrastructure, including hiring additional personnel and expanding laboratory capacity. We will also need to purchase additional equipment, some of which can take several months or more to procure, setup, and validate, and increase our software and computing capacity to meet increased demand. There is no assurance that any of these increases in scale, expansion of personnel, equipment, software, and computing capacities, or process enhancements will be successfully implemented, or that we will have adequate space in our laboratory facilities to accommodate such required expansion. We expect that much of this growth will be in advance of increased demand for our services. Our current and projected future expense levels are to a large extent fixed and are largely based on our current investment plans and our estimates of future test volume. As a result, if revenues do not meet our expectations we may not be able to promptly adjust or reduce our spending to levels commensurate with our revenues. If we fail to generate demand commensurate with our infrastructure growth or if we fail to scale our infrastructure sufficiently in advance of demand to successfully meet such demand, our business, prospects, financial condition, and results of operations could be adversely affected.

As we commercialize additional services or products, we may need to incorporate new equipment, implement new technology systems and laboratory processes, or hire new personnel with different qualifications. Failure to manage this growth or transition could result in turnaround time delays, higher costs, declining service and/or product quality, deteriorating customer service, and slower responses to competitive challenges. A failure in any one of these areas could make it difficult for us to meet market expectations for our services, and could damage our reputation and the prospects for our business.

If our facilities become damaged or inoperable, or we are required to vacate the facilities, our ability to sell and provide our services and pursue our research and development efforts may be jeopardized.

We currently derive our revenues from our genomic analysis conducted in our laboratories. We do not have any clinical reference or research and development laboratory facilities other than our facilities in Menlo Park, California. Our facilities and equipment could be harmed or rendered inoperable by natural or man-made disasters, including fires, earthquakes, flooding, and power outages, which may render it difficult or impossible for us to sell or perform our services for some period of time. Additionally, as a result of the ongoing COVID-19 pandemic, we have limited access to our office and laboratory facilities in Menlo Park to protect the health and safety of our employees and to comply with applicable state and local orders. Northern California has recently experienced serious fires and the San Francisco Bay Area is considered to lie in an area with earthquake risk. The inability to sell or to perform our sequencing and analysis services, disruptions in our operations, or the backlog of samples that could develop if our facilities are inoperable for even a short period of time, may result in the loss of customers or harm to our reputation or relationships with scientific or clinical collaborators, and we may be unable to regain those customers or repair our reputation or such relationships in the future. The limited access to our laboratory facilities as a result of the COVID-19 pandemic has resulted, and may in the future result, in a loss in productivity, including delays to research and development programs. Furthermore, our facilities and the equipment we use to perform our services and our research and development work could be costly and time-consuming to repair or replace.

Additionally, a key component of our research and development process involves using biological samples as the basis for the development of our services. In some cases, these samples are difficult to obtain. If the parts of our laboratory facilities where we store these biological samples were damaged or compromised, our ability to pursue our research and development projects, as well as our reputation, could be jeopardized. We carry insurance for damage to our property and the disruption of our business, but this insurance may not be sufficient to cover all of our potential losses and may not continue to be available to us on acceptable terms, if at all.

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Further, if our laboratory facilities became inoperable, we would likely not be able to license or transfer our technology to other facilities with the qualifications, including state licensure and CLIA certification, that would be necessary to cover the scope of our current and our planned future services. Even if we were to find facilities with such qualifications to perform our services, they may not be available to us on commercially reasonable terms.

Our success depends on our ability to provide reliable, high-quality genomic data and analyses and to rapidly evolve to meet our customers' needs.

Errors, including if our tests fail to accurately detect gene variants, or mistakes, including if we fail to or incompletely or incorrectly identify the significance of gene variants, could have a significant adverse impact on our business. We classify variants in accordance with guidelines that are subject to change and subject to our interpretation. There have also been and could in the future be flaws in the databases, third-party tools or algorithms we use, or in the software that handles automated parts of our classification protocol. If we receive poor quality or degraded samples, our tests may be unable to accurately detect gene variants or we may fail to or incompletely or incorrectly identify the significance of gene variants, which could have a significant adverse impact on our business.

Inaccurate results or misunderstandings of, or inappropriate reliance on, the information we provide to our customers could lead to, or be associated with, side effects or adverse events in patients who use our tests, including treatment-related death, and could lead to termination of our services or claims against us. A product liability or professional liability claim could result in substantial damages and be costly and time-consuming for us to defend.

Although we maintain liability insurance, including for errors and omissions and professional liability, we cannot assure you that our insurance would be sufficient to protect us from the financial impact of defending against these types of claims, or any judgments, fines, or settlement costs arising out of any such claims. Any liability claim, including an errors and omissions liability claim, brought against us, with or without merit, could increase our insurance rates or prevent us from securing insurance coverage in the future. Additionally, any liability lawsuit could cause injury to our reputation or cause us to suspend sales of our tests or cause a suspension of our license to operate. The occurrence of any of these events could have an adverse effect on our business, reputation, and results of operations.

If we cannot develop services and products to keep pace with rapid advances in technology, medicine, and science, or if we experience delays in developing such services and products, our operating results and competitive position could be harmed.

In recent years, there have been numerous advances in technologies relating to the diagnosis and treatment of cancer. Several new cancer drugs have been approved, and a number of new drugs are in pre-clinical and clinical development. There have also been advances in methods used to identify patients likely to benefit from these drugs based on analysis of biomarkers. We must continuously develop new services and products, enhance any existing services, and avoid delays in such developments and enhancements to keep pace with evolving technologies on a timely and cost-effective basis. Our current services and our planned future services and products could become obsolete unless we continually innovate and expand them to demonstrate benefit in the diagnosis, monitoring, or prognosis of patients with cancer. New cancer therapies typically have only a few years of clinical data associated with them, and much of that data may not be disclosed by the pharmaceutical company that conducted the clinical trials. This could limit our ability to develop services and products based on, for example, biomarker analysis related to the appearance or development of resistance to those therapies. If we cannot adequately demonstrate the clinical utility of our services and our planned future services and products to new treatments, sales of our services could decline, which would have a material adverse effect on our business, financial condition, and results of operations.

We are researching and developing improvements to our tests and test features on a continuous basis, but we may not be able to make these improvements on a timely basis, and even if we do, we may not realize the benefits of these efforts in our financial results.

To remain competitive, we must continually research and develop improvements to our tests or test features. However, we cannot assure you that we will be able to develop and commercialize the improvements to our tests or test features on a timely basis. Our competitors may develop and commercialize competing or alternative tests and improvements faster than we are able to do so. In addition, we must expend significant time and funds in order to conduct research and development, further develop and scale our laboratory processes, and further develop and scale our infrastructure. We may never realize a return on investment on this effort and expense, especially if our improvements fail to perform as expected. If we are not able to realize the benefits of our efforts to improve our tests or test features, it could have an adverse effect on our business, financial condition, and results of operations.

Personalized cancer therapies represent new therapeutic approaches that could result in heightened regulatory scrutiny, delays in clinical development, or delays in or inability to achieve regulatory approval, commercialization, or payor coverage, any of which could adversely affect our business.

We currently work with certain companies developing personalized cancer therapies, and our future success will in part depend on our personalized cancer customers obtaining regulatory approval for and commercializing their product candidates. Because personalized cancer therapies represent a new approach to immunotherapy for the treatment of cancer and other diseases, developing and commercializing personalized cancer therapies is subject to a number of challenges.

Actual or perceived safety issues, including adoption of new therapeutics or novel approaches to treatment, may adversely influence the willingness of subjects to participate in clinical studies, or if approved by applicable regulatory authorities, of physicians to subscribe to the novel treatment mechanics. The FDA or other applicable regulatory authorities may ask for specific post-market requirements, and additional information regarding benefits or risks of our services may emerge at any time prior to or after regulatory approval.

Physicians, hospitals, and third-party payors often are slow to adopt new products, technologies, and treatment practices that require additional upfront costs and training. Physicians may not be willing to undergo training to adopt personalized cancer therapies, may decide that such therapies are too complex to adopt without appropriate training or not cost-efficient, and may choose not to administer these therapies. Based on these and other factors, hospitals and payors may decide that the benefits of personalized cancer therapies do not or will not outweigh their costs.

The loss of key members of our executive management team could adversely affect our business.

Our success in implementing our business strategy depends largely on the skills, experience, and performance of key members of our executive management team and others in key management positions, including John West, our Chief Executive Officer, Richard Chen, our Chief Scientific Officer, and Aaron Tachibana, our Chief Financial Officer. The collective efforts of each of these persons and others working with them as a team are critical to us as we continue to develop our technologies, services, products, and research and development programs. As a result of the difficulty in locating qualified new management, the loss or incapacity of existing members of our executive management team could adversely affect our operations. If we were to lose one or more of these key employees, or if one or more of these key employees were to become unable to perform his or her duties due to contracting COVID-19, we could experience difficulties in finding qualified successors, competing effectively, developing our technologies, and implementing our business strategy. Each member of our executive management team has an employment agreement; however, the existence of an employment agreement does not guarantee retention of members of our executive management team, and we may not be able to retain those individuals. We do not maintain “key person” life insurance on any of our employees.

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In addition, we rely on collaborators, consultants, and advisors, including scientific and clinical advisors, to assist us in formulating our research and development and commercialization strategy. Our collaborators, consultants, and advisors are generally employed by employers other than us and may have commitments under agreements with other entities that may limit their availability to us.

The loss or extended illness of a key employee, the failure of a key employee to perform in his or her current position, or our inability to attract and retain skilled employees could result in our inability to continue to grow our business or to implement our business strategy.

We rely on highly skilled personnel in a broad array of disciplines and if we are unable to hire, retain, or motivate these individuals, or maintain our corporate culture, we may not be able to maintain the quality of our services or grow effectively.

Our performance, including our research and development programs and laboratory operations, largely depends on our continuing ability to identify, hire, develop, motivate, and retain highly skilled personnel for all areas of our organization. Competition in our industry for qualified employees is intense, and we may not be able to attract or retain qualified personnel in the future, including bioinformatic scientists, bioinformatic engineers, software engineers, statisticians, variant curators, clinical laboratory scientists, and genetic counselors, due to the competition for qualified personnel among life science businesses, technology companies, as well as universities and public and private research institutions, particularly in the San Francisco Bay Area. All of our U.S. employees are at-will, which means that either we or the employee may terminate their employment at any time. In addition, our compensation arrangements, such as our equity award programs, may not always be successful in attracting new employees and retaining and motivating our existing employees for reasons that may include movements in our stock price. If we are not able to attract and retain the necessary personnel to accomplish our business objectives, we may experience constraints that could adversely affect our ability to scale our business and support our research and development efforts and our laboratory operations. We believe that our corporate culture fosters innovation, creativity, and teamwork. However, as our organization grows, we may find it increasingly difficult to maintain the beneficial aspects of our corporate culture. This could negatively impact our ability to retain and attract employees and our future success.

We may not be able to manage our future growth effectively, which could make it difficult to execute our business strategy.

Our expected future growth could create a strain on our organizational, administrative, and operational infrastructure, including facilities, laboratory operations, quality control, customer service, marketing and sales, and management. We may not be able to maintain the quality of or expected turnaround times for our tests, or satisfy customer demand as our test volume grows. Our ability to manage our growth properly will require us to continue to improve our operational, financial, and management controls, as well as our reporting systems and procedures. As a result of our growth, our operating costs may escalate even faster than planned, and some of our internal systems may need to be enhanced or replaced. If we are unable to manage our growth effectively, it may be difficult for us to execute our business strategy and our business could be harmed.

We may acquire businesses or assets, form joint ventures, or make investments in other companies or technologies that could harm our operating results, dilute our stockholders' ownership, or cause us to incur debt or significant expense.

As part of our business strategy, we may pursue acquisitions of complementary businesses or assets, as well as technology licensing arrangements. We may also pursue strategic alliances that leverage our core technology and industry experience to expand our offerings or distribution, or make investments in other companies. As an organization, we have limited experience with respect to acquisitions as well as the formation of strategic alliances and joint ventures. We may not identify or complete these transactions in a timely manner, on a cost-effective basis, or at all, and we may not realize the anticipated benefits of any acquisition, technology license, strategic alliance, joint venture or investment, and their consideration may be distracting to our management or

prevent us from pursuing other opportunities. In addition, we may not be able to find suitable partners or acquisition candidates, and we may not be able to complete such transactions on favorable terms, if at all. Any future such transactions by us also could result in significant write-offs, the incurrence of debt and contingent liabilities, exposure to additional liability, exposure to additional revenue concentration, additional regulatory obligations and exposure to additional potential liability, any of which could harm our operating results and future prospects. If we make any acquisitions in the future, we may not be able to integrate these acquisitions successfully into our existing business, and we could assume unknown or contingent liabilities. Integration of an acquired company or business also may require management resources that otherwise would be available for ongoing development of our existing business.

To finance any acquisitions or investments, we may choose to raise additional funds. The various ways we could raise additional funds carry potential risks. See “Financial and Market Risks and Risks Related to Owning Our Common Stock—Our inability to raise additional capital on acceptable terms in the future may limit our ability to continue to operate our business and further expand our operations.” If the price of our common stock is low or volatile, we may not be able to acquire other companies using stock as consideration. Alternatively, it may be necessary for us to raise additional funds for these activities through public or private financings. Additional funds may not be available on terms that are favorable to us, or at all.

Ethical, legal, and social concerns related to the use of genetic information could reduce demand for our tests.

Genetic testing has raised ethical, legal, and social concerns regarding privacy and the appropriate uses of the resulting information. Governmental authorities have, through the Genetic Information Nondisclosure Act, and could further, for social or other purposes, limit or regulate the use of genetic information or genetic testing or prohibit testing for genetic predisposition to certain conditions, particularly for those that have no known cure. Ethical and social concerns may also influence governmental authorities to deny or delay the issuance of patents for technology relevant to our business. Similarly, these concerns may lead patients to refuse to use, or clinicians to be reluctant to order, genetic tests even if permissible. These and other ethical, legal, and social concerns may limit market acceptance of our tests or reduce the potential markets for our tests, either of which could have an adverse effect on our business, financial condition, or results of operations.

Any collaboration arrangements that we may enter into in the future may not be successful, which could adversely affect our ability to develop and commercialize our services and products.

Any future collaborations, including any strategic alliances or any collaborations to develop companion diagnostic tests, that we enter into may not be successful. The success of our collaboration arrangements will depend heavily on the efforts and activities of our collaborators. Collaborations are subject to numerous risks, which may include that:

- we would incur increased research and development expenses, and such activities may also divert management attention and resources and/or create competing internal priorities for us, which could prevent us from successfully conducting other parts of our business or collaborating with others;
- collaborators have significant discretion in determining the efforts and resources that they will apply to collaborations;
- collaborators may not pursue development and commercialization of our services or products or may elect not to continue or renew development or commercialization programs based on trial or test results, changes in their strategic focus due to the acquisition of competitive services or products, availability of funding, or other external factors, such as a business combination that diverts resources or creates competing priorities for our collaborator;
- collaborators could independently develop, or develop with third parties, services or products that compete directly or indirectly with our services or products;

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- collaborators with marketing, manufacturing, and distribution rights to one or more services or products may not commit sufficient resources to or otherwise not perform satisfactorily in carrying out these activities;
- we could grant exclusive rights to our collaborators that would prevent us from collaborating with others;
- a large percentage of our revenues may be concentrated with the collaborators if the collaborations are successful and we may experience further losses if they are or later become unsuccessful;
- collaborators may not properly maintain or defend our intellectual property rights or may use our intellectual property or proprietary information in a way that gives rise to actual or threatened litigation that could jeopardize or invalidate our intellectual property or proprietary information or expose us to potential liability;
- disputes may arise between us and a collaborator that causes the delay or termination of the research, development, or commercialization of our current or future services or products or that results in costly litigation or arbitration that diverts management attention and resources;
- collaborations may be terminated, and, if terminated, may result in a need for additional capital to pursue further development or commercialization of the applicable current or future services or products;
- collaborators may own or co-own intellectual property covering our services or products that results from our collaborating with them, and in such cases, we would not have the exclusive right to develop or commercialize such intellectual property;
- collaborators' activities or use of our services or deliverables may create additional regulatory obligations and could lead to side effects or adverse events in patients, exposing us to potential liability; and
- collaborators' sales and marketing activities or other operations may not be in compliance with applicable laws resulting in civil or criminal proceedings.

If we are unable to successfully obtain rights to required third-party intellectual property rights or maintain the existing intellectual property rights we have, we may have to abandon development of that program and our business and financial condition could suffer.

Our planned expansion into China entails substantial risks.

In June 2020, we announced a partnership with a clinical genomics and life sciences company headquartered in China as a means to expand business operations into China in the near term. Our first wholly owned subsidiary was formed in Shanghai in October 2020. Our expansion and investment plans are subject to substantial risks which may include, but are not limited to: the inability to protect our intellectual property rights under Chinese law, which may not offer as high a level of protection as U.S. law; unexpectedly long negotiation periods with Chinese suppliers and customers; quality issues related to supplies sourced from local vendors; unexpectedly high labor costs due to a tight labor supply; foreign investment restrictions; and difficulty in repatriating funds and selling or transferring assets. Our investments in China also expose us to additional foreign currency exchange risk. In addition, as tensions have escalated between the U.S. and China, we believe there is an enhanced risk that our planned investments in China may be subject to unforeseen risks or restrictions, which may include expropriation of the investments by the Chinese government. These and other risks may result in our not realizing a return on, or losing some, or all, of our planned investments in China, which could have a material adverse effect on our financial condition and financial performance.

Personal privacy, cyber security, and data protection are becoming increasingly significant issues in China. For example, the State Council of the People's Republic of China adopted the Regulations of the People's Republic of China on Administration of Human Genetic Resources, which went into effect on July 1, 2019. The

regulations establish a framework for the collection, preservation, utilization, and supply abroad of human genetic resources of China. The regulations also establish a framework for the use of data and other information generated from use of human genetic resources of China. The regulations also provide that foreign organizations, individuals and entities established or controlled by them are prohibited to collect or preserve China's human genetic resources or transport them abroad. Due to the lack of detailed interpretations and implementations, it is not clear whether the agency in China responsible for enforcing the regulations will grant the necessary approvals for use by us and our partners of our NeXT Platform or our other current or future products in research or clinical projects involving China's human genetic resources or information generated therefrom. The Chinese government separately has various regulations relating to the collection, use, storage, disclosure, and security of data, among other things. We cannot assure you that we will be able to comply with all of these regulatory requirements. Any failure to comply with relevant regulations and policies could result in significant cost and liability to us and could adversely affect our business and results of operations. Any additional new regulations or the amendment or modification of previously implemented regulations, or the failure to receive any necessary approvals for use of our products in connection with such projects, could require us and our partners to change our business plans and incur additional costs, and could limit our ability to generate revenues in China.

Expansion into international markets would subject us to increased regulatory oversight and regulatory, economic, social, health and political uncertainties, which could cause a material adverse effect on our business, financial position, and results of operations.

We may in the future expand our business and operations into international jurisdictions in which we have limited operating experience, including with respect to seeking regulatory approvals and marketing and selling products and services. For example, in June 2020, we announced our intention to expand into China. If we expand internationally, our operations in these jurisdictions may be adversely affected by general economic conditions and economic and fiscal policy, including changes in exchange rates and controls, interest rates and taxation policies, increased government regulation, social instability, local or regional health crises, and political, economic or diplomatic developments in the future. Certain jurisdictions have, from time to time, experienced instances of civil unrest and hostilities, both internally and with neighboring countries. Rioting, military activity, terrorist attacks, or armed hostilities could cause our operations in such jurisdictions to be adversely affected or suspended. We generally do not have insurance for losses and interruptions caused by terrorist attacks, military conflicts and wars. In addition, anti-bribery and anti-corruption laws may conflict with some local customs and practices in foreign jurisdictions. Our international operations may subject us to heightened scrutiny under the FCPA, the UK Bribery Act and similar anti-bribery laws, and could subject us to liability under such laws despite our best efforts to comply with such laws. As a result of our policy to comply with the FCPA, the UK Bribery Act and similar anti-bribery laws, we may be at a competitive disadvantage to competitors that are not subject to, or do not comply with, such laws. Further, notwithstanding our compliance programs, there can be no assurances that our policies will prevent our employees or agents from violating these laws or protect us from any such violations. Additionally, we cannot predict the nature, scope or impact of any future regulatory requirements that may apply to our international operations or how foreign governments will interpret existing or new laws. Alleged, perceived, or actual violations of any such existing or future laws by us or due to the acts of others, may result in criminal or civil sanctions, including contract cancellations or debarment, and damage to our reputation, any of which could have a material adverse effect on our business.

Regulatory, Legal and Cybersecurity Risks

Our tests may be subject to regulatory action if regulatory agencies determine that our tests do not appropriately comply with statutory and regulatory requirements enforced by the U.S. Food and Drug Administration, and/or CLIA requirements for quality laboratory testing.

The laws and regulations governing the marketing of clinical laboratory tests are extremely complex and in many instances there are no significant regulatory or judicial interpretations of these laws and regulations. The Federal Food, Drug and Cosmetic Act (the "FDC Act") defines a medical device to include any instrument, apparatus, implement, machine, contrivance, implant, in vitro reagent or other similar or related article, including

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a component, part, or accessory, intended for use in the diagnosis of disease or other conditions, or in the cure, mitigation, treatment or prevention of disease, in man or other animals. Some of our tests may be considered by the FDA to be in vitro diagnostic products that are subject to regulation as medical devices. Among other things, pursuant to the FDC Act and its implementing regulations, the FDA regulates the research, testing, manufacturing, safety, labeling, storage, recordkeeping, premarket clearance or approval, marketing and promotion, and sales and distribution of medical devices in the United States to ensure that medical products distributed domestically are safe and effective for their intended uses. In addition, the FDA regulates the import and export of medical devices.

Although the FDA has statutory authority to assure that medical devices are safe and effective for their intended uses, the FDA has generally exercised its enforcement discretion and not enforced applicable regulations with respect to laboratory developed tests (“LDTs”), which are a subset of in vitro diagnostic devices that are intended for clinical use and designed, manufactured, and used entirely within a single laboratory. We currently market our tests as LDTs and, therefore, we believe that they are not currently subject to the FDA’s enforcement of its medical device regulations and the applicable FDC Act provisions. Despite the FDA’s historic enforcement discretion policy with respect to LDTs, in November 2017, the FDA finalized a classification order setting out the regulatory requirements that apply to certain genetic health risk tests and revised a separate classification order exempting certain carrier screening tests from FDA premarket clearance and approval requirements when certain regulatory requirements are met. None of our tests comply with these classification orders because we market our tests as LDTs that are subject to the FDA’s policy of enforcement discretion. However, the FDA may find that our tests do not fall within the definition of an LDT, and may determine that our tests are subject to the FDA’s enforcement of its medical device regulations, including the recent classification orders, and the applicable FDC Act provisions. While we believe that we are currently in material compliance with applicable laws and regulations, we cannot assure you that the FDA or other regulatory agencies would agree with our determination, and a determination that we have violated these laws, or a public announcement that we are being investigated for possible violations of these laws, could adversely affect our business, prospects, results of operations or financial condition. If the FDA determines that our tests are subject to enforcement as medical devices, we could be subject to enforcement action, including administrative and judicial sanctions, and additional regulatory controls and submissions for our tests, all of which could be burdensome. See “—Failure to comply with federal, state, and foreign laboratory licensing requirements and the applicable requirements of the FDA or any other regulatory authority, could cause us to lose the ability to perform our tests, experience disruptions to our business or become subject to administrative or judicial sanctions.”

Moreover, LDTs may in the future become subject to more onerous regulation by the FDA. A significant change in any of the laws, regulations, or policies may require us to change our business model in order to maintain regulatory compliance. At various times since 2006, the FDA has issued documents outlining its intent to require varying levels of FDA oversight of many types of LDTs. In October 2014, the FDA issued two non-binding draft guidance documents that set forth a proposed risk-based regulatory framework that would apply varying levels of FDA oversight to LDTs. The FDA indicated that it did not intend to implement its proposed framework until the draft guidance documents are finalized. The FDA was expected to finalize its proposal for the oversight of LDTs before the end of 2016, but in November 2016, the FDA announced that it would halt finalizing of the guidance documents and continue to work with stakeholders, the incoming administration, and Congress on the approach to LDT regulation. This announcement was followed by the issuance of an information discussion paper on January 13, 2017, in which the FDA outlined a substantially revised “possible approach” to the oversight of LDTs. The discussion paper explicitly states that it is not a final version of the 2014 draft guidance and that it is not enforceable and does not represent the FDA’s “formal position.” It is unclear at this time if or when the FDA will finalize its plans to end enforcement discretion for LDTs, and even then, whether the new regulatory requirements are expected to be phased-in over time. However, the FDA may decide to regulate certain LDTs on a case-by-case basis at any time, which could result in delay or additional expense in offering our tests and tests that we may develop in the future.

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Legislative proposals addressing oversight of genetic testing and LDTs have been introduced in previous Congresses, and we expect that new legislative proposals will be introduced from time to time in the future. We cannot provide any assurance that FDA regulation, including pre-market review, will not be required in the future for our tests, whether through finalization of guidance issued by the FDA, new enforcement policies adopted by the FDA or new legislation enacted by Congress. It is possible that legislation will be enacted into law or guidance could be issued by the FDA that may result in increased regulatory burdens for us to continue to offer our tests or to develop and introduce new tests. This legislative and regulatory uncertainty exposes us to the possibility of enforcement action or additional regulatory controls and submissions for our tests, both of which could be burdensome. We cannot be certain that the FDA will not enact rules or guidance documents that could impact our ability to purchase certain materials necessary for the performance of our tests, such as products labeled for research use only. Should any of the reagents obtained by us from suppliers and used in conducting our tests be affected by future regulatory actions, our business could be adversely affected by those actions, including increasing the cost of testing or delaying, limiting, or prohibiting the purchase of reagents necessary to perform testing.

Additionally, the Centers for Medicare & Medicaid Services (“CMS”), and certain state agencies regulate the performance of LDTs (as authorized under CLIA and state law, respectively). Our tests are developed in compliance with CLIA requirements. However, if our laboratory fails to comply with the prescribed quality requirements for laboratory testing or other requirements for CLIA, we could lose CLIA certification. That in turn would impact our ability to operate our laboratory and provide results to our customers, which could negatively impact our business operations.

If the FDA determines that our services are subject to enforcement as medical devices, we could incur substantial costs and time delays associated with satisfying statutory and regulatory requirements such as pre-market clearance or approval and we could incur additional expense in offering our tests and tests that we may develop in the future.

If the FDA determines that our tests and associated software do not fall within the definition of an LDT, or there are regulatory or legislative changes, we may be required to obtain premarket clearance for our tests and associated software under Section 510(k) of the FDC Act or approval of a premarket approval application (“PMA”). We would also be subject to ongoing regulatory requirements such as registration and listing requirements, medical device reporting requirements, and quality control requirements. If our tests are considered medical devices not subject to enforcement discretion, the regulatory requirements to which our tests are subject would depend on the FDA’s classification of our tests. The FDA has issued regulations classifying over 1,700 different generic types of medical devices into one of three regulatory control categories (Class I, Class II, or Class III) depending on the degree of regulation that the FDA finds necessary to provide reasonable assurance of their safety and effectiveness. The class into which a device is placed determines the requirements that a medical device manufacturer must meet both pre- and post-market.

Generally, Class I devices do not require premarket authorization, but are subject to a comprehensive set of regulatory authorities referred to as general controls. Class II devices, in addition to general controls, generally require special controls and premarket clearance through the submission of a section 510(k) premarket notification. Class III devices are subject to general controls and special controls, and also require premarket approval prior to commercial distribution, which is a more rigorous process than premarket clearance. Under the FDC Act, a device that is first marketed after May 28, 1976 is by default a Class III device requiring premarket approval unless it is within a type of generic device class that has been classified as Class I or Class II. Even if a device falls under an existing Class II, non-exempt, device classification, the product must also be shown to be “substantially equivalent” to a legally marketed predicate device through submission of a section 510(k) premarket notification. If after reviewing a firm’s 510(k) premarket notification, the FDA determines that a device is not substantially equivalent to a legally marketed predicate device, the new device is classified into Class III, requiring premarket approval. It is possible for a manufacturer to obtain a Class I or Class II designation without an appropriate predicate by submitting a *de novo request for reclassification*.

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The process for submitting a 510(k) premarket notification and receiving FDA clearance usually takes from three to 12 months, but it can take significantly longer and clearance is never guaranteed. The process for submitting and obtaining FDA approval of a PMA is much more costly, lengthy, and uncertain. It generally takes from one to three years or even longer and approval is not guaranteed. PMA approval typically requires extensive clinical data and can be significantly longer, more expensive and more uncertain than the 510(k) clearance process. Despite the time, effort and expense expended, there can be no assurance that a particular device ultimately will be cleared or approved by the FDA through either the 510(k) clearance process or the PMA process on a timely basis, or at all.

If our tests are considered medical devices not subject to enforcement discretion, one classification regulation that could be relevant to one or more of our tests is a recently finalized classification for genetic health risk (“GHR”) assessment tests. On April 6, 2017, in response to a *de novo* request for reclassification submitted by another company, the FDA issued an order classifying genetic tests known as genetic health risk assessment systems (“GHR tests”) as Class II devices subject to premarket notification and specified special controls requirements. On November 7, 2017, the FDA codified this classification at 21 C.F.R. § 866.5950. If our tests are considered medical devices that are not subject to enforcement discretion and one or more of our tests is considered to fall under the 21 C.F.R. § 866.5950 classification regulation for GHR tests, or under another Class II classification that is subject to a premarket notification requirement, we would be required to obtain marketing clearance for such tests. Further, if considered to fall under the 21 C.F.R. § 866.5950 classification for GHR tests, our tests would be required to adhere to specified special controls, such as labeling and testing specifications and information about the test to be posted on the manufacturer’s website. If any of our current or pipeline tests are not considered by the FDA to be GHR tests or do not qualify for the limited exemption for a sponsor’s subsequent GHR tests once the assessment system has been reviewed and cleared by FDA, or if any of our tests fall under a different non-exempt classification or are unclassified, we could be required to obtain 510(k) clearance or approval of a PMA for such test in the future.

If premarket review of our tests is required, the premarket review process may involve, among other things, successfully completing additional clinical trials. If we are required to conduct premarket clinical trials, whether using prospectively acquired samples or archival samples, delays in the commencement or completion of clinical testing could significantly increase our product development costs, delay commercialization of any future products, and interrupt sales of our current products. Many of the factors that may cause or lead to a delay in the commencement or completion of clinical trials may also ultimately lead to delay or denial of regulatory clearance or approval. The commencement of clinical trials may be delayed due to insufficient patient enrollment, which is a function of many factors, including the size of the patient population, the concerns around genetic testing, the nature of the protocol, the proximity of patients to clinical sites, and the eligibility criteria for the clinical trial.

If we are required to conduct clinical trials, we and any third-party contractors we engage would be required to comply with good clinical practices (“GCPs”), which are regulations and guidelines enforced by the FDA, for products in clinical development. The FDA enforces these GCPs through periodic inspections of trial sponsors, principal investigators, and trial sites. If we or any third-party contractor fails to comply with applicable GCPs, the clinical data generated in clinical trials may be deemed unreliable and the FDA may require us to perform additional clinical trials before clearing or approving our marketing applications. A failure to comply with these regulations may require us to repeat clinical trials, which would delay the regulatory clearance or approval process. In addition, if these parties do not successfully carry out their contractual duties or obligations or meet expected deadlines, or if the quality, completeness or accuracy of the clinical data they obtain is compromised due to the failure to adhere to our clinical protocols or for other reasons, our clinical trials may have to be extended, delayed or terminated. Many of these factors would be beyond our control. We may not be able to enter into replacement arrangements without undue delays or considerable expenditures. If there are delays in testing or approvals as a result of the failure to perform by third parties, our research and development costs would increase, and we may not be able to obtain regulatory clearance or approval for our tests. In addition, we may not be able to establish or maintain relationships with these parties on favorable terms, if at all. Each of these outcomes would harm our ability to market our tests or to achieve or sustain profitability.

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The FDA requires medical device manufacturers to comply with, among other things, current good manufacturing practices for medical devices, set forth in the Quality System Regulation at 21 C.F.R. Part 820, which requires manufacturers to follow elaborate design, testing, control, documentation, and other quality assurance procedures during the manufacturing process; the medical device reporting regulation, which requires that manufacturers report to the FDA if their device or a similar device they market may have caused or contributed to a death or serious injury or malfunctioned in a way that would likely cause or contribute to a death or serious injury if it were to recur; labeling regulations, including the FDA's general prohibition against promoting products for unapproved or "off-label" uses; the reports of corrections and removals regulation, which requires manufacturers to report to the FDA if a device correction or removal was initiated to reduce a risk to health posed by the device or to remedy a violation of the FDC Act caused by the device which may present a risk to health; and the establishment registration and device listing regulation.

Moreover, there can be no assurance that any cleared or approved labeling claims will be consistent with our current claims or adequate to support continued adoption of our products. If premarket review is required for some or all of our products, the FDA may require that we stop selling our products pending clearance or approval, which would negatively impact our business. Even if our products are allowed to remain on the market prior to clearance or approval, demand for our products may decline if there is uncertainty about our products, if we are required to label our products as investigational by the FDA, or if the FDA limits the labeling claims we are permitted to make for our products. As a result, we could experience significantly increased development costs and a delay in generating additional revenues from our services, or from other services or products now in development.

In addition, any clearance or approval we obtain for our products may contain requirements for costly post-market testing and surveillance to monitor the safety or efficacy of the product. The FDA has broad post-market enforcement powers, and if unanticipated problems with our products arise, or if we or our suppliers fail to comply with regulatory requirements following FDA clearance or approval, we may become subject to enforcement actions such as:

- restrictions on manufacturing processes;
- restrictions on product marketing;
- warning letters;
- withdrawal or recall of products from the market;
- refusal to approve pending PMAs, 510(k)s, or supplements to approved PMAs or cleared 510(k)s that we submit;
- fines, restitution, or disgorgement of profits or revenue;
- suspension or withdrawal of regulatory clearances or approvals;
- limitation on, or refusal to permit, import or export of our products;
- product seizures;
- injunctions; or
- imposition of civil or criminal penalties.

Moreover, the FDA strictly regulates the promotional claims that may be made about medical devices. In particular, a medical device may not be promoted for uses that are not approved by the FDA as reflected in the device's approved labeling. However, companies may share truthful and not misleading information that is otherwise consistent with the product's FDA approved labeling. The FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses, and a company that is found to have improperly promoted off-label uses may be subject to significant civil, criminal, and administrative penalties.

Failure to comply with federal, state, and foreign laboratory licensing requirements and the applicable requirements of the FDA or any other regulatory authority, could cause us to lose the ability to perform our tests, experience disruptions to our business, or become subject to administrative or judicial sanctions.

We are subject to CLIA, a federal law that regulates clinical laboratories that perform testing on specimens derived from humans for the purpose of providing information for the diagnosis, prevention, or treatment of disease. CLIA regulations establish specific standards with respect to personnel qualifications, facility administration, proficiency testing, quality control, quality assurance, and inspections. We have a current CLIA certificate to conduct our tests at our laboratory in Menlo Park, California. To renew this certificate, we are subject to survey and inspection every two years. Moreover, CLIA inspectors may make random inspections of our clinical reference laboratory.

We are also required to maintain a license to conduct testing in California. California laws establish standards for day-to-day operation of our clinical reference laboratory in Menlo Park, including the training and skills required of personnel and quality control. Several other states in which we operate also require that we hold licenses to test specimens from patients in those states, under certain circumstances. For example, our clinical reference laboratory is required to be licensed on a product-specific basis by New York as an out-of-state laboratory, and our products, as LDTs, must be approved by the New York State Department of Health (the “NYDOH”) on a product-by-product basis before they are offered in New York. We are subject to periodic inspection by the NYDOH and are required to demonstrate ongoing compliance with NYDOH regulations and standards. To the extent NYDOH identified any non-compliance and we are unable to implement satisfactory corrective actions to remedy such non-compliance, the State of New York could withdraw approval for our tests. Additionally, states such as Maryland, Pennsylvania, and Rhode Island may also require us to maintain out-of-state licenses. Other states may have similar requirements or may adopt similar requirements in the future. Although we have obtained licenses from states where we believe we are required to be licensed, we may become aware of other states that require out-of-state laboratories to obtain licensure in order to accept specimens from the state, and it is possible that other states currently have such requirements or will have such requirements in the future. We may also be subject to regulation in foreign jurisdictions as we seek to expand international utilization of our tests or such jurisdictions adopt new licensure requirements, which may require review of our tests in order to offer them or may have other limitations such as restrictions on the transport of human blood necessary for us to perform our tests that may limit our ability to make our tests available outside of the United States. Complying with licensure requirements in new jurisdictions may be expensive and/or time-consuming, may subject us to significant and unanticipated delays, or may be in conflict with other applicable requirements.

Failure to comply with applicable clinical laboratory licensure requirements may result in a range of enforcement actions, including license suspension, limitation, or revocation, directed plan of action, onsite monitoring, civil monetary penalties, and criminal sanctions as well as significant adverse publicity. Any sanction imposed under CLIA, its implementing regulations or state or foreign laws or regulations governing clinical laboratory licensure, or our failure to renew our CLIA certificate, a state or foreign license or accreditation, could have a material adverse effect on our business, financial condition, and results of operations. Even if we were able to bring our laboratory back into compliance, we could incur significant expenses and potentially lose revenues in doing so.

Although we market our tests as LDTs that are currently subject to the FDA’s exercise of enforcement discretion, if we fail to operate within the conditions of that exercise of enforcement discretion, or if any of our products otherwise fail to comply with FDA regulatory requirements as enforced, we would be subject to the applicable requirements of the FDC Act and the FDA’s implementing regulations. The FDA is empowered to impose sanctions for violations of the FDC Act and the FDA’s implementing regulations, including warning letters, civil and criminal penalties, injunctions, product seizure or recall, import bans, restrictions on the conduct of our operations and total or partial suspension of production. Any of the aforementioned sanctions could cause reputational damage, undermine our ability to maintain and increase our revenues, and harm our business, financial condition, and results of operations. In particular, if we or the FDA discover that any of our products

have defects that call into question the accuracy of their results, we may be required to undertake a retest of all results and analyses provided during the period relevant to the defect, or recall the affected products. The direct costs incurred in connection with such a recall in terms of management time, administrative, and legal expenses and lost revenue, together with the indirect costs to our reputation could harm our business, financial condition, and results of operations, and our ability to execute our business strategy. While we believe that we are currently in material compliance with applicable laws and regulations as currently enforced, the FDA or other regulatory agencies may not agree, and a determination that we have violated these laws or a public announcement that we are being investigated for possible violations of these laws could adversely affect our business, financial condition, results of operations, and prospects.

Our internal information technology systems, or those of our third-party vendors, contractors, or consultants, may fail or suffer security breaches, loss or leakage of data, and other disruptions, which could result in a material disruption of our services, compromise sensitive information related to our business, or prevent us from accessing critical information, potentially exposing us to liability or otherwise adversely affecting our business.

We are increasingly dependent upon information technology systems, infrastructure, and data to operate our business. In the ordinary course of business, we collect, store, and transmit confidential information (including but not limited to intellectual property, proprietary business information, and personal information). It is critical that we do so in a secure manner to maintain the confidentiality, integrity, and availability of such confidential information. We also have outsourced elements of our operations to third parties, and as a result we manage a number of third-party vendors and other contractors and consultants who have access to our confidential information.

Despite the implementation of security measures, given the size and complexity of our internal information technology systems and those of our third-party vendors and other contractors and consultants, and the increasing amounts of confidential information that they maintain, such information technology systems are potentially vulnerable to breakdown or other damage or interruption from service interruptions, system malfunction, natural disasters, terrorism, war, and telecommunication and electrical failures, as well as security breaches from inadvertent or intentional actions by our employees, third-party vendors, contractors, consultants, business partners, and/or other third parties, or from cyber-attacks by malicious third parties (including the deployment of harmful malware, ransomware, denial-of-service attacks, social engineering, and other means to affect service reliability and threaten the confidentiality, integrity, and availability of information), which may compromise our system infrastructure, or that of our third-party vendors and other contractors and consultants, or lead to data leakage. The risk of a security breach or disruption, particularly through accidental actions or omissions by trusted insiders, cyber-attacks or cyber intrusions, including by computer hackers, foreign governments, and cyber terrorists, has generally increased as the number, intensity, and sophistication of attempted attacks and intrusions from around the world have increased; in particular, during the COVID-19 pandemic we have observed an increase in attempted attacks against our data systems. We may not be able to anticipate all types of security threats, and we may not be able to implement preventive measures effective against all such security threats. The techniques used by cyber criminals change frequently, may not be recognized until launched, and can originate from a wide variety of sources, including outside groups such as external service providers, organized crime affiliates, terrorist organizations, hostile foreign governments or agencies, or cybersecurity researchers. To the extent that any disruption or security breach were to result in a loss of, or damage to, our data or applications, or those of our third-party vendors and other contractors and consultants, or inappropriate disclosure of confidential or proprietary information, we could incur liability and reputational damage and the further development and commercialization of our services could be delayed. The costs related to significant security breaches or disruptions could be material and exceed the limits of the cybersecurity insurance we maintain against such risks. If the information technology systems of our third-party vendors and other contractors and consultants become subject to disruptions or security breaches, we may have insufficient recourse against such third parties and we may have to expend significant resources to mitigate the impact of such an event, and to develop and implement protections to prevent future events of this nature from occurring.

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While we have not experienced any such system failure, accident, or security breach to date and believe that our data protection efforts and our investment in information technology reduce the likelihood of such incidents in the future, we cannot assure you that our data protection efforts and our investment in information technology will prevent significant breakdowns, data leakages, breaches in our systems, or those of our third-party vendors and other contractors and consultants, or other cyber incidents that could have a material adverse effect upon our reputation, business, operations, or financial condition. For example, if such an event were to occur and cause interruptions in our operations, or those of our third-party vendors and other contractors and consultants, it could result in a material disruption of our programs and the development of our services and technologies could be delayed. Furthermore, significant disruptions of our internal information technology systems or those of our third-party vendors and other contractors and consultants, or security breaches could result in the loss, misappropriation, and/or unauthorized access, use, or disclosure of, or the prevention of access to, confidential information (including trade secrets or other intellectual property, proprietary business information, and personal information), which could result in financial, legal, business, and reputational harm to us. For example, any such event that leads to unauthorized access, use, or disclosure of personal information, including personal information regarding our customers or employees, could harm our reputation directly, compel us to comply with federal and/or state breach notification laws and foreign law equivalents, subject us to mandatory corrective action, and otherwise subject us to liability under laws and regulations that protect the privacy and security of personal information, which could result in significant legal and financial exposure and reputational damages that could potentially have an adverse effect on our business.

Security breaches, loss of data, and other disruptions could compromise sensitive information related to our business or prevent us from accessing critical information and expose us to liability, which could adversely affect our business and our reputation.

In the ordinary course of our business, we collect and store sensitive data, including protected health information (“PHI”), personally identifiable information (“PII”), credit card and other financial information, intellectual property, and proprietary business information owned or controlled by ourselves or our customers, payors, and other parties. We manage and maintain our applications and data utilizing a combination of on-site systems and cloud-based data centers. We utilize external security and infrastructure vendors to manage parts of our data centers. We also communicate sensitive data, including patient data, electronically, and through relationships with multiple third-party vendors and their subcontractors. These applications and data encompass a wide variety of business-critical information, including research and development information, patient data, commercial information, and business and financial information. We face a number of risks relative to protecting this critical information, including loss of access risk, inappropriate use or disclosure, inappropriate modification, and the risk of our being unable to adequately monitor, audit, and modify our controls over our critical information. This risk extends to the third-party vendors and subcontractors we use to manage this sensitive data.

The secure processing, storage, maintenance, and transmission of this critical information are vital to our operations and business strategy, and we devote significant resources to protecting such information. Although we take measures to protect sensitive data from unauthorized access, use or disclosure, our information technology and infrastructure may be vulnerable to attacks by hackers or viruses or breached due to employee error, malfeasance, or other malicious or inadvertent disruptions. Any such breach or interruption could compromise our networks and the information stored there could be accessed by unauthorized parties, manipulated, publicly disclosed, lost, or stolen. Any such access, breach, or other loss of information could result in legal claims or proceedings, liability under federal or state laws that protect the privacy of personal information, such as the Health Insurance Portability and Accountability Act of 1996 (“HIPAA”) and the Health Information Technology for Economic and Clinical Health Act (“HITECH”), and regulatory penalties. Notice of breaches must be made to affected individuals, the Secretary of the Department of Health and Human Services (“HHS”), and for extensive breaches, notice may need to be made to the media or state attorneys general. Such a notice could harm our reputation and our ability to compete. Although we have implemented security measures and a formal, dedicated enterprise security program to prevent unauthorized access to patient data, such data is currently accessible through multiple channels, and there is no guarantee we can protect our data from breach.

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Unauthorized access, loss, or dissemination could also damage our reputation or disrupt our operations, including our ability to conduct our analyses, deliver test results, process claims and appeals, provide customer assistance, conduct research and development activities, collect, process, and prepare company financial information, provide information about our tests and other patient and physician education and outreach efforts through our website, and manage the administrative aspects of our business. Additionally, in connection with the ongoing COVID-19 pandemic, most of our employees are working remotely, which may increase the risk of security breaches, loss of data, and other disruptions as a consequence of more employees accessing sensitive and critical information from remote locations.

Penalties for violations of these laws vary. For instance, penalties for failure to comply with a requirement of HIPAA and HITECH vary significantly, and include significant civil monetary penalties and, in certain circumstances, criminal penalties with fines up to \$250,000 per violation and/or imprisonment. A person who knowingly obtains or discloses individually identifiable health information in violation of HIPAA may face a criminal penalty of up to \$50,000 and up to one-year imprisonment. The criminal penalties increase if the wrongful conduct involves false pretenses or the intent to sell, transfer or use identifiable health information for commercial advantage, personal gain or malicious harm.

Further, various states, such as California and Massachusetts, have implemented similar privacy laws and regulations, such as the California Confidentiality of Medical Information Act, that impose restrictive requirements regulating the use and disclosure of health information and other personally identifiable information. These laws and regulations are not necessarily preempted by HIPAA, particularly if a state affords greater protection to individuals than HIPAA. Where state laws are more protective, we have to comply with the stricter provisions. In addition to fines and penalties imposed upon violators, some of these state laws also afford private rights of action to individuals who believe their personal information has been misused. California's patient privacy laws, for example, provide for penalties of up to \$250,000 and permit injured parties to sue for damages. The interplay of federal and state laws may be subject to varying interpretations by courts and government agencies, creating complex compliance issues for us and data we receive, use and share, potentially exposing us to additional expense, adverse publicity and liability. Further, as regulatory focus on privacy issues continues to increase and laws and regulations concerning the protection of personal information expand and become more complex, these potential risks to our business could intensify. Changes in laws or regulations associated with the enhanced protection of certain types of sensitive data, such as PHI or PII, for the treatment of genetic data, along with increased customer demands for enhanced data security infrastructure, could greatly increase our cost of providing our services, decrease demand for our services, reduce our revenues and/or subject us to additional liabilities.

In addition, the interpretation and application of consumer, health-related and data protection laws, especially with respect to genetic samples and data, in the United States, the European Union (the "EU"), and elsewhere are often uncertain, contradictory and in flux. For example, the EU-wide General Data Protection Regulation (EU) 2016/679 ("GDPR") imposes onerous accountability obligations requiring data controllers and processors to maintain a record of their data processing and policies. It also requires data controllers to implement more stringent operational requirements for processors and controllers of personal data, including, for example, transparent and expanded disclosure to data subjects (in a concise, intelligible and easily accessible form) about how their personal information is to be used, imposes limitations on retention of information, increases requirements pertaining to health data and pseudonymized (i.e., key-coded) data, introduces mandatory data breach notification requirements, and sets higher standards for data controllers to demonstrate that they have obtained valid consent for certain data processing activities. Fines for non-compliance with the GDPR can be significant—the greater of €20 million or 4% of global turnover. The GDPR provides that EU member states may introduce further conditions, including limitations, to make their own further laws and regulations limiting the processing of genetic, biometric, or health data, which could limit our ability to collect, use and share European data, or could cause our compliance costs to increase, ultimately having an adverse impact on our business, and harm our business and financial condition. It is possible that these laws may be interpreted and applied in a manner that is inconsistent with our practices. If so, this could result in government-imposed fines or orders requiring that we change our practices, which could adversely affect our business.

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Although there are legal mechanisms to allow for the transfer of personal data from the UK, EEA and Switzerland to the United States, uncertainty about compliance with such data protection laws remains and such mechanisms may not be available or applicable with respect to the personal data processing activities necessary to research, develop and market our products and services. For example, legal challenges in the EU to the mechanisms allowing companies to transfer personal data from the EEA to the United States could result in further limitations on the ability to transfer personal data across borders, particularly if governments are unable or unwilling to reach new or maintain existing agreements that support cross-border data transfers, such as the EU-U.S. and Swiss-U.S. Privacy Shield Frameworks. Specifically, on July 16, 2020, the Court of Justice of the European Union invalidated Decision 2016/1250 on the adequacy of the protection provided by the EU-U.S. Privacy Shield Framework. To the extent that we or any of our vendors, contractors, or consultants relied on the EU-U.S. Privacy Shield Framework, we will not be able to do so in the future, which could increase our costs and limit our ability to process personal data from the EU in the United States. The same decision also cast doubt on the ability to use one of the primary alternatives to the Privacy Shield, namely, the European Commission’s Standard Contractual Clauses, to lawfully transfer personal data from EU to the United States and most other countries. At present, there are few, if any, viable alternatives to the Privacy Shield and the Standard Contractual Clauses.

Further, Brexit has created uncertainty with regard to data protection regulation in the UK. In particular, while the Data Protection Act of 2018 that implements and complements the GDPR achieved Royal Assent on May 23, 2018 and is now effective in the United Kingdom, it is still unclear whether transfer of data from the EEA to the United Kingdom will remain lawful under GDPR. During the period of “transition” (i.e., until December 31, 2020), EU law will continue to apply in the UK, including the GDPR, after which the GDPR will be converted into UK law. Beginning in 2021, the UK will be a “third country” under the GDPR. We may, however, incur liabilities, expenses, costs, and other operational losses under the GDPR and other privacy laws implemented by EU Member States and the UK in connection with any measures we take to comply with such laws.

Compliance with U.S. and international data protection laws and regulations could cause us to incur substantial costs or require us to change our business practices and compliance procedures in a manner adverse to our business. Moreover, complying with these various laws could require us to take on more onerous obligations in our contracts, restrict our ability to collect, use and disclose data, or in some cases, impact our ability to operate in certain jurisdictions. We typically rely on our customers to obtain valid and appropriate consents from data subjects whose genetic samples and data we process on such customers’ behalf. Given that we do not typically obtain direct consent from such data subjects and we do not audit our customers to ensure that they have obtained the necessary consents required by law, the failure of our customers to obtain consents that are in compliance with applicable law could result in our own non-compliance with privacy laws. Such failure to comply with U.S. and international data protection laws and regulations could result in government enforcement actions (which could include civil or criminal penalties), private litigation and/or adverse publicity and could negatively affect our operating results and business. Claims that we have violated individuals’ privacy rights, failed to comply with data protection laws, or breached our contractual obligations, even if we are not found liable, could be expensive and time consuming to defend, could result in adverse publicity and could have a material adverse effect on our business, financial condition, and results of operations.

We depend on our information technology systems, and any failure of these systems could harm our business.

We depend on information technology and telecommunications systems for significant elements of our operations, including our laboratory information management system, our bioinformatics analytical software systems, our database of information relating to genetic variations and their role in disease process, our clinical report systems, our billing systems, our business intelligence systems, our logistics and customer relationship systems, our customer-facing web-based software, our customer reporting, and our family history and risk assessment tools. We have installed, and expect to expand, a number of enterprise software systems that affect a

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broad range of business processes and functional areas, including, for example, systems handling human resources, financial reporting and controls, customer relationship management, regulatory compliance, and other infrastructure operations.

Although we invest substantially in the backup/restore, high-availability architecture, monitoring and reporting, documentation and preventive security controls of our systems, all information technology and telecommunications systems are vulnerable to damage from a variety of sources, including telecommunications or network failures, malicious or inadvertent human acts and natural disasters. Our servers are potentially vulnerable to physical or electronic break-ins, employee errors, computer viruses and similar disruptive problems. Despite the precautionary measures we have taken to prevent unanticipated problems that could affect our information technology and telecommunications systems, failures or significant downtime of our information technology or telecommunications systems or those used by our third-party service providers could prevent us from conducting tests, preparing and providing reports to our customers, billing customers, collecting revenue, handling inquiries from our customers, conducting research and development activities, and managing the administrative aspects of our business. For example, in the first quarter of 2018, we experienced downtime in our information technology systems in connection with the adoption of certain new information technology, and our results of operations in the first and second quarters of 2018 were adversely affected as a result. Any disruption or loss of information technology or telecommunications systems on which critical aspects of our operations depend could have an adverse effect on our business.

Additionally, we have internally developed, and expect to continue to invest in and expand, proprietary informatics and software systems that are designed to manage the unique aspects and challenges of our genomics laboratory and on which we depend. Any disruption or failure of our internally developed informatics and software systems could have an adverse effect on our business.

Our employees may engage in misconduct or other improper activities, including noncompliance with regulatory standards and requirements, which could cause significant liability for us and harm our reputation.

We are exposed to the risk of employee fraud or other misconduct, including intentional failures to comply with government regulations, including federal and state healthcare fraud and abuse laws and regulations, to misuse information, including patient information, and to report financial information or data accurately or disclose unauthorized activities to us. Such misconduct could also involve the improper use of information obtained in the course of clinical studies, which could result in regulatory sanctions and cause serious harm to our reputation. We have a code of conduct and ethics for our directors, officers and employees, but it is not always possible to identify and deter employee misconduct, and the precautions we take to detect and prevent this activity may not be effective in controlling risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to be in compliance with such laws or regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business and results of operations, including the imposition of significant administrative, civil and criminal penalties, damages, fines, imprisonment, exclusion from government healthcare programs, contractual damages, refunding of payments received by us, reputational harm, additional reporting, or oversight obligations if we become subject to a corporate integrity agreement or other agreement to resolve allegations of non-compliance with the law and curtailment or restructuring of our operations. Whether or not we are successful in defending against such actions or investigations, we could incur substantial costs, including legal fees, and divert the attention of management in defending ourselves against any of these claims or investigations.

Complying with numerous statutes and regulations pertaining to our business is an expensive and time-consuming process, and any failure to comply could result in substantial penalties.

Our operations may be subject to other extensive federal, state, local, and foreign laws and regulations, all of which are subject to change. These laws and regulations currently include, among others:

- the federal Anti-Kickback Statute, which prohibits knowingly and willfully offering, paying, soliciting, or receiving remuneration, directly or indirectly, overtly or covertly, in cash or in kind, in return for or to induce such person to refer an individual, or to purchase, lease, order, arrange for, or recommend purchasing, leasing or ordering, any good, facility, item or service that is reimbursable, in whole or in part, under a federal healthcare program. A person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation. In addition, the government may assert that a claim including items or services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the false claims statutes;
- the federal Stark physician self-referral law, which prohibits a physician from making a referral for certain designated health services covered by the Medicare program, including laboratory and pathology services, if the physician or an immediate family member has a financial relationship with the entity providing the designated health services, and prohibits that entity from billing or presenting a claim for the designated health services furnished pursuant to the prohibited referral, unless an exception applies. Failure to refund amounts received as a result of a prohibited referral on a timely basis may constitute a false or fraudulent claim under the False Claims Act;
- the “Anti-Markup Rule” and similar state laws, among other things, prohibit a physician or supplier billing the Medicare program from marking up the price of a purchased diagnostic service performed by another laboratory or supplier that does not “share a practice” with the billing physician or supplier. Penalties may apply to the billing physician or supplier if Medicare or another payer is billed at a rate that exceeds the performing laboratory’s charges to the billing physician or supplier, and the performing laboratory could be at risk under false claims laws, described below, for causing the submission of a false claim;
- the federal civil and criminal false claims laws, including the False Claims Act, which impose liability on any person or entity that, among other things, knowingly presents, or causes to be presented, a false or fraudulent claim for payment to the federal government. These laws can apply to entities that provide information on coverage, coding, and reimbursement of their products and assistance with obtaining reimbursement to persons who bill payors. Private individuals can bring False Claims Act “qui tam” actions, on behalf of the government and such individuals, commonly known as “whistleblowers,” may share in amounts paid by the entity to the government in fines or settlement;
- the federal Civil Monetary Penalties Law, which prohibits, among other things, the offering or transfer of remuneration to a Medicare or state healthcare program beneficiary if the person knows or should know it is likely to influence the beneficiary’s selection of a particular provider, practitioner, or supplier of services reimbursable by Medicare or a state healthcare program, unless an exception applies;
- the federal Physician Payments Sunshine Act, which requires certain manufacturers of drugs, biologicals, and medical devices or supplies that require premarket approval by or notification to the FDA, and for which payment is available under Medicare, Medicaid, or the Children’s Health Insurance Program (“CHIP”) to report annually to CMS information related to (i) payments and other transfers of value to physicians (including certain other healthcare professionals) and teaching hospitals, and (ii) ownership and investment interests held by physicians and their immediate family members, which will be expanded beginning in 2022, to require applicable manufacturers to report such information regarding its relationships with physician assistants, nurse practitioners, clinical nurse specialists, certified registered nurse anesthetists and certified nurse midwives during the previous year;

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- the HIPAA fraud and abuse provisions, which created federal civil and criminal statutes that prohibit, among other things, defrauding healthcare programs, willfully obstructing a criminal investigation of a healthcare offense, and falsifying or concealing a material fact or making any materially false statements in connection with the payment for healthcare benefits, items or services. Similar to the federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;
- the Eliminating Kickbacks in Recovery Act of 2018 (“EKRA”), which prohibits payments for referrals to recovery homes, clinical treatment facilities, and laboratories. EKRA’s reach extends beyond federal health care programs to include private insurance (i.e., it is an “all payer” statute);
- other federal and state fraud and abuse laws, such as anti-kickback laws, prohibitions on self-referral, fee-splitting restrictions, insurance fraud laws, prohibitions on the provision of tests at no or discounted cost to induce physician or patient adoption, and false claims acts, which may extend to services reimbursable by any payer, including private insurers;
- the prohibition on reassignment of Medicare claims, which, subject to certain exceptions, precludes the reassignment of Medicare claims to any other party;
- state laws that prohibit other specified practices, such as billing physicians for testing that they order; waiving coinsurance, copayments, deductibles, and other amounts owed by patients; billing a state Medicaid program at a price that is higher than what is charged to one or more other payors; employing, exercising control over, licensed professionals in violation of state laws prohibiting corporate practice of medicine and other professions, and prohibitions against the splitting of professional fees with licensed professionals; and
- similar foreign laws and regulations that apply to us in the countries in which we operate or may operate in the future.

As a clinical laboratory, our business practices may face additional scrutiny from government regulatory agencies such as the Department of Justice, the HHS Office of Inspector General (the “OIG”) and CMS. Certain arrangements between clinical laboratories and referring physicians have been identified in fraud alerts issued by the OIG as implicating the Anti-Kickback Statute. The OIG has stated that it is particularly concerned about these types of arrangements because the choice of laboratory, as well as the decision to order laboratory tests, typically are made or strongly influenced by the physician, with little or no input from patients. Moreover, the provision of payments or other items of value by a clinical laboratory to a referral source could be prohibited under the Stark Law unless the arrangement meets all criteria of an applicable exception. The government has been active in enforcement of these laws as they apply to clinical laboratories.

The growth of our business and our expansion outside of the United States may increase the potential of violating these laws or our internal policies and procedures. The risk of our being found in violation of these or other laws and regulations is further increased by the fact that many have not been fully interpreted by the regulatory authorities or the courts, and their provisions are open to a variety of interpretations. Any action brought against us for violation of these or other laws or regulations, even if we successfully defend against it, could cause us to incur significant legal expenses and reputational harm and divert our management’s attention from the operation of our business. If our operations are found to be in violation of any of these laws and regulations, we may be subject to any applicable penalty associated with the violation, including significant administrative, civil and criminal penalties, damages, fines, imprisonment, exclusion from participation in federal healthcare programs, refunding of payments received by us, integrity oversight and reporting obligations, and curtailment or cessation of our operations. Any of the foregoing consequences could seriously harm our business and our financial results.

We could be adversely affected by violations of the Foreign Corrupt Practices Act of 1977, as amended (the “FCPA”), and other worldwide anti-bribery laws.

We are subject to the FCPA, which prohibits companies and their intermediaries from making payments in violation of law to non-U.S. government officials for the purpose of obtaining or retaining business or securing any other improper advantage. Other U.S. companies in the medical device and pharmaceutical fields have faced criminal penalties under the FCPA for allowing their agents to deviate from appropriate practices in doing business with these individuals. We are also subject to similar anti-bribery laws in the jurisdictions in which we operate, including the United Kingdom’s Bribery Act of 2010, which also prohibits commercial bribery and makes it a crime for companies to fail to prevent bribery. These laws are complex and far-reaching in nature, and, as a result, we cannot assure you that we would not be required in the future to alter one or more of our practices to be in compliance with these laws or any changes in these laws or the interpretation thereof. Any violations of these laws, or allegations of such violations, could disrupt our operations, involve significant management distraction, involve significant costs and expenses, including legal fees, and could result in a material adverse effect on our business, prospects, financial condition or results of operations. We could also incur severe penalties, including criminal and civil penalties, disgorgement, and other remedial measures.

If we decide to grow our business by developing in vitro diagnostic tests, we may be subject to reimbursement challenges.

The coverage and reimbursement status of newly approved or cleared laboratory tests, including our Next Dx test, is uncertain. If we decide to seek reimbursement for our Next Dx test or other in vitro diagnostic tests we may develop, and if such tests are inadequately covered by insurance and ineligible for such reimbursement, this could limit our ability to market any such future tests. The commercial success of future products in both domestic and international markets may depend in part on the availability of coverage and adequate reimbursement from third-party payors, including government payors, such as the Medicare and Medicaid programs, managed care organizations, and other third-party payors. The government and other third-party payors are increasingly attempting to contain health care costs by limiting both insurance coverage and the level of reimbursement for new diagnostic tests. As a result, they may not cover or provide adequate payment for any future in vitro diagnostic tests that we develop. These payors may conclude that our products are less safe, less effective, or less cost-effective than existing or later-introduced products. These payors may also conclude that the overall cost of using one of our tests exceeds the overall cost of using a competing test, and third-party payors may not approve any future in vitro diagnostic tests we develop for insurance coverage and adequate reimbursement.

Changes in health care policy could increase our costs, decrease our revenues, and impact sales of and reimbursement for our tests.

In March 2010, the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act (the “ACA”), became law. This law substantially changed the way health care is financed by both commercial payers and government payers, and significantly impacts our industry. The ACA contains a number of provisions that are expected to impact the business and operations of our customers, some of which in ways we cannot currently predict, including those governing enrollment in state and federal health care programs, reimbursement changes, and fraud and abuse, which will impact existing state and federal health care programs and will result in the development of new programs.

Among other things, the ACA:

- expanded eligibility criteria for Medicaid programs by, among other things, allowing states to offer Medicaid coverage to additional individuals and by adding new mandatory eligibility categories for individuals with income at or below 133% of the federal poverty level, thereby potentially increasing manufacturers’ Medicaid rebate liability;

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- established a new Patient-Centered Outcomes Research Institute to oversee and identify priorities in comparative clinical efficacy research in an effort to coordinate and develop such research; and
- established a Center for Medicare and Medicaid Innovation at CMS to test innovative payment and service delivery models to lower Medicare and Medicaid spending.

There remain judicial and Congressional challenges to certain aspects of the ACA, as well as efforts by the Trump administration to repeal or replace certain aspects of the ACA. Since January 2017, President Trump has signed several Executive Orders and other directives to delay the implementation of certain requirements of the ACA. Concurrently, Congress has considered legislation that would repeal or repeal and replace all or part of the ACA. While Congress has not passed comprehensive repeal legislation, it has enacted laws that modify certain provisions of the ACA such as removing penalties, starting January 1, 2019, for not complying with the ACA's individual mandate to carry health insurance and eliminating the implementation of certain ACA-mandated fees. On December 14, 2018, a Texas U.S. District Court Judge ruled that the ACA is unconstitutional in its entirety because the "individual mandate" was repealed by Congress as part of the Tax Cuts and Jobs Act. Additionally, on December 18, 2019, the U.S. Court of Appeals for the 5th Circuit upheld the District Court ruling that the individual mandate was unconstitutional and remanded the case back to the District Court to determine whether the remaining provisions of the ACA are invalid as well. On March 2, 2020, the United States Supreme Court granted the petitions for writs of certiorari to review this case. It is unclear how this decision, subsequent appeals, and other efforts to repeal and replace the ACA will impact the ACA and our business. Additional legislation may be enacted that further amends, or repeals, the ACA, which could result in lower numbers of insured individuals, reduced coverage for insured individuals and adversely affect our and our customers' business.

In addition, other legislative changes have been proposed and adopted since the ACA was enacted. On August 2, 2011, the Budget Control Act of 2011 was signed into law, which, among other things, reduced Medicare payments to providers by 2% per fiscal year, effective on April 1, 2013 and, due to subsequent legislative amendments to the statute, will remain in effect through 2030 unless additional Congressional action is taken. The CARES Act, which was signed into law in March 2020, is designed to provide financial support and resources to individuals and businesses affected by the COVID-19 pandemic, suspended the 2% Medicare sequester from May 1, 2020 through December 31, 2020, and extended the sequester by one year, through 2030. On January 2, 2013, the American Taxpayer Relief Act of 2012 was signed into law, which, among other things, reduced Medicare payments to several providers, including hospitals, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. The Medicare Access and CHIP Reauthorization Act of 2015, enacted on April 16, 2015 ("MACRA"), repealed the formula by which Medicare made annual payment adjustments to physicians and replaced the former formula with fixed annual updates, and established a quality payment incentive program, also referred to as the Quality Payment Program. This program provides clinicians with two ways to participate, including through the Advanced Alternative Payment Models, or APMs, and the Merit-based Incentive Payment System, or MIPS. In November 2019, CMS issued a final rule finalizing the changes to the Quality Payment Program. At this time, it is unclear how the introduction of the Quality Payment Program will impact overall physician reimbursement under the Medicare program. Any reduction in reimbursement from Medicare or other government programs may result in a similar reduction in payments from private payors.

In April 2014, Congress passed the Protecting Access to Medicare Act of 2014 ("PAMA"), which included substantial changes to the way in which clinical laboratory services are paid under Medicare. Under PAMA, laboratories that receive the majority of their Medicare revenues from payments made under the Medicare Clinical Laboratory Fee Schedule, or the Physician Fee Schedule are required to report to CMS, beginning in 2017 and every three years thereafter (or annually for "advanced diagnostic laboratory tests"), private payer payment rates and volumes for their tests. CMS will use this data to calculate a weighted median payment rate for each test, which will be used to establish revised Medicare reimbursement rates for the tests. Laboratories that fail to report the required payment information may be subject to substantial civil monetary penalties. In January 2020, CMS announced that data reporting for clinical diagnostic laboratory tests is delayed by one year. Therefore, data that was supposed to be reported between January 1, 2020 and March 31, 2020 must now be

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reported between January 1, 2021 and March 31, 2021. Covered laboratories must report data from the original data collection period of January 1, 2019 through June 30, 2019. Data reporting for these tests will then resume on a three year cycle beginning in 2024. The payment rate applies to laboratory tests furnished by a hospital laboratory if the test is separately paid under the hospital outpatient prospective payment system. It is still too early to predict the full impact on reimbursement for our products in development. In addition, CMS updated the statutory phase-in provisions such that, for 2020, the rates for clinical diagnostic laboratory tests may not be reduced by more than 10% of the rates for 2019. Additionally, there will be a 15% reduction cap for each of 2021, 2022, and 2023. It is unclear what impact new quality and payment programs, such as MACRA, or new pricing structures, such as those adopted under PAMA, may have on our business, financial condition, results of operations, or cash flows.

Further, it is possible that additional governmental action is taken to address the COVID-19 pandemic. For example, on August 6, 2020, President Trump issued an Executive Order that instructs the federal government to develop a list of “essential” medicines and then buy them and other medical supplies from U.S. manufacturers instead of from companies around the world, including China. The order is meant to reduce regulatory barriers to domestic pharmaceutical manufacturing and catalyze manufacturing technologies needed to keep drug prices low and the production of drug products in the United States. We anticipate there will continue to be proposals by legislators at both the federal and state levels, regulators and private payers to reduce costs while expanding individual healthcare benefits. Certain of these changes could impose additional limitations on the prices we will be able to charge for our tests, the coverage of or the amounts of reimbursement available for our tests from payers, including commercial payers and government payers.

If we use hazardous materials in a manner that causes injury, we could be liable for resulting damages.

Our activities currently require the use of hazardous chemicals and biological material. We cannot eliminate the risk of an accidental environmental release or injury to employees or third parties from the use, storage, handling, or disposal of these materials. In the event of an environmental release or injury, we could be held liable for any resulting damages, and any liability could exceed our resources or any applicable insurance coverage we may have. Additionally, we are subject on an ongoing basis to federal, state, and local laws and regulations governing the use, storage, handling, and disposal of these materials and specified waste products. The cost of maintaining compliance with these laws and regulations may become significant and our failure to comply may result in substantial fines or other consequences, and either could negatively affect our operating results.

The 2017 tax reform law, as modified by 2020 tax legislation, and possible future changes in tax laws or regulations could adversely affect our business and financial condition.

On December 22, 2017, President Trump signed into law comprehensive tax legislation (the “Tax Cuts and Jobs Act”) that significantly revised the Internal Revenue Code of 1986, as amended (the “Code”). Future guidance from the U.S. Internal Revenue Service and other tax authorities with respect to the Tax Cuts and Jobs Act may affect us, and certain aspects of the Tax Cuts and Jobs Act could be repealed or modified in future legislation. For example, on March 27, 2020, the Coronavirus Aid, Relief and Economic Security (“CARES”) Act was enacted, which includes changes to the tax provisions that benefit business entities and makes certain technical corrections to the Tax Cuts and Jobs Act. On June 29, 2020, California Assembly Bill 85 (AB 85) was signed into law, which suspends the use of California net operating losses and limits the use of California research tax credits for tax years beginning in 2020 and before 2023. Changes in corporate tax rates, the realization of net deferred tax assets relating to our U.S. operations, the taxation of foreign earnings, and the deductibility of expenses under the Tax Cuts and Jobs Act, the CARES Act, or future tax reform legislation could have a material impact on the value of our deferred tax assets, could result in significant one-time charges in the current or future taxable years, and could increase our future U.S. tax expense. The foregoing items, as well as any other future changes in tax laws, could have a material adverse effect on our business, cash flow, financial condition, or results of operations. In addition, it is uncertain if and to what extent various states will conform to the Tax Cuts and Jobs Act, the CARES Act, or any newly enacted federal tax legislation.

Our effective tax rate may fluctuate, and we may incur obligations in tax jurisdictions in excess of accrued amounts.

We are subject to taxation in numerous U.S. states and territories, as well as various non-U.S. jurisdictions. As a result, our effective tax rate is derived from a combination of applicable tax rates in the various places that we operate. In preparing our financial statements, we estimate the amount of tax that will become payable in each of such places. Nevertheless, our effective tax rate may be different than experienced in the past due to numerous factors, including passage of the Tax Cuts and Jobs Act and the CARES Act, changes in the mix of our profitability from state to state, the results of examinations and audits of our tax filings, our inability to secure or sustain acceptable agreements with tax authorities, changes in accounting for income taxes and changes in tax laws. Any of these factors could cause us to experience an effective tax rate significantly different from previous periods or our current expectations and may result in tax obligations in excess of amounts accrued in our financial statements.

Intellectual Property Risks

Litigation or other proceedings or third-party claims of intellectual property infringement, misappropriation or other violations may require us to spend significant time and money, and could in the future prevent us from selling our tests or impact our stock price, any of which could have a material adverse effect.

Our commercial success will depend in part on our avoiding infringement of patents and infringement, misappropriation or other violations of other proprietary rights of third parties, including for example the intellectual property of competitors. There is extensive intellectual property litigation involving the biotechnology and pharmaceutical industries and genetic sequencing technology. Our activities may be subject to claims that we infringe or otherwise violate patents owned or controlled by third parties. Numerous U.S. and foreign patents and pending patent applications exist in the genetic testing market and are owned by third parties. We cannot assure you that our operations do not, or will not in the future, infringe existing or future patents. For example, we are aware of several third-party issued U.S. patents and pending patent applications with claims relating to genetic sequencing technology and methodology that may be asserted against us and may be construed to encompass our products and services, including ACE ImmunoID and ImmunoID NeXT technology. In order to avoid infringing these third-party patents, we may find it necessary to or prudent to initiate invalidity proceedings against such patents or to obtain licenses from such third-party intellectual property holders. If we are not able to invalidate such patents or obtain or maintain a license on commercially reasonable terms and such third parties assert infringement claims against us, we may be prevented from exploiting our technology and our business, financial condition, results of operations, and prospects may be materially and adversely affected. We may also be unaware of patents that a third party, including for example a competitor in the genetic testing market, might assert are infringed by our business. There may also be patent applications that, if issued as patents, could be asserted against us. Patent applications in the United States and elsewhere are typically published approximately 18 months after the earliest filing for which priority is claimed, with such earliest filing date being commonly referred to as the priority date. Certain U.S. patent applications that will not be filed outside the United States can remain confidential until patents issue. Therefore, patent applications covering our products, services, or technologies could have been filed by third parties without our knowledge. Additionally, pending patent applications that have been published can, subject to certain limitations, be later amended in a manner that could cover our products, services, technologies, and their use. The scope of a patent claim is determined by an interpretation of the law, the written disclosure in a patent and the patent's prosecution history and can involve other factors such as expert opinion. Our interpretation of the relevance or the scope of claims in a patent or a pending application may be incorrect, which may negatively impact our ability to market our products and services. Further, we may incorrectly determine that our technologies, products, or services are not covered by a third-party patent or may incorrectly predict whether a third party's pending patent application will issue with claims of relevant scope. Our determination of the expiration date of any patent in the United States or abroad that we consider relevant may be incorrect, which may negatively impact our ability to develop and market our products or services.

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Third-party intellectual property right holders may also actively bring infringement or other intellectual property-related claims against us, even if we have received patent protection for our technologies, products, and services. Regardless of the merit of third parties' claims against us for infringement, misappropriation or violations of their intellectual property rights, such third parties may seek and obtain injunctive or other equitable relief, which could effectively block our ability to perform our tests. Further, if a patent infringement suit were brought against us, we could be forced to stop or delay our development or sales of any tests or other activities that are the subject of such suit. Defense of these claims, even if such claims are resolved in our favor, could cause us to incur substantial expenses and be a substantial diversion of our employee resources even if we are ultimately successful. Any adverse ruling or perception of an adverse ruling in defending ourselves could have a material adverse impact on our cash position and stock price. Such litigation or proceedings could substantially increase our operating losses and reduce the resources available for development activities or any future sales, marketing, or distribution activities. We may not have sufficient financial or other resources to conduct such litigation or proceedings adequately. Some of our competitors may be able to sustain the costs of such litigation or proceedings more effectively than we can because of their greater financial resources and more mature and developed intellectual property portfolios.

As we continue to commercialize our tests in their current or an updated form, launch different and expanded tests and enter new markets, other competitors might claim that our tests infringe, misappropriate or violate their intellectual property rights as part of business strategies designed to impede our successful commercialization and entry into new markets. If such a suit were brought, regardless of merit, there is no assurance that a court would find in our favor on questions of infringement, validity, enforceability or priority. Even if we are successful in defending against such a suit, we could incur substantial costs and diversion of the attention of our management and technical personnel in defending ourselves against such claims. A court of competent jurisdiction could hold that third-party patents asserted against us are valid, enforceable, and infringed, which could materially and adversely affect our ability to commercialize any products, services or technologies we may develop and any other technologies covered by the asserted third-party patents and any adverse ruling or perception of an adverse ruling in defending ourselves could have a material adverse impact on our cash position and stock price. If we are found to infringe, misappropriate or otherwise violate a third party's intellectual property rights, and we are unsuccessful in demonstrating that such rights are invalid or unenforceable, we may be required to pay substantial damages, including treble damages and attorneys' fees for willful infringement; obtain one or more licenses from third parties in order to continue developing and marketing our products and technology, which may not be available on commercially reasonable terms (if at all) or may be non-exclusive, thereby giving our competitors and other third parties access to the same technologies licensed to us; pay substantial royalties and other fees; and redesign any infringing tests or other activities, which may be impossible or require substantial time and monetary expenditure, or be prohibited from commercializing certain tests, all of which could have a material adverse effect on our business, financial condition, results of operations, and prospects.

Where we collaborate with third parties in the development of technology, our collaborators may not properly maintain or defend our intellectual property rights or may use our proprietary information in such a way as to invite litigation that could jeopardize or invalidate our intellectual property or proprietary information. Further, collaborators may infringe the intellectual property rights of third parties, which may expose us to litigation and potential liability. Also, we may be obligated under our agreements with our collaborators, licensors, suppliers and others to indemnify and hold them harmless for damages arising from intellectual property infringement by us.

If we cannot license rights to use technologies on reasonable terms, we may not be able to commercialize new products in the future.

In the future, we may identify additional third-party intellectual property we may need to license in order to engage in our business, including to develop or commercialize new products or services. However, such licenses may not be available on acceptable terms or at all. Even if such licenses are available, we may be required to pay the licensor substantial royalties based on sales of our products and services. Such royalties are a component of the cost of our products or services and may affect the margins on our products and services. In addition, such licenses may be nonexclusive, which could give our competitors access to the same intellectual property licensed to us. If we are unable to enter into the necessary licenses on acceptable terms or at all, if any necessary licenses are subsequently terminated, if our licensors fail to abide by the terms of the licenses, if our licensors fail to prevent infringement by third parties, or if the licensed patents or other rights are found to be invalid or unenforceable, our business, financial condition, results of operations, and prospects could be materially and adversely affected.

If licenses to third-party intellectual property rights are or become required for us to engage in our business, the rights may be non-exclusive, which could give our competitors access to the same technology or intellectual property rights licensed to us. Moreover, we could encounter delays in the introduction of tests while we attempt to develop alternatives. Defense of any lawsuit or failure to obtain any of these licenses on favorable terms could prevent us from commercializing tests, which could materially affect our ability to grow and thus adversely affect our business and financial condition.

Developments or uncertainty in the patent statute, patent case law or U.S. Patent and Trademark Office (“USPTO”), rules and regulations may impact the validity, scope or enforceability of our patent rights, thereby impairing our ability to protect our products.

Our patent rights, their associated costs, and the enforcement or defense of such patent rights may be affected by developments or uncertainty in the patent statute, patent case law or USPTO rules and regulations.

There are a number of recent changes to the patent laws that may have a significant impact on our ability to protect our technology and enforce our intellectual property rights. For example, the Leahy-Smith America Invents Act (the “AIA”) enacted within the last several years involves significant changes in patent legislation. These include provisions that affect the way patent applications will be prosecuted and may also affect patent litigation. As an example, assuming that other requirements for patentability are met, prior to March 2013, in the United States, the first to invent the claimed invention was entitled to the patent, while outside the United States, the first to file a patent application was entitled to the patent. On or after March 16, 2013, under the AIA, the United States transitioned to a first inventor to file system in which, assuming that other requirements for patentability are met, means that the party that is first to file in the United States generally is awarded the patent rights, regardless of whether such party invented the claimed invention first.

The AIA also includes a number of significant changes that affect the way patent applications will be prosecuted and also may affect patent litigation. These include allowing third party submission of prior art to the USPTO during patent prosecution and additional procedures to attack the validity of a patent by USPTO administered post-grant proceedings, including post-grant review, *inter partes* review, and derivation proceedings. Because of a lower evidentiary standard in USPTO proceedings compared to the evidentiary standard in United States federal courts necessary to invalidate a patent claim, a third party could potentially provide evidence in a USPTO proceeding sufficient for the USPTO to hold a claim invalid even though the same evidence would be insufficient to invalidate the claim if first presented in a district court action. Accordingly, a third party may attempt to use the USPTO procedures to invalidate our patent claims that would not have been invalidated if first challenged by the third party as a defendant in a district court action. The AIA and its implementation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents, all of which could have a material adverse effect on our business, financial condition, results of operations, and prospects.

Further, the standards applied by the USPTO and foreign patent offices in granting patents are not always applied uniformly or predictably. For example, there is no uniform worldwide policy regarding patentable subject matter or the scope of claims allowable in biotechnology patents. As such, we do not know the degree of future protection that we will have on our technologies, products, and services. While we will endeavor to try to protect our technologies, products, and services with intellectual property rights such as patents, as appropriate, the process of obtaining patents is time-consuming, expensive, and sometimes unpredictable.

In addition, the patent position of companies engaged in the development and commercialization of diagnostic tests is particularly uncertain. Various courts, including the Supreme Court have rendered decisions that affect the scope of patentability of certain inventions or discoveries relating to certain diagnostic tests and related methods. These decisions state, among other things, that a patent claim that recites an abstract idea, natural phenomenon or law of nature (for example, the relationship between particular genetic variants and cancer) are not themselves patentable. Precisely what constitutes a law of nature or abstract idea is uncertain, and it is possible that certain aspects of genetic diagnostics tests would be considered natural laws. Accordingly, the evolving case law in the United States may adversely affect our ability to obtain patents and may facilitate third-party challenges to any owned or licensed patents. The laws of some foreign countries do not protect intellectual property rights to the same extent as the laws of the United States, and we may encounter difficulties in protecting and defending such rights in foreign jurisdictions. The legal systems of many other countries do not favor the enforcement of patents and other intellectual property protection, particularly those relating to biotechnology, which could make it difficult for us to stop the infringement of our patents in such countries. Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial cost and divert our efforts and attention from other aspects of our business.

Patent terms may be inadequate to protect our competitive position for an adequate amount of time.

Patents have a limited lifespan. In the United States, the natural expiration of a patent is generally 20 years after its first effective non-provisional filing date. Although various extensions may be available, the life of a patent, and the protection it affords, is limited. Even if patents covering our technologies, products, and services are obtained, once the patent life has expired, we may be open to competition from competitive products. Our issued patents will expire on dates ranging from 2033 to 2038, subject to any patent extensions that may be available for such patents. If patents are issued on our pending patent applications, the resulting patents are projected to expire on dates ranging from 2033 to 2040. In addition, although upon issuance in the United States a patent's life can be increased based on certain delays caused by the USPTO, this increase can be reduced or eliminated based on certain delays caused by the patent applicant during patent prosecution. If we do not have sufficient patent life to protect our technologies, products and services, our competitive position, business, financial condition, results of operations, and prospects will be adversely affected.

If we are not able to obtain and enforce patent protection for any products we develop and for our technologies, or if the scope of patent protection obtained is not sufficiently broad, our competitors and other third parties could develop and commercialize products and technology similar or identical to ours, and our ability to successfully commercialize our products, services, and technologies may be adversely affected.

We have applied, and we intend to continue applying, for patents covering such aspects of our technologies as we deem appropriate. However, the patent process is expensive, time consuming and complex, and we may not be able to apply for patents on certain aspects of our services, products, and other technologies in a timely fashion, at a reasonable cost, in all jurisdictions or at all, and any potential patent coverage we obtain may not be sufficient to prevent substantial competition.

Moreover, the patent position of biotechnology companies can be highly uncertain because it involves complex legal and factual questions for which important legal principles remain unresolved. No consistent policy regarding the breadth of claims allowed in such companies' patents has emerged to date in the United States or

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elsewhere. Courts frequently render opinions in the biotechnology field that may affect the patentability of certain inventions or discoveries, including opinions that may affect the patentability of methods for analyzing nucleic acid sequences.

Others may independently develop similar or alternative technologies or design around technologies for which we may not be able to obtain patent protection. In addition, any patent applications we file may be challenged and may not result in issued patents or may be invalidated, rendered unenforceable or narrowed in scope after they are issued, and there is no guarantee any of our issued patents include or will include claims that are sufficiently broad to cover our products, services and other technologies or to provide meaningful protection from our competitors. Consequently, we do not know whether any of our platform advances, products, services, and other technologies will be protectable or remain protected by valid and enforceable patents. Our competitors or other third parties may be able to circumvent our patents by developing similar or alternative technologies or products in a non-infringing manner.

Even if they are unchallenged, our patents and patent applications may not adequately protect our intellectual property, provide exclusivity for our technologies, products, and services, or prevent others from designing around our claims. Any finding that our patents or applications are invalid, unpatentable, or unenforceable could harm our ability to prevent others from practicing the related technology, and a finding that others have inventorship or ownership rights to our patents and applications could require us to obtain certain rights to practice related technologies, which may not be available on favorable terms, if at all. If we initiate lawsuits to protect or enforce our patents, or litigate against third-party claims, which would be expensive, and, if we lose, we may lose some of our intellectual property rights. Furthermore, these lawsuits may divert the attention of our management and technical personnel. Any of the foregoing could have a material adverse effect on our competitive position, business, financial condition, results of operations, and prospects.

Once granted, patents may remain open to opposition, interference, re-examination, post-grant review, *inter partes* review, nullification or derivation action in court or before patent offices or similar proceedings for a given period after allowance or grant, during which time third parties can raise objections against such initial grant. In the course of such proceedings, which may continue for a protracted period of time, the patent owner may be compelled to limit the scope of the granted claims thus attacked, or may lose the granted claims altogether. An adverse determination in any such proceeding or litigation could reduce the scope of, or invalidate, our patent rights, allow third parties to commercialize our technology or products and compete directly with us, without payment to us, or result in our inability to commercialize our products, services and technologies without infringing third-party patent rights. Such proceedings also may result in substantial cost and require significant time from our scientists and management, even if the eventual outcome is favorable to us. If the breadth or strength of protection provided by our patents and patent applications is threatened, regardless of the outcome, it could dissuade companies from collaborating with us to license, develop or commercialize current or future products or technologies. In addition, there can be no assurance that:

- others will not or may not be able to make, use, offer to sell, or sell tests that are the same as or similar to our products or services but that are not covered by the claims of the patents that we own or license;
- we or our future licensors or collaborators are the first to make the inventions covered by each of our issued patents and pending patent applications that we own or license;
- we or our future licensors or collaborators are the first to file patent applications covering certain aspects of our inventions;
- others will not independently develop similar or alternative technologies or duplicate any of our technologies without infringing our intellectual property rights;
- a third party may not challenge our patents and, if challenged, a court would hold that our patents are valid, enforceable, and infringed;
- any issued patents that we own or may license will provide us with any competitive advantages, or will not be challenged by third parties;

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- we may develop or in-license additional proprietary technologies that are patentable;
- pending patent applications that we own or may license will lead to issued patents;
- the patents of others will not have a material or adverse effect on our business, financial condition, results of operations, and prospects; and
- our competitors do not conduct research and development activities in countries where we do not have enforceable patent rights and then use the information learned from such activities to develop competitive products for sale in our major commercial markets.

The issuance of a patent is not conclusive as to its inventorship, scope, validity, or enforceability. Some of our patents or patent applications may be challenged at a future point in time in opposition, derivation, reexamination, *inter partes* review, post-grant review, or interference proceedings. Any successful opposition to these patents or any other patents owned by or, if applicable in the future, licensed to us could deprive us of rights necessary for the practice of our technologies or the successful commercialization of any products or technologies that we may develop, which could lead to increased competition to our business and harm our business. Since patent applications in the United States and most other countries are confidential for a period of time after filing, we cannot be certain that we or our licensors were the first to file any patent application related to our technologies, products, or services. Furthermore, an interference proceeding can be provoked by a third party or instituted by the USPTO to determine who was the first to invent any of the subject matter covered by the patent claims of our applications for any application with an effective filing date before March 16, 2013.

Where we obtain licenses from or collaborate with third parties, in some circumstances, we may not have the right to control the preparation, filing, and prosecution of patent applications, or to maintain the patents, covering technology that we license from third parties. We may also require the cooperation of our licensors and collaborators to enforce any licensed patent rights, and such cooperation may not be provided. Therefore, these patents and applications may not be prosecuted and enforced in a manner consistent with the best interests of our business. Moreover, if we do obtain necessary licenses, we will likely have obligations under those licenses, and any failure to satisfy those obligations could give our licensor the right to terminate the license. Termination of a necessary license could have a material adverse impact on our business.

It is also possible that we fail to file patent applications covering inventions made in the course of development and commercialization activities before a competitor or another third party files a patent application covering, or publishes information disclosing, a similar, independently-developed invention. Such competitor's patent application may pose obstacles to our ability to obtain or limit the scope of patent protection we may obtain. Although we enter into non-disclosure and confidentiality agreements with parties who have access to confidential or patentable aspects of our research and development output, such as our employees, collaborators, contract manufacturers, consultants, advisors, and other third parties, any of these parties may breach the agreements and disclose such output before a patent application is filed, thereby jeopardizing our ability to seek patent protection. In addition, publications of discoveries in the scientific literature often lag behind the actual discoveries, and patent applications in the United States and other jurisdictions are typically not published until 18 months after filing, or in some cases not at all. Therefore, we cannot be certain that we or our licensors were the first to make the inventions claimed in our owned or licensed patents or pending patent applications, or were the first to file for patent protection of such inventions. To determine the priority of these inventions, we may have to participate in interference proceedings, derivation proceedings, *inter partes* review proceedings, or other post-grant proceedings declared by the USPTO that could result in substantial cost to us. The outcome of such proceedings is uncertain. No assurance can be given that other patent applications will not have priority over our patent applications. In addition, changes to the patent laws of the United States allow for various post-grant opposition proceedings, such as *inter partes* review proceedings, that have not been extensively tested, and their outcome is therefore uncertain. An unfavorable outcome could require us to cease using the related technology or to attempt to license rights to it from the prevailing party. Our business could be harmed if the prevailing party does not offer us a license on commercially reasonable terms or at all, or if a non-exclusive license is offered and

our competitors gain access to the same technology. Furthermore, if third parties bring these proceedings against our patents, we could experience significant costs and management distraction.

We may become involved in lawsuits to protect or enforce our patents or other intellectual property, which could be expensive, time consuming, and unsuccessful.

Competitors may also infringe our patents or the patents of our licensing partners. In addition, our patents or the patents of our licensors may become involved in inventorship, priority, or validity disputes. To counter or defend against such claims can be expensive and time consuming. In an infringement proceeding, a court may refuse to stop the other party from using the technology at issue on the grounds that our owned and in-licensed patents do not cover the technology in question. Further in such proceedings, the defendant could counterclaim that our asserted patent covering our product is invalid or unenforceable, and the court may agree that our asserted patent is invalid or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity or unenforceability are commonplace. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, including lack of novelty, obviousness or non-enablement. Grounds for an unenforceability assertion could be an allegation that someone connected with the prosecution of the patent withheld relevant information from the USPTO, or made a misleading statement, during prosecution. Third parties may also raise similar claims before administrative bodies in the United States or abroad, even outside the context of litigation. Such mechanisms include re-examination, post grant review, *inter partes* review, and equivalent proceedings in foreign jurisdictions (e.g., opposition proceedings). Such proceedings could result in revocation or amendment to our patents in such a way that they no longer cover our product. The outcome following legal assertions of invalidity and unenforceability is unpredictable. With respect to the validity question, for example, we cannot be certain that there is no invalidating prior art, of which we and the patent examiner were unaware during prosecution. An adverse result in any litigation or other proceeding could put one or more of our owned or in-licensed patents at risk of being invalidated or interpreted narrowly. Such a loss of patent protection could have a material adverse impact on our business. Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation.

Even if resolved in our favor, litigation or other legal proceedings relating to intellectual property claims may cause us to incur significant expenses and could distract our personnel from their normal responsibilities. In addition, there could be public announcements of the results of hearings, motions, or other interim proceedings or developments, and if securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on the price of our common stock. Such litigation or proceedings could substantially increase our operating losses and reduce the resources available for development activities or any future sales, marketing, or distribution activities. We may not have sufficient financial or other resources to conduct such litigation or proceedings adequately. Some of our competitors may be able to sustain the costs of such litigation or proceedings more effectively than we can because of their greater financial resources and more mature and developed intellectual property portfolios. Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings could have a material adverse effect on our ability to compete in the marketplace.

If we are unable to protect the confidentiality of our trade secrets and know-how, our business and competitive position would be harmed.

We seek protection for certain aspects of our technologies, products, and services through the filing of patents, registration of copyrights, and use of non-disclosure agreements. In addition, we also expect to rely on trade secrets and proprietary know-how protection for our confidential and proprietary information, and we have taken security measures to protect this information. These measures, however, may not provide adequate protection for our trade secrets, know-how, or other confidential information. Among other things, we seek to protect our trade secrets, know-how, and confidential information by entering into confidentiality agreements with parties who have access to them, such as our employees, collaborators, contract manufacturers, consultants, advisors, and other third parties. We cannot guarantee that we have entered into such agreements with each party that may have or have had access to our trade secrets or proprietary technology and processes. Moreover, there

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can be no assurance that any confidentiality agreements that we have with our employees, consultants, or other third parties will provide meaningful protection for our trade secrets, know-how, and confidential information or will provide adequate remedies in the event of unauthorized use or disclosure of such information. Despite these efforts, any of these parties may breach the agreements and disclose our proprietary information, including our trade secrets, and we may not be able to obtain adequate remedies for such breaches. Monitoring unauthorized uses and disclosures is difficult, and we do not know whether the steps we have taken to protect our proprietary technologies will be effective. Accordingly, there also can be no assurance that our trade secrets or know-how will not otherwise become known or be independently developed by competitors.

Enforcing a claim that a party illegally disclosed or misappropriated a trade secret can be difficult, expensive, and time-consuming, and the outcome is unpredictable. In addition, trade secrets may be independently developed by others in a manner that could prevent legal recourse by us. If any of our confidential or proprietary information, such as our trade secrets, were to be disclosed or misappropriated, or if any such information was independently developed by a competitor, our competitive position would be materially and adversely harmed.

Trade secrets and know-how can be difficult to protect as trade secrets and know-how will over time be disseminated within the industry through independent development, the publication of journal articles, and the movement of personnel skilled in the art from company to company or academic to industry scientific positions. If any of our trade secrets were to be lawfully obtained or independently developed by a competitor or other third party, we would have no right to prevent such competitor from using that technology or information to compete with us, which could harm our competitive position. Because from time to time we expect to rely on third parties in the development, manufacture and distribution of our products and provision of our services, we must, at times, share trade secrets with them. We seek to protect our proprietary technology in part by entering into confidentiality agreements and, if applicable, material transfer agreements, license agreements, collaboration agreements, supply agreements, consulting agreements, or other similar agreements with our advisors, employees, collaborators, licensors, suppliers, third-party contractors, and consultants prior to beginning research or disclosing proprietary information. These agreements typically limit the rights of the third parties to use or disclose our confidential information, including our trade secrets and know-how. Despite the contractual provisions employed when working with third parties, the need to share trade secrets, know-how, and other confidential information increases the risk that such trade secrets and know-how become known by our competitors, are inadvertently incorporated into the technology of others, or are disclosed or used in violation of these agreements. Given that our proprietary position is based, in part, on our know-how and trade secrets, a competitor's discovery of our trade secrets or know-how, or other unauthorized use or disclosure would impair our competitive position and may have an adverse effect on our business and results of operations.

In addition, these agreements typically restrict the ability of our advisors, employees, collaborators, licensors, suppliers, third-party contractors, and consultants to publish data potentially relating to our trade secrets or know-how, although our agreements may contain certain limited publication rights. Despite our efforts to protect our trade secrets and know-how, our competitors may discover our trade secrets or know-how, either through breach of our agreements with third parties, independent development, or publication of information by any of our third-party collaborators. A competitor's discovery of our trade secrets or know-how would impair our competitive position and have a material adverse impact on our business.

We may not be able to enforce our intellectual property rights throughout the world.

Filing, prosecuting, maintaining, defending, and enforcing patents on our products, services, and technologies in all countries throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the United States can be less extensive than those in the United States. Competitors may use our technologies in jurisdictions where we have not obtained patent protection to develop their own products and, further, may export otherwise infringing products to territories where we have patent protection or licenses but enforcement is not as strong as that in the United States. These products may compete

with our products, and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing. In addition, the laws of some foreign countries do not protect proprietary rights to the same extent as the laws of the United States, and many companies have encountered significant challenges in establishing and enforcing their proprietary rights outside of the United States. These challenges can be caused by the absence or inconsistency of the application of rules and methods for the establishment and enforcement of intellectual property rights outside of the United States. In addition, the legal systems of some countries, particularly developing countries, do not favor the enforcement of patents and other intellectual property protection, especially those relating to healthcare. This could make it difficult for us to stop the infringement of our patents, if obtained, or the misappropriation of our other intellectual property rights. For example, many foreign countries, including European Union countries, India, Japan, and China, have compulsory licensing laws under which a patent owner may be compelled under specified circumstances to grant licenses to third parties. In addition, many countries limit the enforceability of patents against third parties, including government agencies or government contractors. In these countries, patents may provide limited or no benefit given that we may have limited remedies available if patents are infringed or if we are compelled to grant a license to a third party, which could materially diminish the value of those patents and limit our potential revenue opportunities. Furthermore, patent protection must ultimately be sought on a country-by-country basis, which is an expensive and time-consuming process with uncertain outcomes. Accordingly, we may choose not to seek patent protection in certain countries, and we will not have the benefit of patent protection in such countries.

Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business. Accordingly, our efforts to protect our intellectual property rights in such countries may be inadequate. In addition, changes in the law and legal decisions by courts in the United States and foreign countries may affect our ability to obtain adequate protection for our products, services and other technologies and the enforcement of intellectual property. Any of the foregoing could have a material adverse effect on our competitive position, business, financial condition, results of operations, and prospects.

Obtaining and maintaining patent protection depends on compliance with various procedural, document submission, fee payment and other requirements imposed by governmental patent agencies, and our patent protection could be reduced or eliminated for non-compliance with these requirements.

The USPTO and various foreign governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other provisions during the patent application and prosecution process. Periodic maintenance fees, renewal fees, annuity fees, and various other governmental fees on patents and/or applications will be due to be paid to the USPTO and various other governmental patent agencies outside of the United States in several stages over the lifetime of the patents and/or applications. We employ reputable professionals and rely on such third parties to help us comply with these requirements and effect payment of these fees with respect to the patents and patent applications that we own. Noncompliance events that could result in abandonment or lapse of a patent or patent application include failure to respond to official communications within prescribed time limits, non-payment of fees and failure to properly legalize and submit formal documents. In many cases, an inadvertent lapse can be cured by payment of a late fee or by other means in accordance with the applicable rules. However, there are situations in which noncompliance can result in abandonment or lapse of a patent or patent application, resulting in loss of patent rights in the relevant jurisdiction. In such an event, competitors might be able to enter the market earlier than would otherwise have been the case, which could have a material adverse effect on our competitive position, business, financial condition, results of operations, and prospects.

Third parties may assert that our employees or consultants have wrongfully used or disclosed confidential information or misappropriated trade secrets.

We employ individuals who were previously employed or otherwise engaged with universities or genetic testing, diagnostic or other healthcare companies, including our competitors or potential competitors.

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Although we have policies to ensure that our employees and consultants do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that we or our employees or consultants have inadvertently or otherwise used or disclosed intellectual property, including trade secrets or other proprietary information, of a former employer or other third parties. Further, we may be subject to ownership disputes in the future arising, for example, from conflicting obligations of consultants or others who are involved in developing our intellectual property. Litigation may be necessary to defend against these claims. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management and other employees. Such claims could have a material adverse effect on our business, financial condition, results of operations, and prospects.

In addition, while it is our policy to require our employees and contractors who may be involved in the conception or development of intellectual property to execute agreements assigning such intellectual property to us, we may be unsuccessful in executing such an agreement with each party who, in fact, conceives or develops intellectual property that we regard as our own. The assignment of intellectual property rights may not be self-executing, or the assignment agreements may be breached, and we may be forced to bring claims against third parties, or defend claims that they may bring against us, to determine the ownership of what we regard as our intellectual property. Such claims could have a material adverse effect on our business, financial condition, results of operations, and prospects.

Our use of “open source” software could subject our proprietary software to general release, adversely affect our ability to sell our products and services, and subject us to possible litigation.

A portion of the products or technologies licensed, developed, and/or distributed by us incorporate so-called “open source” software and we may incorporate open source software into other products in the future. Such open source software is generally licensed by its authors or other third parties under open source licenses. Some open source licenses contain requirements that we disclose source code for modifications we make to the open source software and that we license such modifications to third parties at no cost. In some circumstances, distribution of our software in connection with open source software could require that we disclose and license some or all of our proprietary code in that software, as well as distribute our products or provide our services that use particular open source software at no cost to the user. We monitor our use of open source software in an effort to avoid uses in a manner that would require us to disclose or grant licenses under our proprietary source code; however, there can be no assurance that such efforts will be successful. Open source license terms are often ambiguous and such use could inadvertently occur. There is little legal precedent governing the interpretation of many of the terms of these licenses, and the potential impact of these terms on our business may result in unanticipated obligations regarding our products and technologies. Companies that incorporate open source software into their products have, in the past, faced claims seeking enforcement of open source license provisions and claims asserting ownership of open source software incorporated into their products. If an author or other third party that distributes such open source software were to allege that we had not complied with the conditions of an open source license, we could incur significant legal costs defending ourselves against such allegations. In the event such claims were successful, we could be subject to significant damages or be enjoined from the distribution of our products. In addition, if we combine our proprietary software with open source software in certain ways, under some open source licenses, we could be required to release the source code of our proprietary software, which could substantially help our competitors develop products that are similar to or better than ours and otherwise adversely affect our business. These risks could be difficult to eliminate or manage, and, if not addressed, could have a material adverse effect on our business, financial condition, and results of operations.

If we fail to comply with our obligations under license or technology agreements with third parties, we may be required to pay damages and we could lose license rights that are critical to our business.

We license certain intellectual property that is important to our business, and in the future we may enter into additional agreements that provide us with licenses to valuable intellectual property or technology. For example, our agreements with third parties, such as Illumina, include certain non-exclusive license rights that are essential

to the operation of our business as it is currently conducted. If we fail to comply with any of the obligations under our license agreements, we may be required to pay damages and the licensor may have the right to terminate the license. Termination by the licensor would cause us to lose valuable rights, and could prevent us from selling our products and services, or inhibit our ability to commercialize future products and services. Our business would suffer if any current or future licenses terminate, if the licensors fail to abide by the terms of the license, if the licensors fail to enforce licensed patents against infringing third parties, if the licensed patents or other rights are found to be invalid or unenforceable, or if we are unable to enter into necessary licenses on acceptable terms. In addition, our rights to certain technologies, including those of Illumina, are licensed to us on a non-exclusive basis. The owners of these non-exclusively licensed technologies are therefore free to license them to third parties, including our competitors, on terms that may be superior to those offered to us, which could place us at a competitive disadvantage. Moreover, our licensors may own or control intellectual property that has not been licensed to us and, as a result, we may be subject to claims, regardless of their merit, that we are infringing or otherwise violating the licensor's rights.

We may be subject to claims challenging the inventorship of our patents and other intellectual property.

We or our licensors may be subject to claims that former employees, collaborators, or other third parties have an interest in our patents, trade secrets, or other intellectual property as an inventor or co-inventor. For example, we or our licensors may have inventorship disputes arise from conflicting obligations of employees, consultants, or others who are involved in developing our products, services, or technologies. Litigation may be necessary to defend against these and other claims challenging inventorship or our licensors' ownership of our owned or in-licensed patents, trade secrets, or other intellectual property. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights, such as exclusive ownership of, or right to use, intellectual property that is important to our products, services, or technologies. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management and other employees. Any of the foregoing could have a material adverse effect on our business, financial condition, results of operations, and prospects.

If our trademarks and trade names are not adequately protected, then we may not be able to build name recognition in our markets of interest and our business may be adversely affected.

Our trademarks or trade names may be challenged, infringed, circumvented, or declared generic or determined to be infringing on other marks. We may not be able to protect our rights to these trademarks and trade names or may be forced to stop using these names, which we need for name recognition by potential partners or customers in our markets of interest. During trademark registration proceedings, we may receive rejections. Although we would be given an opportunity to respond to those rejections, we may be unable to overcome such rejections. In addition, in the USPTO and in comparable agencies in many foreign jurisdictions, third parties are given an opportunity to oppose pending trademark applications and to seek to cancel registered trademarks. Opposition or cancellation proceedings may be filed against our trademarks, and our trademarks may not survive such proceedings. If we are unable to establish brand name recognition based on our trademarks and trade names, we may not be able to compete effectively and our business may be adversely affected.

Financial and Market Risks and Risks Related to Owning Our Common Stock

Certain of our customers prepay us for a portion of the services that they expect to order from us in the future and we may be required to refund some or all of those prepayments if a customer cancels its contract with us or reduces the level of services that it expects to receive.

Certain of our customers prepay us for a portion of the services that they expect to order from us before they place purchase orders and we deliver those services. In some cases, this prepayment can be substantial and may be paid months or a year or more in advance of these customers providing samples to us and before our delivery of the services to which some or all of the deposit relates. As of September 30, 2020, we had approximately \$20.6 million in customer deposits, including \$17.6 million from one customer. However, as of that date, we had

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\$206.1 million of cash and cash equivalents, and short-term investments. We are generally not required by our contracts to retain these deposits in cash or otherwise and we have generally used these deposits to make capital expenditures and fund our operations. When a customer that has prepaid us for future services cancels its contract with us or reduces the level of services that it expects to receive, we are required to repay that customer's deposit with little or no notice. We may not have the cash or other available resources to satisfy that repayment obligation. Even if we are able to satisfy the repayment obligation from available resources, we may need to seek additional sources of capital to fund our operations, which funding may not be available when needed or on acceptable terms. In either of those circumstances, our business, financial condition, results of operations, and reputation would be materially and adversely affected. Furthermore, in the future, customers may elect not to prepay us for our services in which case we would have to find other sources of funding for our capital expenditures and operations, which would be costly relative to the aforementioned cost-free customer deposit funding and which may not be available when needed or on acceptable terms.

Our inability to raise additional capital on acceptable terms in the future may limit our ability to continue to operate our business and further expand our operations.

We expect capital expenditures and operating expenses to increase over the next several years as we continue to operate our business and expand our infrastructure, commercial operations, and research and development activities. Additionally, if we decide to grow our business by developing in vitro diagnostic tests, our capital expenditures and operating expenses would significantly increase. We may seek to raise additional capital through equity offerings, debt financings, collaborations, or licensing arrangements. Additional funding may not be available to us on acceptable terms, or at all.

The various ways we could raise additional capital carry potential risks. If we raise funds by issuing equity securities, dilution to our stockholders would result. Any equity securities issued may also provide for rights, preferences, or privileges senior to those of holders of our common stock. In addition, the issuance of additional equity securities by us, or the possibility of such issuance, may cause the market price of our common stock to decline. If we raise funds by issuing debt securities, those debt securities would have rights, preferences, and privileges senior to those of holders of our common stock. The terms of debt securities issued or borrowings pursuant to a credit agreement, if available, could impose significant restrictions on our operations. The incurrence of additional indebtedness or the issuance of certain equity securities could result in increased fixed payment obligations and could also result in restrictive covenants, such as limitations on our ability to incur additional debt or issue additional equity, limitations on our ability to acquire or license intellectual property rights, and other operating restrictions that could adversely affect our ability to conduct our business. In the event that we enter into collaborations or licensing arrangements to raise capital, we may be required to accept unfavorable terms. These agreements may require that we relinquish or license to a third party on unfavorable terms our rights to tests we otherwise would seek to develop or commercialize ourselves, or reserve certain opportunities for future potential arrangements when we might be able to achieve more favorable terms.

If we are not able to secure additional funding when needed, we may have to delay, reduce the scope of or eliminate one or more research and development programs or sales and marketing initiatives. Our ability to raise additional capital may be adversely impacted by potential worsening global economic conditions and the recent disruption to and volatility in the credit and financial markets in the United States and worldwide resulting from the ongoing COVID-19 pandemic. In addition, we may have to work with a partner on one or more aspects of our tests or market development programs, which could lower the economic value of those tests or programs to us. While we believe our existing cash and cash equivalents, and short-term investments will be sufficient to meet our anticipated cash requirements for at least the next 12 months, we cannot assure you that we will generate sufficient revenues from commercial sales to adequately fund our operating needs or achieve or sustain profitability.

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The market price of our common stock may be volatile or may decline steeply or suddenly regardless of our operating performance, we may not be able to meet investor or analyst expectations, and you may lose all or part of your investment.

The market price of our common stock may fluctuate or decline significantly in response to numerous factors, many of which are beyond our control, including:

- actual or anticipated fluctuations in our operating results;
- failure to meet or exceed financial estimates and projections of the investment community or that we provide to the public;
- issuance of new or updated research reports by securities analysts or changed recommendations for our stock;
- competition from existing tests or new tests that may emerge;
- announcements by us or our competitors of significant acquisitions, strategic partnerships, joint ventures, collaborations, capital commitments, or by or pertaining to our customers, particularly the VA MVP, as our largest customer;
- the timing and amount of our investments in the growth of our business;
- actual or anticipated changes in regulatory oversight of our business or issues we may face with regulators;
- additions or departures of key management or other personnel;
- inability to obtain additional funding;
- sales of our common stock by us or our stockholders in the future;
- disputes or other developments related to our intellectual property or other matters, including litigation;
- the long-term macroeconomic effects of the COVID-19 pandemic, including potential global, regional or national economic slowdowns, recessions, depressions or other economic downturns; and
- general economic, industry, and market conditions, including factors unrelated to our operating performance or the operating performance of our competitors.

In addition, the stock market in general, and the market for life sciences companies in particular, has experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of those companies, including very recently in connection with the ongoing COVID-19 pandemic, which has resulted in depressed stock prices for many companies notwithstanding the lack of a fundamental change in their underlying business models or prospects. Broad market and industry factors may seriously affect the market price of our common stock, regardless of our actual operating performance. In addition, in the past, following periods of volatility in the overall market and the market price of a particular company's securities, securities class action litigation has often been instituted against these companies. This litigation, if instituted against us, could result in substantial costs and a diversion of our management's attention and resources.

Moreover, because of these fluctuations, comparing our operating results on a period-to-period basis may not be meaningful. You should not rely on our past results as an indication of our future performance. This variability and unpredictability could also result in our failing to meet the expectations of industry or financial analysts or investors for any period. If our revenues or operating results fall below the expectations of analysts or investors or below any forecasts we may provide to the market, or if the forecasts we provide to the market are below the expectations of analysts or investors, the price of our common stock could decline substantially. Such a stock price decline could occur even when we have met any previously publicly stated revenues or earnings forecasts that we may provide.

Our quarterly results may fluctuate significantly, which could adversely impact the value of our common stock.

Our quarterly results of operations, including our revenue, gross margin, profitability, and cash flows, may vary significantly in the future, and period-to-period comparisons of our operating results may not be meaningful. Accordingly, our quarterly results should not be relied upon as an indication of future performance. Our quarterly financial results may fluctuate as a result of a variety of factors, many of which are outside of our control. For example, the VA MVP and other large customers are not obliged to deliver tissue samples or other specimens to us at any particular time or at all. The rate at which we receive tissue samples or other specimens can vary dramatically from quarter to quarter, and is difficult or impossible for us to accurately forecast. Our receipt and processing of tissue samples and other specimens from our customers leads to our recognition of revenue, and as such the variable rates of delivery of customer samples will lead to variations in our revenues from quarter to quarter. For example, we often see fluctuations in receipt and processing of samples and revenues in the fourth quarter due, in part, to the concentration of holidays in late November and in December and some of our biopharmaceutical customers have fiscal years ending in December, which we believe may impact the timing of samples or payments provided by such customers. Fluctuations in quarterly results may adversely impact the value of our common stock. Factors that may cause fluctuations in our quarterly financial results include, without limitation, those listed elsewhere in this “Risk Factors” section. We also may face competitive pricing pressures, and we may not be able to maintain our pricing in the future, which would adversely affect our operating results.

Insiders may exercise significant control over our company and will be able to influence corporate matters.

Acting together, our directors, executive officers and their affiliates, and holders of greater than five percent of our outstanding common stock are able to exercise significant influence over our management and affairs and matters requiring stockholder approval, including the election of directors and approval of significant corporate transactions, such as mergers, consolidations or the sale of substantially all of our assets. This concentration of ownership may have the effect of delaying or preventing a third party from acquiring control of our company and could adversely affect the market price of our common stock, and may not be in the best interests of our other stockholders.

Future sales of shares by existing stockholders, or the perception that such sales could occur, could cause our stock price to decline.

Sales of a substantial number of shares of our common stock into the public market, including sales by members of our management or board of directors or entities affiliated with such members, could occur at any time. These sales, or the perception in the market that the holders of a large number of shares intend to sell shares, could reduce the market price of our common stock and could impair our ability to raise capital through the sale of additional equity or equity-related securities. We are unable to predict the effect that such sales may have on the prevailing market price of our common stock. As of September 30, 2020, we had 38,790,189 shares of common stock outstanding, all of which shares were eligible as of such date for sale in the public market, subject in some cases to the volume limitations and manner of sale and other requirements under Rule 144. In addition, upon issuance, shares of common stock subject to outstanding options under our stock option plans as of September 30, 2020 will become eligible for sale in the public market in the future, subject to certain legal and contractual limitations. Moreover, certain holders of shares of our common stock have the right to require us to register these shares under the Securities Act pursuant to an investors’ rights agreement. If our existing stockholders sell substantial amounts of our common stock in the public market, or if the public perceives that such sales could occur, this could have an adverse effect on the market price of our common stock.

We do not currently intend to pay dividends on our common stock and, consequently, your ability to achieve a return on your investment will depend on appreciation of the value of our common stock.

We have never declared or paid cash dividends on our capital stock. We currently intend to retain any future earnings to finance the operation and expansion of our business, and we do not expect to pay any cash dividends on our common stock in the foreseeable future. In addition, our ability to pay cash dividends on our capital stock is limited by our credit agreement and may be prohibited or limited by the terms of any future debt financing arrangement. As a result, any investment returns on our common stock will depend upon increases in the value for our common stock, which are not certain.

Future sales and issuances of our common stock or rights to purchase common stock, including pursuant to our equity incentive plans, could result in additional dilution of the percentage ownership of our stockholders and could cause the stock price of our common stock to decline.

In the future, we may sell common stock, rights to purchase common stock, convertible securities, or other equity securities in one or more transactions at prices and in a manner we determine from time to time. We also expect to issue common stock to employees, directors, and consultants pursuant to our equity incentive plans. If we sell common stock, rights to purchase common stock, convertible securities, or other equity securities in subsequent transactions, or common stock is issued pursuant to equity incentive plans, investors may be materially diluted. In addition, new investors in such subsequent transactions could gain rights, preferences, and privileges senior to those of holders of our common stock.

If securities or industry analysts do not publish research or reports about our business, or publish inaccurate or unfavorable research about our business, our stock price and trading volume could decline.

The trading market for our common stock will depend in part on the research and reports that equity research analysts publish about us and our business. We do not control these analysts or the content and opinions included in their reports. Securities analysts may elect not to provide research coverage of our company, and such lack of research coverage may adversely affect the market price of our common stock. The price of our common stock could also decline if one or more equity research analysts downgrade our common stock or issue other unfavorable commentary or cease publishing reports about us or our business. If one or more equity research analysts cease coverage of our company, we could lose visibility in the market, which in turn could cause our stock price to decline.

Holders of our common stock could be adversely affected if we issue preferred stock.

Pursuant to our amended and restated certificate of incorporation, our board of directors is authorized to issue up to 10,000,000 shares of preferred stock without any action on the part of our stockholders. Our board of directors will also have the power, without stockholder approval, to set the terms of any series of preferred stock that may be issued, including voting rights, dividend rights, preferences over our common stock with respect to dividends or in the event of a dissolution, liquidation, or winding up, and other terms. In the event that we issue preferred stock in the future that has preferences over our common stock with respect to payment of dividends or upon our liquidation, dissolution, or winding up, or if we issue preferred stock that is convertible into our common stock at greater than a one-to-one ratio, the voting and other rights of the holders of our common stock or the market price of our common stock could be adversely affected.

Our ability to use net operating losses to offset future taxable income may be subject to limitations.

As of December 31, 2019, we had federal and state net operating loss carryforwards of approximately \$114.9 million and approximately \$72.2 million, respectively. Certain of our federal and state net operating loss carryforwards will begin to expire, if not utilized, beginning in 2031. These net operating loss carryforwards could expire unused and be unavailable to offset future income tax liabilities. Under the Tax Cuts and Jobs Act, as modified by the CARES Act, federal net operating losses incurred in tax years beginning in 2018 and in future

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years may be carried forward indefinitely, but the deductibility of such federal net operating losses for tax years beginning after 2020 is limited. It is uncertain if and to what extent various states will conform to the Tax Cuts and Jobs Act, as modified by the CARES Act. In addition, under Section 382 of the Code, and corresponding provisions of state law, if a corporation undergoes an “ownership change,” which is generally defined as a greater than 50% change, by value, in its equity ownership over a three-year period, the corporation’s ability to use its pre-change net operating loss carryforwards and other pre-change tax attributes (including certain tax credits) to offset its post-change income or taxes may be limited. We may experience ownership changes in the future as a result of subsequent shifts in our stock ownership, some of which may be outside of our control. If an ownership change occurs and our ability to use our net operating loss carryforwards is materially limited, it would harm our future operating results by effectively increasing our future tax obligations. In addition, for California income tax purposes, California net operating losses and California research tax credits will be suspended and limited, respectively, for tax years beginning after 2019 but before 2023.

Delaware law and provisions in our amended and restated certificate of incorporation and amended and restated bylaws could make a merger, tender offer, or proxy contest difficult, thereby depressing the trading price of our common stock.

Our amended and restated certificate of incorporation and amended and restated bylaws contain provisions that could depress the trading price of our common stock by acting to discourage, delay or prevent a change of control of our company or changes in our management that the stockholders of our company may deem advantageous. These provisions include the following:

- establish a classified board of directors so that not all members of our board of directors are elected at one time;
- authorize the issuance of “blank check” preferred stock that our board of directors could use to implement a stockholder rights plan;
- permit the board of directors to establish the number of directors and fill any vacancies and newly-created directorships;
- provide that directors may only be removed for cause;
- require super-majority voting to amend some provisions in our certificate of incorporation and bylaws;
- eliminate the ability of our stockholders to call special meetings of stockholders;
- prohibit stockholder action by written consent, which requires all stockholder actions to be taken at a meeting of our stockholders;
- provide that the board of directors is expressly authorized to make, alter, or repeal our bylaws;
- restrict the forum for certain litigation against us to Delaware; and
- establish advance notice requirements for nominations for election to our board of directors or for proposing matters that can be acted upon by stockholders at annual stockholder meetings.

Any provision of our amended and restated certificate of incorporation or amended and restated bylaws, or Delaware law that has the effect of delaying or deterring a change in control could limit the opportunity for our stockholders to receive a premium for their shares of our common stock, and could also affect the price that some investors are willing to pay for our common stock.

Our amended and restated certificate of incorporation provides that the Court of Chancery of the State of Delaware and the federal district courts of the United States of America will be the exclusive forums for substantially all disputes between us and our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers, or employees.

Our amended and restated certificate of incorporation provides that the Court of Chancery of the State of Delaware is the exclusive forum for the following types of actions or proceedings under Delaware statutory or common law:

- any derivative action or proceeding brought on our behalf;
- any action asserting a breach of fiduciary duty;
- any action asserting a claim against us arising under the Delaware General Corporation Law, our amended and restated certificate of incorporation, or our amended and restated bylaws; and
- any action asserting a claim against us that is governed by the internal-affairs doctrine.

This provision would not apply to suits brought to enforce a duty or liability created by the Exchange Act. Furthermore, Section 22 of the Securities Act creates concurrent jurisdiction for federal and state courts over all such Securities Act actions. Accordingly, both state and federal courts have jurisdiction to entertain such claims. To prevent having to litigate claims in multiple jurisdictions and the threat of inconsistent or contrary rulings by different courts, among other considerations, our amended and restated certificate of incorporation further provides that the federal district courts of the United States of America will be the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act. While the Delaware courts have determined that such choice of forum provisions are facially valid, a stockholder may nonetheless seek to bring a claim in a venue other than those designated in the exclusive forum provisions. In such instance, we would expect to vigorously assert the validity and enforceability of the exclusive forum provisions of our amended and restated certificate of incorporation. This may require significant additional costs associated with resolving such action in other jurisdictions, and there can be no assurance that the provisions will be enforced by a court in those other jurisdictions.

These exclusive forum provisions may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers, or other employees, which may discourage lawsuits against us and our directors, officers, and other employees. If a court were to find either exclusive forum provision in our amended and restated certificate of incorporation to be inapplicable or unenforceable in an action, we may incur further significant additional costs associated with resolving the dispute in other jurisdictions, all of which could seriously harm our business.

The requirements of being a public company may strain our resources, result in litigation and divert management's attention.

As a public company, we are subject to the reporting requirements of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), the Sarbanes-Oxley Act of 2002, as amended (the "Sarbanes-Oxley Act"), the Dodd-Frank Wall Street Reform and Consumer Protection Act, the listing requirements of The Nasdaq Global Market and other applicable securities rules and regulations. Complying with these rules and regulations has increased and will increase our legal and financial compliance costs, make some activities more difficult, time-consuming, or costly and increase demand on our systems and resources, particularly after we are no longer an "emerging growth company" as defined in the Jumpstart our Business Startups Act of 2012 (the "JOBS Act"). The Exchange Act requires, among other things, that we file annual, quarterly, and current reports with respect to our business and operating results. The Sarbanes-Oxley Act requires, among other things, that we maintain effective disclosure controls and procedures and internal control over financial reporting. We are required to disclose changes made in our internal control and procedures on a quarterly basis. In order to maintain and, if required, improve our disclosure controls and procedures and internal control over financial reporting to meet

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this standard, significant resources and management oversight may be required. As a result, management's attention may be diverted from other business concerns, which could adversely affect our business and operating results. We may be required to hire additional employees or engage outside consultants to comply with these requirements, which will increase our costs and expenses.

In addition, changing laws, regulations, and standards relating to corporate governance and public disclosure are creating uncertainty for public companies, increasing legal and financial compliance costs and making some activities more time-consuming. These laws, regulations, and standards are subject to varying interpretations, in many cases due to their lack of specificity, and, as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. This could result in continuing uncertainty regarding compliance matters and higher costs necessitated by ongoing revisions to disclosure and governance practices. We intend to invest resources to comply with evolving laws, regulations, and standards, and this investment will result in increased general and administrative expenses and a diversion of management's time and attention from revenue-generating activities to compliance activities. If our efforts to comply with new laws, regulations and standards differ from the activities intended by regulatory or governing bodies due to ambiguities related to their application and practice, regulatory authorities may initiate legal proceedings against us and our business may be adversely affected. By disclosing information in this prospectus and in filings required of a public company, our business and financial condition will become more visible, which we believe may result in threatened or actual litigation, including by competitors and other third parties. If those claims are successful, our business could be seriously harmed. Even if the claims do not result in litigation or are resolved in our favor, the time and resources needed to resolve them could divert our management's resources and seriously harm our business.

As a public company, it may be increasingly expensive for us to obtain director and officer liability insurance and, in the future, we may be required to accept reduced coverage or incur substantially higher costs to obtain coverage. These factors could also make it more difficult for us to attract and retain qualified members of our board of directors, particularly to serve on our audit committee and compensation committee, and qualified executive officers.

In addition, as a result of our disclosure obligations as a public company, we have reduced strategic flexibility as compared to our competitors that are privately-held companies, and are under pressure to focus on short-term results, which may materially and adversely affect our ability to achieve long-term profitability.

We are an emerging growth company, and any decision on our part to comply only with certain reduced reporting and disclosure requirements applicable to emerging growth companies could make our common stock less attractive to investors.

We are an "emerging growth company," as defined in the JOBS Act, and, for as long as we continue to be an emerging growth company, we may choose to take advantage of exemptions from various reporting requirements applicable to other public companies but not to emerging growth companies, including:

- not being required to have our independent registered public accounting firm audit our internal control over financial reporting under Section 404 of the Sarbanes-Oxley Act;
- reduced disclosure obligations regarding executive compensation in our periodic reports and annual report on Form 10-K; and
- exemptions from the requirements of holding non-binding advisory votes on executive compensation and stockholder approval of any golden parachute payments not previously approved.

We could be an emerging growth company for up to five years following the closing of our initial public offering of our common stock. Our status as an emerging growth company will end as soon as any of the following takes place:

- the last day of the fiscal year in which we have more than \$1.07 billion in annual revenue;

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- the date we qualify as a “large accelerated filer,” with at least \$700 million of equity securities held by non-affiliates;
- the date on which we have issued, in any three-year period, more than \$1.0 billion in non-convertible debt securities; or
- December 31, 2024.

We cannot predict if investors will find our common stock less attractive if we choose to rely on any of the exemptions afforded emerging growth companies. If some investors find our common stock less attractive because we rely on any of these exemptions, there may be a less active trading market for our common stock and the market price of our common stock may be more volatile.

Under the JOBS Act, emerging growth companies can also delay adopting new or revised accounting standards until such time as those standards apply to private companies. We have irrevocably elected not to avail ourselves of this accommodation and, therefore, we will be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies.

Material weaknesses in our internal control over financial reporting may cause us to fail to timely and accurately report our financial results or result in a material misstatement of our financial statements.

Management evaluates our internal control systems, processes, and procedures for compliance with the requirements of a smaller reporting company under Section 404 of the Sarbanes-Oxley Act of 2002 (“Section 404”). This evaluation includes disclosure of any material weaknesses identified by our management in our internal control over financial reporting. A “material weakness” is a deficiency, or a combination of deficiencies, in internal control over financial reporting such that there is a reasonable possibility that a material misstatement of our annual or interim financial statements will not be prevented or detected on a timely basis.

In connection with the preparation of our financial statements for the years ended December 31, 2017 and 2018, management identified a material weakness in our internal controls due to a lack of sufficient full-time accounting staff with requisite experience and deep technical accounting knowledge to (i) identify and resolve complex accounting issues under generally accepted accounting principles in the United States and (ii) allow for appropriate segregation of duties. The identified material weakness could result in misstatements to our consolidated financial statements that would be material and would not be prevented or detected on a timely basis.

We implemented additional procedures to remediate this material weakness, however, we cannot assure you that these or other measures will prevent future material weaknesses from occurring. Remediation of the material weakness involved hiring a Chief Financial Officer in March 2019 and four additional accounting resources in the second, third, and fourth quarters of 2019, including two Certified Public Accountants with the specific technical accounting and financial reporting experience necessary for a public company. We will continue to assess the adequacy of our accounting personnel and resources, and will add additional personnel, as well as adjust our resources, as necessary, commensurate with any increase in the size and complexity of our business.

If we identify future material weaknesses in our internal controls over financial reporting or fail to meet the demands that are placed upon us as a public company, including the requirements of the Sarbanes-Oxley Act, we may be unable to accurately report our financial results or report them within the timeframes required by law or stock exchange regulations. Failure to comply with Section 404 could also potentially subject us to sanctions or investigations by the U.S. Securities and Exchange Commission (the “SEC”) or other regulatory authorities. If additional material weaknesses exist or are discovered in the future, and we are unable to remediate any such material weakness, our reputation, financial condition, and operating results could suffer.

Our disclosure controls and procedures may not prevent or detect all errors or acts of fraud.

We have implemented disclosure controls and procedures designed to provide reasonable assurance that information we must disclose in reports we file or submit under the Exchange Act is accumulated and communicated to management, and recorded, processed, summarized, and reported within the time periods specified in the rules and forms of the SEC. We believe that any disclosure controls and procedures, no matter how well-conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met.

These inherent limitations include the realities that judgments in decision-making can be faulty and that breakdowns can occur because of simple errors or mistakes. Additionally, controls can be circumvented by the individual acts of some persons, by collusion of two or more people or by an unauthorized override of the controls. As a result, because of these inherent limitations in our control system, misstatements or omissions due to error or fraud may occur and may not be detected, which could result in failures to file required reports in a timely manner and filing reports containing incorrect information. Any of these outcomes could result in SEC enforcement actions, monetary fines or other penalties, damage to our reputation, and harm to our financial condition.

FORWARD-LOOKING STATEMENTS

This prospectus and the documents we have filed with the SEC that are incorporated by reference contain “forward-looking statements” within the meaning of Section 27A of the Securities Act of 1933, as amended, or the Securities Act, and Section 21E of the Securities Exchange Act of 1934, as amended, or the Exchange Act. These statements relate to future events or to our future operating or financial performance and involve known and unknown risks, uncertainties and other factors that may cause our actual results, performance or achievements to be materially different from any future results, performances or achievements expressed or implied by the forward-looking statements. All statements other than statements of historical facts contained in this prospectus, including statements regarding our future results of operations and financial condition, business strategy and plans and objectives of management for future operations, are forward-looking statements. In some cases, forward-looking statements may be identified by words such as “anticipate,” “believe,” “continue,” “could,” “design,” “estimate,” “expect,” “intend,” “may,” “plan,” “potentially,” “predict,” “project,” “should,” “will” or the negative of these terms or other similar expressions.

We have based these forward-looking statements largely on our current expectations and projections about future events and financial trends that we believe may affect our financial condition, results of operations, business strategy and financial needs. These forward-looking statements are subject to a number of known and unknown risks, uncertainties and assumptions, including risks described in the section titled “Risk Factors” and elsewhere in this prospectus and in our most recent Annual Report on Form 10-K and Quarterly Report on Form 10-Q, as well as any amendments thereto reflected in subsequent filings with the SEC, which are incorporated by reference into this prospectus in their entirety, together with other information in this prospectus, the documents incorporated by reference and any free writing prospectus that we may authorize for use in connection with a specific offering. These factors include, among other things:

- the evolution of cancer therapies and market adoption of our services;
- estimates of our total addressable market, future revenue, expenses, capital requirements, and our needs for additional financing;
- the impact of the COVID-19 pandemic on our business, our customers’ and suppliers’ businesses and the general economy;
- our ability to compete effectively with existing competitors and new market entrants;
- our ability to scale our infrastructure;
- our ability to manage and grow our business by expanding our sales to existing customers or introducing our products to new customers;
- expectations regarding our relationship with the U.S. Department of Veterans Affairs’ Million Veteran Program;
- our ability to establish and maintain intellectual property protection for our products or avoid claims of infringement;
- potential effects of extensive government regulation;
- our ability to hire and retain key personnel;
- our ability to obtain financing in future offerings;
- the volatility of the trading price of our common stock;
- our belief that approval of personalized cancer therapies by the Food and Drug Administration may drive benefits to our business;
- our expectation regarding the time during which we will be an emerging growth company under the JOBS Act; and
- our ability to maintain proper and effective internal controls.

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These risks are not exhaustive. Other sections of this prospectus may include additional factors that could harm our business and financial performance. Moreover, we operate in a very competitive and rapidly changing environment. New risks and uncertainties emerge from time to time, and it is not possible for our management to predict all risks and uncertainties nor can we assess the impact of all such factors on our business or the extent to which any such factor, or combination of such factors, may cause actual results to differ from those contained in, or implied by, any forward-looking statements.

You should not rely upon forward-looking statements as predictions of future events. Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee future results, levels of activity, performance or achievements. Except as required by law, we undertake no obligation to update publicly any forward-looking statements for any reason after the date of this prospectus or to conform these statements to actual results or to changes in our expectations.

In addition, statements that “we believe” and similar statements reflect our beliefs and opinions on the relevant subject. These statements are based upon information available to us as of the date of this prospectus, and while we believe such information forms a reasonable basis for such statements, such information may be limited or incomplete, and our statements should not be read to indicate that we have conducted an exhaustive inquiry into, or review of, all relevant information. These statements are inherently uncertain and investors are cautioned not to unduly rely upon these statements.

You should read this prospectus and the documents that we reference in this prospectus and have filed as exhibits to the registration statement of which this prospectus is a part with the understanding that our actual future results, levels of activity, performance and achievements may be different from what we expect. We qualify all of our forward-looking statements by these cautionary statements.

USE OF PROCEEDS

Except as described in any applicable prospectus supplement or in any free writing prospectuses we have authorized for use in connection with a specific offering, we currently intend to use the net proceeds from this offering for working capital and general corporate purposes, which may include, among other things, funding research and development programs, vendor payables, hiring additional personnel, and capital expenditures.

We will not receive any proceeds from the sale of shares of our common stock by any selling stockholder.

DESCRIPTION OF CAPITAL STOCK

General

As of the date of this prospectus, our amended and restated certificate of incorporation authorizes us to issue up to 210,000,000 shares of capital stock, all with a par value of \$0.0001 per share, of which: 200,000,000 shares are designated as common stock and 10,000,000 shares are designated as preferred stock.

The following summary describes the material terms of our capital stock. The description of capital stock is qualified by reference to our amended and restated certificate of incorporation and our amended and restated bylaws.

Common Stock

As of September 30, 2020, 38,790,189 shares of common stock were outstanding. All outstanding shares of common stock are duly authorized, validly issued, fully paid, and nonassessable. All authorized but unissued shares of our common stock are available for issuance by our board of directors without any further stockholder action, except as required by the listing standards of Nasdaq.

Voting Rights

Holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of stockholders, including the election of directors, and do not have cumulative voting rights. Accordingly, the holders of a majority of the outstanding shares of common stock entitled to vote in any election of directors can elect all of the directors standing for election, if they so choose, other than any directors that holders of any preferred stock we may issue may be entitled to elect.

Dividend Rights

Subject to preferences that may be applicable to any then-outstanding preferred stock, holders of common stock are entitled to receive ratably those dividends, if any, as may be declared by the board of directors out of legally available funds.

Liquidation

In the event of our liquidation, dissolution, or winding up, the holders of common stock will be entitled to share ratably in the assets legally available for distribution to stockholders after the payment of or provision for all of our debts and other liabilities, subject to the prior rights of any preferred stock then-outstanding.

Rights and Preferences

Holders of common stock have no preemptive or conversion rights or other subscription rights and there are no redemption or sinking fund provisions applicable to the common stock. The rights, preferences, and privileges of holders of common stock are subject to and may be adversely affected by the rights of the holders of shares of any series of preferred stock that we may designate and issue in the future.

Preferred Stock

As of September 30, 2020, no shares of preferred stock were outstanding. Our board of directors may, without further action by our stockholders, fix the rights, preferences, privileges and restrictions of up to an aggregate of 10,000,000 shares of preferred stock in one or more series and authorize their issuance. These rights, preferences and privileges could include dividend rights, conversion rights, voting rights, terms of redemption, liquidation

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preferences, sinking fund terms and the number of shares constituting any series or the designation of such series, any or all of which may be greater than the rights of our common stock. The issuance of our preferred stock could adversely affect the voting power of holders of our common stock and the likelihood that such holders will receive dividend payments and payments upon liquidation. In addition, the issuance of preferred stock could have the effect of decreasing the market price of our common stock and could also have the effect of delaying, deferring or preventing a change of control or other corporate action.

We will fix the designations, voting powers, preferences and rights of the preferred stock of each series we issue under this prospectus, as well as the qualifications, limitations or restrictions thereof, in the certificate of designation relating to that series. We will file as an exhibit to the registration statement of which this prospectus is a part, or will incorporate by reference from reports that we file with the SEC, the form of any certificate of designation that describes the terms of the series of preferred stock we are offering. We will describe in the applicable prospectus supplement the terms of the series of preferred stock being offered, including, to the extent applicable:

- the title and stated value;
- the number of shares we are offering;
- the liquidation preference per share;
- the purchase price;
- the dividend rate, period and payment date and method of calculation for dividends;
- whether dividends will be cumulative or non-cumulative and, if cumulative, the date from which dividends will accumulate;
- the procedures for any auction and remarketing;
- the provisions for a sinking fund;
- the provisions for redemption or repurchase, if applicable, and any restrictions on our ability to exercise those redemption and repurchase rights;
- any listing of the preferred stock on any securities exchange or market;
- whether the preferred stock will be convertible into our common stock, and, if applicable, the conversion price, or how it will be calculated, and the conversion period;
- whether the preferred stock will be exchangeable into debt securities, and, if applicable, the exchange price, or how it will be calculated, and the exchange period;
- voting rights of the preferred stock;
- preemptive rights;
- restrictions on transfer, sale or other assignment;
- whether interests in the preferred stock will be represented by depositary shares;
- a discussion of material United States federal income tax considerations applicable to the preferred stock;
- the relative ranking and preferences of the preferred stock as to dividend rights and rights if we liquidate, dissolve or wind up our affairs;
- any limitations on the issuance of any class or series of preferred stock ranking senior to or on a parity with the series of preferred stock as to dividend rights and rights if we liquidate, dissolve or wind up our affairs; and
- any other specific terms, preferences, rights or limitations of, or restrictions on, the preferred stock.

If we issue shares of preferred stock under this prospectus, the shares will be fully paid and non-assessable.

Options and Restricted Stock Units

As of September 30, 2020, stock options to purchase an aggregate of 3,548,764 shares of common stock were outstanding under our 2011 Equity Incentive Plan, or 2011 Plan.

As of September 30, 2020, (i) stock options to purchase an aggregate of 1,679,200 shares of common stock were outstanding under our 2019 Equity Incentive Plan, or 2019 Plan, (ii) restricted stock units covering an aggregate of 560,410 shares of common stock were outstanding under our 2019 Plan, and (iii) 2,200,594 shares remained available for future issuance under the 2019 Plan.

As of September 30, 2020, 413,266 shares remained available for future issuance under the 2019 Employee Stock Purchase Plan, or ESPP.

As of September 30, 2020, (i) stock options to purchase an aggregate of 112,500 shares of common stock were outstanding under our 2020 Inducement Plan, or 2020 Plan, (ii) restricted stock units covering an aggregate of 86,800 shares of common stock were outstanding under our 2020 Plan, and (iii) 800,700 shares remained available for future issuance under the 2020 Plan.

Warrants

As of September 30, 2020, no warrants to purchase shares of our capital stock were issued or outstanding.

Anti-Takeover Effects of Delaware Law and Our Certificate of Incorporation and Bylaws

Some provisions of Delaware law, our amended and restated certificate of incorporation, and our amended and restated bylaws contain provisions that could make the following transactions more difficult: an acquisition of us by means of a tender offer; an acquisition of us by means of a proxy contest or otherwise; or the removal of our incumbent officers and directors. It is possible that these provisions could make it more difficult to accomplish or could deter transactions that stockholders may otherwise consider to be in their best interest or in our best interests, including transactions which provide for payment of a premium over the market price for our shares.

These provisions, summarized below, are intended to discourage coercive takeover practices and inadequate takeover bids. These provisions are also designed to encourage persons seeking to acquire control of us to first negotiate with our board of directors. We believe that the benefits of the increased protection of our potential ability to negotiate with the proponent of an unfriendly or unsolicited proposal to acquire or restructure us outweigh the disadvantages of discouraging these proposals because negotiation of these proposals could result in an improvement of their terms.

Stockholder Meetings

Our amended and restated bylaws provide that a special meeting of stockholders may be called only by our chairman of the board, chief executive officer or president, or by a resolution adopted by a majority of our board of directors.

Requirements for Advance Notification of Stockholder Nominations and Proposals

Our amended and restated bylaws establish advance notice procedures with respect to stockholder proposals to be brought before a stockholder meeting and the nomination of candidates for election as directors, other than nominations made by or at the direction of the board of directors or a committee of the board of directors.

Elimination of Stockholder Action by Written Consent

Our amended and restated certificate of incorporation and amended and restated bylaws eliminate the right of stockholders to act by written consent without a meeting.

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Staggered Board

Our board of directors is divided into three classes. The directors in each class will serve for a three-year term, one class being elected each year by our stockholders. This system of electing and removing directors may tend to discourage a third party from making a tender offer or otherwise attempting to obtain control of us, because it generally makes it more difficult for stockholders to replace a majority of the directors.

Removal of Directors

Our amended and restated certificate of incorporation provides that no member of our board of directors may be removed from office by our stockholders except for cause and, in addition to any other vote required by law, upon the approval of not less than two-thirds of the total voting power of all of our outstanding voting stock then entitled to vote in the election of directors.

Stockholders Not Entitled to Cumulative Voting

Our amended and restated certificate of incorporation does not permit stockholders to cumulate their votes in the election of directors. Accordingly, the holders of a majority of the outstanding shares of our common stock entitled to vote in any election of directors can elect all of the directors standing for election, if they choose, other than any directors that holders of our preferred stock may be entitled to elect.

Delaware Anti-Takeover Statute

We are subject to Section 203 of the Delaware General Corporation Law, or DGCL, which prohibits persons deemed to be “interested stockholders” from engaging in a “business combination” with a publicly held Delaware corporation for three years following the date these persons become interested stockholders unless the business combination is, or the transaction in which the person became an interested stockholder was, approved in a prescribed manner or another prescribed exception applies. Generally, an “interested stockholder” is a person who, together with affiliates and associates, owns, or within three years prior to the determination of interested stockholder status did own, 15% or more of a corporation’s voting stock. Generally, a “business combination” includes a merger, asset or stock sale, or other transaction resulting in a financial benefit to the interested stockholder. The existence of this provision may have an anti-takeover effect with respect to transactions not approved in advance by the board of directors.

Choice of Forum

Our amended and restated certificate of incorporation provides that, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware is the exclusive forum for the following types of actions or proceedings under Delaware statutory or common law: (1) any derivative action or proceeding brought on our behalf; (2) any action asserting a claim of breach of a fiduciary duty or other wrongdoing by any of our directors, officers, employees, or agents to us or our stockholders; (3) any action asserting a claim against us arising pursuant to any provision of the DGCL or our certificate of incorporation or bylaws; (4) any action to interpret, apply, enforce or determine the validity of our certificate of incorporation or bylaws; or (5) any action asserting a claim governed by the internal affairs doctrine. This provision does not apply to suits brought to enforce a duty or liability created by the Exchange Act or any other claim for which the U.S. federal courts have exclusive jurisdiction. Our amended and restated certificate of incorporation further provides that the federal district courts of the United States of America are the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act. Our amended and restated certificate of incorporation also provides that any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock will be deemed to have notice of and to have consented to these choice of forum provisions. It is possible that a court of law could rule that the choice of forum provisions contained in our amended and restated certificate of incorporation are inapplicable or unenforceable if they are challenged in a proceeding or otherwise.

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Amendment of Charter Provisions

The amendment of any of the above provisions, except for the provision making it possible for our board of directors to issue preferred stock, would require approval by holders of at least two-thirds of the total voting power of all of our outstanding voting stock.

The provisions of Delaware law, our amended and restated certificate of incorporation, and our amended and restated bylaws could have the effect of discouraging others from attempting hostile takeovers and, as a consequence, they may also inhibit temporary fluctuations in the market price of our common stock that often result from actual or rumored hostile takeover attempts. These provisions may also have the effect of preventing changes in the composition of our board and management. It is possible that these provisions could make it more difficult to accomplish transactions that stockholders may otherwise deem to be in their best interests.

Transfer Agent and Registrar

The transfer agent and registrar for our common stock is Computershare Trust Company, N.A. The transfer agent's address is 250 Royall Street, Canton, Massachusetts 02021.

Listing on the Nasdaq Global Market

Our common stock is listed on the Nasdaq Global Market under the symbol "PSNL."

DESCRIPTION OF DEBT SECURITIES

We may issue debt securities from time to time, in one or more series, as either senior or subordinated debt or as senior or subordinated convertible debt. While the terms we have summarized below will apply generally to any debt securities that we may offer under this prospectus, we will describe the particular terms of any debt securities that we may offer in more detail in the applicable prospectus supplement. The terms of any debt securities offered under a prospectus supplement may differ from the terms described below. Unless the context requires otherwise, whenever we refer to the indenture, we also are referring to any supplemental indentures that specify the terms of a particular series of debt securities.

We will issue the debt securities under the indenture that we will enter into with the trustee named in the indenture. The indenture will be qualified under the Trust Indenture Act of 1939, as amended, or the Trust Indenture Act. We have filed the form of indenture as an exhibit to the registration statement of which this prospectus is a part, and supplemental indentures and forms of debt securities containing the terms of the debt securities being offered will be filed as exhibits to the registration statement of which this prospectus is a part or will be incorporated by reference from reports that we file with the SEC.

The following summary of material provisions of the debt securities and the indenture is subject to, and qualified in its entirety by reference to, all of the provisions of the indenture applicable to a particular series of debt securities. We urge you to read the applicable prospectus supplements and any related free writing prospectuses related to the debt securities that we may offer under this prospectus, as well as the complete indenture that contains the terms of the debt securities.

General

The indenture does not limit the amount of debt securities that we may issue. It provides that we may issue debt securities up to the principal amount that we may authorize and may be in any currency or currency unit that we may designate. Except for the limitations on consolidation, merger and sale of all or substantially all of our assets contained in the indenture, the terms of the indenture do not contain any covenants or other provisions designed to give holders of any debt securities protection against changes in our operations, financial condition or transactions involving us.

We may issue the debt securities issued under the indenture as “discount securities,” which means they may be sold at a discount below their stated principal amount. These debt securities, as well as other debt securities that are not issued at a discount, may be issued with “original issue discount,” or OID, for U.S. federal income tax purposes because of interest payment and other characteristics or terms of the debt securities. Material U.S. federal income tax considerations applicable to debt securities issued with OID will be described in more detail in any applicable prospectus supplement.

We will describe in the applicable prospectus supplement the terms of the series of debt securities being offered, including:

- the title of the series of debt securities;
- any limit upon the aggregate principal amount that may be issued;
- the maturity date or dates;
- the form of the debt securities of the series;
- the applicability of any guarantees;
- whether or not the debt securities will be secured or unsecured, and the terms of any secured debt;
- whether the debt securities rank as senior debt, senior subordinated debt, subordinated debt or any combination thereof, and the terms of any subordination;

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- if the price (expressed as a percentage of the aggregate principal amount thereof) at which such debt securities will be issued is a price other than the principal amount thereof, the portion of the principal amount thereof payable upon declaration of acceleration of the maturity thereof, or if applicable, the portion of the principal amount of such debt securities that is convertible into another security or the method by which any such portion shall be determined;
- the interest rate or rates, which may be fixed or variable, or the method for determining the rate and the date interest will begin to accrue, the dates interest will be payable and the regular record dates for interest payment dates or the method for determining such dates;
- our right, if any, to defer payment of interest and the maximum length of any such deferral period;
- if applicable, the date or dates after which, or the period or periods during which, and the price or prices at which, we may, at our option, redeem the series of debt securities pursuant to any optional or provisional redemption provisions and the terms of those redemption provisions;
- the date or dates, if any, on which, and the price or prices at which we are obligated, pursuant to any mandatory sinking fund or analogous fund provisions or otherwise, to redeem, or at the holder's option to purchase, the series of debt securities and the currency or currency unit in which the debt securities are payable;
- the denominations in which we will issue the series of debt securities, if other than denominations of \$1,000 and any integral multiple thereof;
- any and all terms, if applicable, relating to any auction or remarketing of the debt securities of that series and any security for our obligations with respect to such debt securities and any other terms which may be advisable in connection with the marketing of debt securities of that series;
- whether the debt securities of the series shall be issued in whole or in part in the form of a global security or securities; the terms and conditions, if any, upon which such global security or securities may be exchanged in whole or in part for other individual securities; and the depositary for such global security or securities;
- if applicable, the provisions relating to conversion or exchange of any debt securities of the series and the terms and conditions upon which such debt securities will be so convertible or exchangeable, including the conversion or exchange price, as applicable, or how it will be calculated and may be adjusted, any mandatory or optional (at our option or the holders' option) conversion or exchange features, the applicable conversion or exchange period and the manner of settlement for any conversion or exchange;
- if other than the full principal amount thereof, the portion of the principal amount of debt securities of the series which shall be payable upon declaration of acceleration of the maturity thereof;
- additions to or changes in the covenants applicable to the particular debt securities being issued, including, among others, the consolidation, merger or sale covenant;
- additions to or changes in the events of default with respect to the securities and any change in the right of the trustee or the holders to declare the principal, premium, if any, and interest, if any, with respect to such securities to be due and payable;
- additions to or changes in or deletions of the provisions relating to covenant defeasance and legal defeasance;
- additions to or changes in the provisions relating to satisfaction and discharge of the indenture;
- additions to or changes in the provisions relating to the modification of the indenture both with and without the consent of holders of debt securities issued under the indenture;
- the currency of payment of debt securities if other than U.S. dollars and the manner of determining the equivalent amount in U.S. dollars;

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- whether interest will be payable in cash or additional debt securities at our or the holders' option and the terms and conditions upon which the election may be made;
- the terms and conditions, if any, upon which we will pay amounts in addition to the stated interest, premium, if any and principal amounts of the debt securities of the series to any holder that is not a "United States person" for federal tax purposes;
- any restrictions on transfer, sale or assignment of the debt securities of the series; and
- any other specific terms, preferences, rights or limitations of, or restrictions on, the debt securities, any other additions or changes in the provisions of the indenture, and any terms that may be required by us or advisable under applicable laws or regulations.

Conversion or Exchange Rights

We will set forth in the applicable prospectus supplement the terms on which a series of debt securities may be convertible into or exchangeable for our common stock or our other securities. We will include provisions as to settlement upon conversion or exchange and whether conversion or exchange is mandatory, at the option of the holder or at our option. We may include provisions pursuant to which the number of shares of our common stock or our other securities that the holders of the series of debt securities receive would be subject to adjustment.

Consolidation, Merger or Sale

Unless we provide otherwise in the prospectus supplement applicable to a particular series of debt securities, the indenture will not contain any covenant that restricts our ability to merge or consolidate, or sell, convey, transfer or otherwise dispose of our assets as an entirety or substantially as an entirety. However, any successor to or acquirer of such assets (other than a subsidiary of ours) must assume all of our obligations under the indenture or the debt securities, as appropriate.

Events of Default under the Indenture

Unless we provide otherwise in the prospectus supplement applicable to a particular series of debt securities, the following are events of default under the indenture with respect to any series of debt securities that we may issue:

- if we fail to pay any installment of interest on any series of debt securities, as and when the same shall become due and payable, and such default continues for a period of 90 days; provided, however, that a valid extension of an interest payment period by us in accordance with the terms of any indenture supplemental thereto shall not constitute a default in the payment of interest for this purpose;
- if we fail to pay the principal of, or premium, if any, on any series of debt securities as and when the same shall become due and payable whether at maturity, upon redemption, by declaration or otherwise, or in any payment required by any sinking or analogous fund established with respect to such series; provided, however, that a valid extension of the maturity of such debt securities in accordance with the terms of any indenture supplemental thereto shall not constitute a default in the payment of principal or premium, if any;
- if we fail to observe or perform any other covenant or agreement contained in the debt securities or the indenture, other than a covenant specifically relating to another series of debt securities, and our failure continues for 90 days after we receive written notice of such failure, requiring the same to be remedied and stating that such is a notice of default thereunder, from the trustee or holders of at least 25% in aggregate principal amount of the outstanding debt securities of the applicable series; and
- if specified events of bankruptcy, insolvency or reorganization occur.

If an event of default with respect to debt securities of any series occurs and is continuing, other than an event of default specified in the last bullet point above, the trustee or the holders of at least 25% in aggregate principal

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amount of the outstanding debt securities of that series, by notice to us in writing, and to the trustee if notice is given by such holders, may declare the unpaid principal of, premium, if any, and accrued interest, if any, due and payable immediately. If an event of default specified in the last bullet point above occurs with respect to us, the principal amount of and accrued interest, if any, of each issue of debt securities then outstanding shall be due and payable without any notice or other action on the part of the trustee or any holder.

The holders of a majority in principal amount of the outstanding debt securities of an affected series may waive any default or event of default with respect to the series and its consequences, except defaults or events of default regarding payment of principal, premium, if any, or interest, unless we have cured the default or event of default in accordance with the indenture. Any waiver shall cure the default or event of default.

Subject to the terms of the indenture, if an event of default under an indenture shall occur and be continuing, the trustee will be under no obligation to exercise any of its rights or powers under such indenture at the request or direction of any of the holders of the applicable series of debt securities, unless such holders have offered the trustee reasonable indemnity. The holders of a majority in principal amount of the outstanding debt securities of any series will have the right to direct the time, method and place of conducting any proceeding for any remedy available to the trustee, or exercising any trust or power conferred on the trustee, with respect to the debt securities of that series, provided that:

- the direction so given by the holder is not in conflict with any law or the applicable indenture; and
- subject to its duties under the Trust Indenture Act, the trustee need not take any action that might involve it in personal liability or might be unduly prejudicial to the holders not involved in the proceeding.

A holder of the debt securities of any series will have the right to institute a proceeding under the indenture or to appoint a receiver or trustee, or to seek other remedies only if:

- the holder has given written notice to the trustee of a continuing event of default with respect to that series;
- the holders of at least 25% in aggregate principal amount of the outstanding debt securities of that series have made written request;
- such holders have offered to the trustee indemnity satisfactory to it against the costs, expenses and liabilities to be incurred by the trustee in compliance with the request; and
- the trustee does not institute the proceeding, and does not receive from the holders of a majority in aggregate principal amount of the outstanding debt securities of that series other conflicting directions within 90 days after the notice, request and offer.

These limitations do not apply to a suit instituted by a holder of debt securities if we default in the payment of the principal, premium, if any, or interest on, the debt securities.

We will periodically file statements with the trustee regarding our compliance with specified covenants in the indenture.

Modification of Indenture; Waiver

We and the trustee may change an indenture without the consent of any holders with respect to specific matters:

- to cure any ambiguity, defect or inconsistency in the indenture or in the debt securities of any series;
- to comply with the provisions described above under “Description of Debt Securities—Consolidation, Merger or Sale;”
- to provide for uncertificated debt securities in addition to or in place of certificated debt securities;

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- to add to our covenants, restrictions, conditions or provisions such new covenants, restrictions, conditions or provisions for the benefit of the holders of all or any series of debt securities, to make the occurrence, or the occurrence and the continuance, of a default in any such additional covenants, restrictions, conditions or provisions an event of default or to surrender any right or power conferred upon us in the indenture;
- to add to, delete from or revise the conditions, limitations, and restrictions on the authorized amount, terms, or purposes of issue, authentication and delivery of debt securities, as set forth in the indenture;
- to make any change that does not adversely affect the interests of any holder of debt securities of any series in any material respect;
- to provide for the issuance of and establish the form and terms and conditions of the debt securities of any series as provided above under “Description of Debt Securities—General” to establish the form of any certifications required to be furnished pursuant to the terms of the indenture or any series of debt securities, or to add to the rights of the holders of any series of debt securities;
- to evidence and provide for the acceptance of appointment under any indenture by a successor trustee; or
- to comply with any requirements of the SEC in connection with the qualification of any indenture under the Trust Indenture Act.

In addition, under the indenture, the rights of holders of a series of debt securities may be changed by us and the trustee with the written consent of the holders of at least a majority in aggregate principal amount of the outstanding debt securities of each series that is affected. However, unless we provide otherwise in the prospectus supplement applicable to a particular series of debt securities, we and the trustee may make the following changes only with the consent of each holder of any outstanding debt securities affected:

- extending the fixed maturity of any debt securities of any series;
- reducing the principal amount, reducing the rate of or extending the time of payment of interest, or reducing any premium payable upon the redemption of any series of any debt securities; or
- reducing the percentage of debt securities, the holders of which are required to consent to any amendment, supplement, modification or waiver.

Discharge

Each indenture provides that we can elect to be discharged from our obligations with respect to one or more series of debt securities, except for specified obligations, including obligations to:

- provide for payment;
- register the transfer or exchange of debt securities of the series;
- replace stolen, lost or mutilated debt securities of the series;
- pay principal of and premium and interest on any debt securities of the series;
- maintain paying agencies;
- hold monies for payment in trust;
- recover excess money held by the trustee;
- compensate and indemnify the trustee; and
- appoint any successor trustee.

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In order to exercise our rights to be discharged, we must deposit with the trustee money or government obligations sufficient to pay all the principal of, any premium, if any, and interest on, the debt securities of the series on the dates payments are due.

Form, Exchange and Transfer

We will issue the debt securities of each series only in fully registered form without coupons and, unless we provide otherwise in the applicable prospectus supplement, in denominations of \$1,000 and any integral multiple thereof. The indenture provides that we may issue debt securities of a series in temporary or permanent global form and as book-entry securities that will be deposited with, or on behalf of, The Depository Trust Company, or DTC, or another depository named by us and identified in the applicable prospectus supplement with respect to that series. To the extent the debt securities of a series are issued in global form and as book-entry, a description of terms relating to any book-entry securities will be set forth in the applicable prospectus supplement.

At the option of the holder, subject to the terms of the indenture and the limitations applicable to global securities described in the applicable prospectus supplement, the holder of the debt securities of any series can exchange the debt securities for other debt securities of the same series, in any authorized denomination and of like tenor and aggregate principal amount.

Subject to the terms of the indenture and the limitations applicable to global securities set forth in the applicable prospectus supplement, holders of the debt securities may present the debt securities for exchange or for registration of transfer, duly endorsed or with the form of transfer endorsed thereon duly executed if so required by us or the security registrar, at the office of the security registrar or at the office of any transfer agent designated by us for this purpose. Unless otherwise provided in the debt securities that the holder presents for transfer or exchange, we will impose no service charge for any registration of transfer or exchange, but we may require payment of any taxes or other governmental charges.

We will name in the applicable prospectus supplement the security registrar, and any transfer agent in addition to the security registrar, that we initially designate for any debt securities. We may at any time designate additional transfer agents or rescind the designation of any transfer agent or approve a change in the office through which any transfer agent acts, except that we will be required to maintain a transfer agent in each place of payment for the debt securities of each series.

If we elect to redeem the debt securities of any series, we will not be required to:

- issue, register the transfer of, or exchange any debt securities of that series during a period beginning at the opening of business 15 days before the day of mailing of a notice of redemption of any debt securities that may be selected for redemption and ending at the close of business on the day of the mailing; or
- register the transfer of or exchange any debt securities so selected for redemption, in whole or in part, except the unredeemed portion of any debt securities we are redeeming in part.

Information Concerning the Trustee

The trustee, other than during the occurrence and continuance of an event of default under an indenture, undertakes to perform only those duties as are specifically set forth in the applicable indenture. Upon an event of default under an indenture, the trustee must use the same degree of care as a prudent person would exercise or use in the conduct of his or her own affairs. Subject to this provision, the trustee is under no obligation to exercise any of the powers given it by the indenture at the request of any holder of debt securities unless it is offered reasonable security and indemnity against the costs, expenses and liabilities that it might incur.

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Payment and Paying Agents

Unless we otherwise indicate in the applicable prospectus supplement, we will make payment of the interest on any debt securities on any interest payment date to the person in whose name the debt securities, or one or more predecessor securities, are registered at the close of business on the regular record date for the interest.

We will pay principal of and any premium and interest on the debt securities of a particular series at the office of the paying agents designated by us, except that unless we otherwise indicate in the applicable prospectus supplement, we will make interest payments by check that we will mail to the holder or by wire transfer to certain holders. Unless we otherwise indicate in the applicable prospectus supplement, we will designate the corporate trust office of the trustee as our sole paying agent for payments with respect to debt securities of each series. We will name in the applicable prospectus supplement any other paying agents that we initially designate for the debt securities of a particular series. We will maintain a paying agent in each place of payment for the debt securities of a particular series.

All money we pay to a paying agent or the trustee for the payment of the principal of or any premium or interest on any debt securities that remains unclaimed at the end of two years after such principal, premium or interest has become due and payable will be repaid to us, and the holder of the debt security thereafter may look only to us for payment thereof.

Governing Law

The indenture and the debt securities will be governed by and construed in accordance with the internal laws of the State of New York, except to the extent that the Trust Indenture Act of 1939 is applicable.

DESCRIPTION OF WARRANTS

The following description, together with the additional information we may include in any applicable prospectus supplement and free writing prospectus, summarizes the material terms and provisions of the warrants that we may offer under this prospectus, which may consist of warrants to purchase common stock, preferred stock or debt securities and may be issued in one or more series. Warrants may be offered independently or in combination with common stock, preferred stock or debt securities offered by any prospectus supplement. While the terms we have summarized below will apply generally to any warrants that we may offer under this prospectus, we will describe the particular terms of any series of warrants in more detail in the applicable prospectus supplement. The following description of warrants will apply to the warrants offered by this prospectus unless we provide otherwise in the applicable prospectus supplement. The applicable prospectus supplement for a particular series of warrants may specify different or additional terms.

We have filed forms of the warrant agreements and forms of warrant certificates containing the terms of the warrants that may be offered as exhibits to the registration statement of which this prospectus is a part. We will file as exhibits to the registration statement of which this prospectus is a part, or will incorporate by reference from reports that we file with the SEC, the form of warrant and/or the warrant agreement and warrant certificate, as applicable, that contain the terms of the particular series of warrants we are offering, and any supplemental agreements, before the issuance of such warrants. The following summaries of material terms and provisions of the warrants are subject to, and qualified in their entirety by reference to, all the provisions of the form of warrant and/or the warrant agreement and warrant certificate, as applicable, and any supplemental agreements applicable to a particular series of warrants that we may offer under this prospectus. We urge you to read the applicable prospectus supplement related to the particular series of warrants that we may offer under this prospectus, as well as any related free writing prospectus, and the complete form of warrant and/or the warrant agreement and warrant certificate, as applicable, and any supplemental agreements, that contain the terms of the warrants.

General

We will describe in the applicable prospectus supplement the terms of the series of warrants being offered, including:

- the offering price and aggregate number of warrants offered;
- the currency for which the warrants may be purchased;
- if applicable, the designation and terms of the securities with which the warrants are issued and the number of warrants issued with each such security or each principal amount of such security;
- in the case of warrants to purchase debt securities, the principal amount of debt securities purchasable upon exercise of one warrant and the price at, and currency in which, this principal amount of debt securities may be purchased upon such exercise;
- in the case of warrants to purchase common stock or preferred stock, the number of shares of common stock or preferred stock, as the case may be, purchasable upon the exercise of one warrant and the price at which these shares may be purchased upon such exercise;
- the effect of any merger, consolidation, sale or other disposition of our business on the warrant agreements and the warrants;
- the terms of any rights to redeem or call the warrants;
- any provisions for changes to or adjustments in the exercise price or number of securities issuable upon exercise of the warrants;
- the dates on which the right to exercise the warrants will commence and expire;
- the manner in which the warrant agreements and warrants may be modified;

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- a discussion of any material or special U.S. federal income tax considerations of holding or exercising the warrants;
- the terms of the securities issuable upon exercise of the warrants; and
- any other specific terms, preferences, rights or limitations of or restrictions on the warrants.

Before exercising their warrants, holders of warrants will not have any of the rights of holders of the securities purchasable upon such exercise, including:

- in the case of warrants to purchase debt securities, the right to receive payments of principal of, or premium, if any, or interest on, the debt securities purchasable upon exercise or to enforce covenants in the applicable indenture; or
- in the case of warrants to purchase common stock or preferred stock, the right to receive dividends, if any, or, payments upon our liquidation, dissolution or winding up or to exercise voting rights, if any.

Exercise of Warrants

Each warrant will entitle the holder to purchase the securities that we specify in the applicable prospectus supplement at the exercise price that we describe in the applicable prospectus supplement. The warrants may be exercised as set forth in the prospectus supplement relating to the warrants offered. Unless we otherwise specify in the applicable prospectus supplement, warrants may be exercised at any time up to the close of business on the expiration date set forth in the prospectus supplement relating to the warrants offered thereby. After the close of business on the expiration date, unexercised warrants will become void.

Upon receipt of payment and the warrant or warrant certificate, as applicable, properly completed and duly executed at the corporate trust office of the warrant agent, if any, or any other office, including ours, indicated in the prospectus supplement, we will, as soon as practicable, issue and deliver the securities purchasable upon such exercise. If less than all of the warrants (or the warrants represented by such warrant certificate) are exercised, a new warrant or a new warrant certificate, as applicable, will be issued for the remaining warrants.

Governing Law

Unless we otherwise specify in the applicable prospectus supplement, the warrants and any warrant agreements will be governed by and construed in accordance with the laws of the State of New York.

Enforceability of Rights by Holders of Warrants

Each warrant agent, if any, will act solely as our agent under the applicable warrant agreement and will not assume any obligation or relationship of agency or trust with any holder of any warrant. A single bank or trust company may act as warrant agent for more than one issue of warrants. A warrant agent will have no duty or responsibility in case of any default by us under the applicable warrant agreement or warrant, including any duty or responsibility to initiate any proceedings at law or otherwise, or to make any demand upon us. Any holder of a warrant may, without the consent of the related warrant agent or the holder of any other warrant, enforce by appropriate legal action its right to exercise, and receive the securities purchasable upon exercise of, its warrants.

LEGAL OWNERSHIP OF SECURITIES

We can issue securities in registered form or in the form of one or more global securities. We describe global securities in greater detail below. We refer to those persons who have securities registered in their own names on the books that we or any applicable trustee, depositary or warrant agent maintain for this purpose as the “holders” of those securities. These persons are the legal holders of the securities. We refer to those persons who, indirectly through others, own beneficial interests in securities that are not registered in their own names, as “indirect holders” of those securities. As we discuss below, indirect holders are not legal holders, and investors in securities issued in book-entry form or in street name will be indirect holders.

Book-Entry Holders

We may issue securities in book-entry form only, as we will specify in the applicable prospectus supplement. This means securities may be represented by one or more global securities registered in the name of a financial institution that holds them as depositary on behalf of other financial institutions that participate in the depositary’s book-entry system. These participating institutions, which are referred to as participants, in turn, hold beneficial interests in the securities on behalf of themselves or their customers.

Only the person in whose name a security is registered is recognized as the holder of that security. Securities issued in global form will be registered in the name of the depositary or its participants. Consequently, for securities issued in global form, we will recognize only the depositary as the holder of the securities, and we will make all payments on the securities to the depositary. The depositary passes along the payments it receives to its participants, which in turn pass the payments along to their customers who are the beneficial owners. The depositary and its participants do so under agreements they have made with one another or with their customers; they are not obligated to do so under the terms of the securities.

As a result, investors in a global security will not own securities directly. Instead, they will own beneficial interests in a global security, through a bank, broker or other financial institution that participates in the depositary’s book-entry system or holds an interest through a participant. As long as the securities are issued in global form, investors will be indirect holders, and not legal holders, of the securities.

Street Name Holders

We may terminate a global security or issue securities in non-global form. In these cases, investors may choose to hold their securities in their own names or in “street name.” Securities held by an investor in street name would be registered in the name of a bank, broker or other financial institution that the investor chooses, and the investor would hold only a beneficial interest in those securities through an account he or she maintains at that institution.

For securities held in street name, we or any applicable trustee or depositary will recognize only the intermediary banks, brokers and other financial institutions in whose names the securities are registered as the holders of those securities, and we or any applicable trustee or depositary will make all payments on those securities to them. These institutions pass along the payments they receive to their customers who are the beneficial owners, but only because they agree to do so in their customer agreements or because they are legally required to do so. Investors who hold securities in street name will be indirect holders, not holders, of those securities.

Legal Holders

Our obligations, as well as the obligations of any applicable trustee and of any third parties employed by us or a trustee, run only to the legal holders of the securities. We do not have obligations to investors who hold beneficial interests in global securities, in street name or by any other indirect means. This will be the case whether an investor chooses to be an indirect holder of a security or has no choice because we are issuing the securities only in global form.

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For example, once we make a payment or give a notice to the legal holder, we have no further responsibility for the payment or notice even if that legal holder is required, under agreements with its participants or customers or by law, to pass it along to the indirect holders but does not do so. Similarly, we may want to obtain the approval of the legal holders to amend an indenture, to relieve us of the consequences of a default or of our obligation to comply with a particular provision of the indenture or for other purposes. In such an event, we would seek approval only from the holders, and not the indirect holders, of the securities. Whether and how the legal holders contact the indirect holders is up to the legal holders.

Special Considerations For Indirect Holders

If you hold securities through a bank, broker or other financial institution, either in book-entry form because the securities are represented by one or more global securities or in street name, you should check with your own institution to find out:

- how it handles securities payments and notices;
- whether it imposes fees or charges;
- how it would handle a request for the holders' consent, if ever required;
- whether and how you can instruct it to send you securities registered in your own name so you can be a holder, if that is permitted in the future;
- how it would exercise rights under the securities if there were a default or other event triggering the need for holders to act to protect their interests; and
- if the securities are in book-entry form, how the depositary's rules and procedures will affect these matters.

Global Securities

A global security is a security that represents one or any other number of individual securities held by a depositary. Generally, all securities represented by the same global securities will have the same terms.

Each security issued in book-entry form will be represented by a global security that we issue to, deposit with and register in the name of a financial institution or its nominee that we select. The financial institution that we select for this purpose is called the depositary. Unless we specify otherwise in the applicable prospectus supplement, DTC will be the depositary for all securities issued in book-entry form.

A global security may not be transferred to or registered in the name of anyone other than the depositary, its nominee or a successor depositary, unless special termination situations arise. We describe those situations below under "Special Situations When a Global Security Will Be Terminated." As a result of these arrangements, the depositary, or its nominee, will be the sole registered owner and legal holder of all securities represented by a global security, and investors will be permitted to own only beneficial interests in a global security. Beneficial interests must be held by means of an account with a broker, bank or other financial institution that in turn has an account with the depositary or with another institution that does. Thus, an investor whose security is represented by a global security will not be a legal holder of the security, but only an indirect holder of a beneficial interest in the global security.

If the prospectus supplement for a particular security indicates that the security will be issued in global form only, then the security will be represented by a global security at all times unless and until the global security is terminated. If termination occurs, we may issue the securities through another book-entry clearing system or decide that the securities may no longer be held through any book-entry clearing system.

Special Considerations for Global Securities

The rights of an indirect holder relating to a global security will be governed by the account rules of the investor's financial institution and of the depository, as well as general laws relating to securities transfers. We do not recognize an indirect holder as a holder of securities and instead deal only with the depository that holds the global security.

If securities are issued only in the form of a global security, an investor should be aware of the following:

- an investor cannot cause the securities to be registered in his or her name, and cannot obtain non-global certificates for his or her interest in the securities, except in the special situations we describe below;
- an investor will be an indirect holder and must look to his or her own bank, broker or other financial institution for payments on the securities and protection of his or her legal rights relating to the securities, as we describe above;
- an investor may not be able to sell interests in the securities to some insurance companies and to other institutions that are required by law to own their securities in non-book-entry form;
- an investor may not be able to pledge his or her interest in a global security in circumstances where certificates representing the securities must be delivered to the lender or other beneficiary of the pledge in order for the pledge to be effective;
- the depository's policies, which may change from time to time, will govern payments, transfers, exchanges and other matters relating to an investor's interest in a global security;
- we and any applicable trustee have no responsibility for any aspect of the depository's actions or for its records of ownership interests in a global security, nor do we or any applicable trustee supervise the depository in any way;
- the depository may, and we understand that DTC will, require that those who purchase and sell interests in a global security within its book-entry system use immediately available funds, and your bank, broker or other financial institution may require you to do so as well; and
- financial institutions that participate in the depository's book-entry system, and through which an investor holds its interest in a global security, may also have their own policies affecting payments, notices and other matters relating to the securities.

There may be more than one financial intermediary in the chain of ownership for an investor. We do not monitor and are not responsible for the actions of any of those intermediaries.

Special Situations when a Global Security will be Terminated

In a few special situations described below, the global security will terminate and interests in it will be exchanged for physical certificates representing those interests. After that exchange, the choice of whether to hold securities directly or in street name will be up to the investor. Investors must consult their own banks, brokers or other financial institutions to find out how to have their interests in securities transferred to their own name, so that they will be direct holders. We have described the rights of holders and street name investors above.

Unless we provide otherwise in the applicable prospectus supplement, the global security will terminate when the following special situations occur:

- if the depository notifies us that it is unwilling, unable or no longer qualified to continue as depository for that global security and we do not appoint another institution to act as depository within 90 days;
- if we notify any applicable trustee that we wish to terminate that global security; or

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- if an event of default has occurred with regard to securities represented by that global security and has not been cured or waived.

The applicable prospectus supplement may also list additional situations for terminating a global security that would apply only to the particular series of securities covered by the applicable prospectus supplement. When a global security terminates, the depositary, and not we or any applicable trustee, is responsible for deciding the names of the institutions that will be the initial direct holders.

SELLING STOCKHOLDER

This prospectus also relates to the possible resale by one of our stockholders, who we refer to in this prospectus as the selling stockholder, of up to 1,774,240 shares of our common stock that were issued and outstanding prior to the date of the registration statement of which this prospectus forms a part. The selling stockholder is a holder of our common stock, who purchased shares of our common stock in the open market in June 2020 and in our public offering in August 2020.

The applicable prospectus supplement will set forth the name of each selling stockholder and the number of securities beneficially owned by such selling stockholder that are covered by such applicable prospectus supplement. The applicable prospectus supplement will also disclose whether any selling stockholder has held any position or office with, has been employed by, or otherwise has had a material relationship with us during the three years prior to the date of the applicable prospectus supplement.

The selling stockholder shall not sell any shares of our common stock pursuant to this prospectus until we have identified such selling stockholder and the shares being offered for resale by such selling stockholder in a subsequent prospectus supplement. However, the selling stockholder may sell or transfer all or a portion of its shares of our common stock pursuant to any available exemption from the registration requirements of the Securities Act.

PLAN OF DISTRIBUTION

We or the selling stockholder may sell our securities covered by this prospectus in any of three ways (or in any combination):

- to or through underwriters or dealers;
- directly to one or more purchasers; or
- through agents.

We or the selling stockholder may distribute the securities:

- from time to time in one or more transactions at a fixed price or prices, which may be changed from time to time;
- at market prices prevailing at the time of sale;
- at prices related to the prevailing market prices; or
- at negotiated prices.

Each time we or the selling stockholder offer and sell securities covered by this prospectus, we will provide a prospectus supplement or supplements that will describe the method of distribution and set forth the terms of the offering, including:

- the name or names of any underwriters, dealers or agents;
- the amounts of securities underwritten or purchased by each of them;
- the purchase price of securities and the proceeds, if any, we or the selling stockholder will receive from the sale;
- any over-allotment options under which underwriters may purchase additional securities from us or the selling stockholder;
- any underwriting discounts or commissions or agency fees and other items constituting underwriters' or agents' compensation;
- the public offering price of the securities;
- any discounts, commissions or concessions allowed or reallocated or paid to dealers; and
- any securities exchange or market on which the securities may be listed.

Any public offering price and any discounts or concessions allowed or reallocated or paid to dealers may be changed from time to time. We or the selling stockholder may determine the price or other terms of the securities offered under this prospectus by use of an electronic auction. We will describe how any auction will determine the price or any other terms, how potential investors may participate in the auction and the nature of the obligations of the underwriter, dealer or agent in the applicable prospectus supplement.

Underwriters or dealers may offer and sell the offered securities from time to time in one or more transactions, including negotiated transactions, at a fixed public offering price or at varying prices determined at the time of sale. If underwriters or dealers are used in the sale of any securities, the securities will be acquired by the underwriters or dealers for their own account and may be resold from time to time in one or more transactions described above. The securities may be either offered to the public through underwriting syndicates represented by managing underwriters, or directly by underwriters or dealers. Generally, the underwriters' or dealers' obligations to purchase the securities will be subject to certain conditions precedent. The underwriters or dealers will be obligated to purchase all of the securities if they purchase any of the securities, unless otherwise specified in the prospectus supplement. We may use underwriters with whom we have a material relationship. We will describe the nature of any such relationship in the prospectus supplement, naming the underwriter.

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We or the selling stockholder may sell the securities through agents from time to time. The prospectus supplement will name any agent involved in the offer or sale of the securities and any commissions we or the selling stockholder pay to them. Generally, any agent will be acting on a best efforts basis for the period of its appointment. We or the selling stockholder may authorize underwriters, dealers or agents to solicit offers by certain purchasers to purchase the securities from us or the selling stockholder at the public offering price set forth in the prospectus supplement pursuant to delayed delivery contracts providing for payment and delivery on a specified date in the future. The contracts will be subject only to those conditions set forth in the prospectus supplement, and the prospectus supplement will set forth any commissions we or the selling stockholder pay for solicitation of these contracts.

Agents, dealers and underwriters may be entitled to indemnification by us or the selling stockholder against certain civil liabilities, including liabilities under the Securities Act, or to contribution with respect to payments which the agents, dealers or underwriters may be required to make in respect thereof. Agents, dealers and underwriters may be customers of, engage in transactions with, or perform services for us or the selling stockholder in the ordinary course of business.

All securities we may offer, other than common stock, will be new issues of securities with no established trading market. Any underwriters may make a market in these securities, but will not be obligated to do so and may discontinue any market making at any time without notice. We cannot guarantee the liquidity of the trading markets for any securities.

Any underwriter may engage in over-allotment, stabilizing transactions, short covering transactions and penalty bids in accordance with Regulation M under the Securities Exchange Act of 1934, as amended. Over-allotment involves sales in excess of the offering size, which create a short position. This short sales position may involve either "covered" short sales or "naked" short sales. Covered short sales are short sales made in an amount not greater than the underwriters' over-allotment option to purchase additional securities in this offering described above. The underwriters may close out any covered short position either by exercising their over-allotment option or by purchasing securities in the open market. To determine how they will close the covered short position, the underwriters will consider, among other things, the price of securities available for purchase in the open market, as compared to the price at which they may purchase securities through the over-allotment option. Naked short sales are short sales in excess of the over-allotment option. The underwriters must close out any naked short position by purchasing securities in the open market. A naked short position is more likely to be created if the underwriters are concerned that, in the open market after pricing, there may be downward pressure on the price of the securities that could adversely affect investors who purchase securities in this offering. Stabilizing transactions permit bids to purchase the underlying security for the purpose of fixing the price of the security so long as the stabilizing bids do not exceed a specified maximum. Penalty bids permit the underwriters to reclaim a selling concession from a dealer when the securities originally sold by the dealer are purchased in a covering transaction to cover short positions.

Any underwriters who are qualified market makers on the Nasdaq Global Market may engage in passive market making transactions in our common stock, preferred stock, warrants and debt securities, as applicable, on the Nasdaq Global Market in accordance with Rule 103 of Regulation M, during the business day prior to the pricing of the offering, before the commencement of offers or sales of the securities. Passive market makers must comply with applicable volume and price limitations and must be identified as passive market makers. In general, a passive market maker must display its bid at a price not in excess of the highest independent bid for such security; if all independent bids are lowered below the passive market maker's bid, however, the passive market maker's bid must then be lowered when certain purchase limits are exceeded.

In compliance with guidelines of the Financial Industry Regulatory Authority, or FINRA, the maximum consideration or discount to be received by any FINRA member or independent broker dealer may not exceed 8% of the aggregate amount of the securities offered pursuant to this prospectus and any applicable prospectus supplement.

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Similar to other purchase transactions, an underwriter's purchase to cover the syndicate short sales or to stabilize the market price of our securities may have the effect of raising or maintaining the market price of our securities or preventing or mitigating a decline in the market price of our securities. As a result, the price of our securities may be higher than the price that might otherwise exist in the open market. The imposition of a penalty bid might also have an effect on the price of the securities if it discourages resales of the securities.

Neither we nor the underwriters make any representation or prediction as to the effect that the transactions described above may have on the price of the securities. If such transactions are commenced, they may be discontinued without notice at any time.

LEGAL MATTERS

Unless otherwise indicated in the applicable prospectus supplement, the validity of the securities offered by this prospectus, and any supplement thereto, will be passed upon for us by Cooley LLP.

EXPERTS

The financial statements incorporated in this prospectus by reference from the Company's Annual Report on Form 10-K have been audited by Deloitte & Touche LLP, an independent registered public accounting firm, as stated in their report, which is incorporated herein by reference. Such financial statements have been so incorporated in reliance upon the report of such firm given upon their authority as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

This prospectus is part of a registration statement we filed with the SEC. This prospectus does not contain all of the information set forth in the registration statement and the exhibits to the registration statement. For further information with respect to us and the securities we are offering under this prospectus, we refer you to the registration statement and the exhibits and schedules filed as a part of the registration statement. Neither we nor any agent, underwriter or dealer has authorized any person to provide you with different information. We are not making an offer of these securities in any state where the offer is not permitted. You should not assume that the information in this prospectus is accurate as of any date other than the date on the front page of this prospectus, regardless of the time of delivery of this prospectus or any sale of the securities offered by this prospectus.

We file annual, quarterly and current reports, proxy statements and other information with the SEC. The SEC maintains a website that contains reports, proxy and information statements and other information regarding issuers that file electronically with the SEC, including Personalis. The address of the SEC website is www.sec.gov.

We maintain a website at www.personalis.com. Information contained in or accessible through our website does not constitute a part of this prospectus.

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC allows us to “incorporate by reference” the information we file with it, which means that we can disclose important information to you by referring you to those documents instead of having to repeat the information in this prospectus. The information incorporated by reference is considered to be part of this prospectus, and later information that we file with the SEC will automatically update and supersede this information. We incorporate by reference the documents listed below and any future filings (including those made after the date of the initial filing of the registration statement of which this prospectus is a part and prior to the effectiveness of such registration statement) we will make with the SEC under Sections 13(a), 13(c), 14, or 15(d) of the Exchange Act until the termination of the offering of the shares covered by this prospectus (other than information furnished under Item 2.02 or Item 7.01 of Form 8-K):

- our annual report on [Form 10-K](#) for the year ended December 31, 2019, filed with the SEC on March 25, 2020, including the information specifically incorporated by reference therein from our definitive proxy statement on [Schedule 14A](#), filed with the SEC on April 3, 2020;
- our quarterly report on Form 10-Q for the quarter ended March 31, 2020, filed with the SEC on [May 7, 2020](#), our quarterly report on Form 10-Q for the quarter ended June 30, 2020, filed with the SEC on [August 6, 2020](#), and our quarterly report on Form 10-Q for the quarter ended September 30, 2020, filed with the SEC on [November 5, 2020](#);
- our current report on Form 8-K filed with the SEC on [May 20, 2020](#), and our current report on Form 8-K filed with the SEC on [August 12, 2020](#); and
- the description of our common stock set forth in our registration statement on [Form 8-A](#), filed with the SEC on June 17, 2019, including any amendments thereto or reports filed for the purposes of updating this description.

We will furnish without charge to each person, including any beneficial owner, to whom a prospectus is delivered, upon written or oral request, a copy of any or all of the documents incorporated by reference, including exhibits to these documents.:

Personalis, Inc.
1330 O’Brien Drive
Menlo Park, California 94025
(650) 752-1300
Attn: General Counsel

PART II
INFORMATION NOT REQUIRED IN THE PROSPECTUS

Item 14. Other Expenses of Issuance and Distribution.

The following table sets forth the estimated costs and expenses, other than the underwriting discounts and commissions, payable by us, in connection with the offering of the securities pursuant to this Registration Statement:

SEC Registration Fee	\$40,157
Financial Industry Regulatory Authority Filing Fee	(1)
Legal Fees and Expenses	(1)
Nasdaq Global Market Listing Fees	(1)
Accounting Fees	(1)
Printing and Miscellaneous Fees	(1)
Total	(1)

(1) The amount of securities and number of offerings are indeterminable and the expenses cannot be estimated at this time. An estimate of the aggregate expenses in connection with the sale and distribution of securities being offered will be included in the applicable prospectus supplement.

Item 15. Indemnification of Directors and Officers.

Section 145 of the Delaware General Corporation Law authorizes a court to award, or a corporation's board of directors to grant, indemnity to directors and officers in terms sufficiently broad to permit such indemnification under certain circumstances for liabilities, including reimbursement for expenses incurred, arising under the Securities Act. Our amended and restated certificate of incorporation provides for indemnification of our directors, officers, employees and other agents to the maximum extent permitted by the Delaware General Corporation Law, and our amended and restated bylaws provide for indemnification of our directors, officers, employees and other agents to the maximum extent permitted by the Delaware General Corporation Law.

We have entered into indemnification agreements with our directors and officers whereby we have agreed to indemnify our directors and officers to the fullest extent permitted by law, including indemnification against expenses and liabilities incurred in legal proceedings to which the director or officer was, or is threatened to be made, a party by reason of the fact that such director or officer is or was a director, officer, employee or agent of Personalis, Inc., provided that such director or officer acted in good faith and in a manner that the director or officer reasonably believed to be in, or not opposed to, the best interest of Personalis, Inc. At present, there is no pending litigation or proceeding involving a director or officer of Personalis, Inc. regarding which indemnification is sought, nor is the registrant aware of any threatened litigation that may result in claims for indemnification.

We maintain insurance policies that indemnify our directors and officers against various liabilities arising under the Securities Act and the Securities Exchange Act of 1934, as amended, that might be incurred by any director or officer in his capacity as such.

The underwriting agreement(s) that the Registrant may enter into may provide for indemnification by any underwriters of the Registrant, its directors, its officers who sign the registration statement and the Registrant's controlling persons for some liabilities, including liabilities arising under the Securities Act.

Insofar as indemnification for liabilities arising under the Securities Act may be permitted for directors, executive officers or persons controlling us, we have been informed that in the opinion of the SEC such indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable.

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Item 16. Exhibits.

Exhibit Number	Description	Incorporation by Reference			
		Form	File No.	Exhibit	Filing Date
1.1*	Form of Underwriting Agreement.				
3.1	Amended and Restated Certificate of Incorporation of the Registrant.	8-K	001-38943	3.1	6/24/2019
3.2	Amended and Restated Bylaws of the Registrant.	8-K	001-38943	3.2	6/24/2019
4.1	Form of common stock certificate of the Registrant.	S-1/A	333-231703	4.1	6/7/2019
4.2	Amended and Restated Investor Rights Agreement by and among the Registrant and certain of its stockholders, dated December 16, 2014.	S-1	333-231703	4.2	5/23/2019
4.3*	Form of Preferred Stock Certificate and Form of Certificate of Designation of Preferred Stock.				
4.4	Form of Indenture.				
4.5*	Form of Debt Securities.				
4.6	Form of Common Stock Warrant Agreement and Warrant Certificate.				
4.7	Form of Preferred Stock Warrant Agreement and Warrant Certificate.				
4.8	Form of Debt Securities Warrant Agreement and Warrant Certificate.				
5.1	Opinion of Cooley LLP.				
23.1	Consent of Independent Registered Public Accounting Firm.				
23.2	Consent of Cooley LLP (reference is made to Exhibit 5.1).				
24.1	Power of Attorney (reference is made to the signature page hereto).				
25.1*+	Statement of Eligibility of Trustee under the Indenture.				

* To be filed by amendment or as an exhibit to a Current Report on Form 8-K and incorporated herein by reference, if applicable.

+ To be filed separately under electronic form type 305B2, if applicable.

Item 17. Undertakings.

The undersigned registrants hereby undertakes:

(a) To file, during any period in which offers or sales are being made, a post-effective amendment to this registration statement:

(i) to include any prospectus required by Section 10(a)(3) of the Securities Act of 1933;

(ii) to reflect in the prospectus any facts or events arising after the effective date of the registration statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in the registration statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the Commission pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than 20% change in the maximum aggregate offering price set forth in the "Calculation of Registration Fee" table in the effective registration statement; and

(iii) to include any material information with respect to the plan of distribution not previously disclosed in the registration statement or any material change to such information in the registration statement;

provided, however, that the undertakings set forth in paragraphs (i), (ii) and (iii) of this section do not apply if the registration statement is on Form S-3, Form SF-3 or Form F-3 and the information required to be included in a post-effective amendment by those paragraphs is contained in reports filed with or furnished to the Commission by the registrant pursuant to Section 13 or Section 15(d) of the Securities Exchange Act of 1934 that are incorporated by reference in the registration statement, or is contained in a form of prospectus filed pursuant to Rule 424(b) that is part of the registration statement.

(b) That, for the purpose of determining any liability under the Securities Act of 1933, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(c) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.

(d) That, for the purpose of determining liability under the Securities Act of 1933 to any purchaser:

(i) Each prospectus filed by the registrant pursuant to Rule 424(b)(3) shall be deemed to be part of the registration statement as of the date the filed prospectus was deemed part of and included in the registration statement; and

(ii) Each prospectus required to be filed pursuant to Rule 424(b)(2), (b)(5) or (b)(7) as part of a registration statement in reliance on Rule 430B relating to an offering made pursuant to Rule 415(a)(1)(i), (vii) or (x) for the purpose of providing the information required by Section 10(a) of the Securities Act of 1933 shall be deemed to be part of and included in the registration statement as of the earlier of the date such form of prospectus is first used after effectiveness or the date of the first contract of sale of securities in the offering described in the prospectus. As provided in Rule 430B, for liability purposes of the issuer and any person that is at that date an underwriter, such date shall be deemed to be a new effective date of the registration statement relating to the securities in the registration statement to which that prospectus relates, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof. *Provided, however*; that no statement made in a registration statement or prospectus that is part of the registration statement or made in a document incorporated or deemed incorporated by reference into the registration statement or prospectus that is part of the registration statement will, as to a purchaser with a time of contract of sale prior to such effective date,

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supersede or modify any statement that was made in the registration statement or prospectus that was part of the registration statement or made in any such document immediately prior to such effective date.

(e) That, for the purpose of determining liability of the registrant under the Securities Act of 1933 to any purchaser in the initial distribution of the securities, the undersigned registrant undertakes that in a primary offering of securities of the undersigned registrant pursuant to this registration statement, regardless of the underwriting method used to sell the securities to the purchaser, if the securities are offered or sold to such purchaser by means of any of the following communications, the undersigned registrant will be a seller to the purchaser and will be considered to offer or sell such securities to such purchaser:

(i) Any preliminary prospectus or prospectus of the undersigned registrant relating to the offering required to be filed pursuant to Rule 424;

(ii) Any free writing prospectus relating to the offering prepared by or on behalf of the undersigned registrant or used or referred to by the undersigned registrant;

(iii) The portion of any other free writing prospectus relating to the offering containing material information about the undersigned registrant or its securities provided by or on behalf of the undersigned registrant; and

(iv) Any other communication that is an offer in the offering made by the undersigned registrant to the purchaser.

(f) That for purposes of determining any liability under the Securities Act of 1933, each filing of the registrant's annual report pursuant to Section 13(a) or Section 15(d) of the Securities Exchange Act of 1934 (and, where applicable, each filing of an employee benefit plan's annual report pursuant to Section 15(d) of the Securities Exchange Act of 1934) that is incorporated by reference in the registration statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(g) That, for purposes of determining any liability under the Securities Act, (i) the information omitted from the form of prospectus filed as part of the registration statement in reliance upon Rule 430A and contained in the form of prospectus filed by the registrant pursuant to Rule 424(b)(1) or (4) or 497(h) under the Securities Act shall be deemed to be a part of the registration statement as of the time it was declared effective; and (ii) each post-effective amendment that contains a form of prospectus shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(h) To file an application for the purpose of determining the eligibility of the trustee to act under subsection (a) of Section 310 of the Trust Indenture Act in accordance with the rules and regulations prescribed by the Commission under Section 305(b)(2) of the Trust Indenture Act.

(i) Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Act and is therefore unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Act and will be governed by the final adjudication of such issue.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-3 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the city of Menlo Park, state of California, on December 30, 2020.

PERSONALIS, INC.

By: /s/ John West
John West
President and Chief Executive Officer

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints John West and Aaron Tachibana, and each of them, as his or her true and lawful agent, proxy and attorney-in-fact, each acting alone, with full power of substitution and resubstitution, for him or her and in his or her name, place and stead, in any and all capacities, to (i) act on, sign, and file with the SEC any and all amendments (including post-effective amendments) to this registration statement together with all schedules and exhibits thereto, (ii) act on, sign and file such certificates, instruments, agreements and other documents as may be necessary or appropriate in connection therewith, (iii) act on and file any supplement to any prospectus included in this registration statement or any such amendment or any subsequent registration statement filed pursuant to Rule 462(b) under the Securities Act, and (iv) take any and all actions which may be necessary or appropriate to be done, as fully for all intents and purposes as he or she might or could do in person, hereby approving, ratifying and confirming all that such agent, proxy and attorney-in-fact or any of his substitutes may lawfully do or cause to be done by virtue thereof.

Pursuant to the requirements of the Securities Act, this Registration Statement has been signed by the following persons in the capacities and on the dates indicated:

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ John West</u> John West	President, Chief Executive Officer and Director <i>(Principal Executive Officer)</i>	December 30, 2020
<u>/s/ Aaron Tachibana</u> Aaron Tachibana	Chief Financial Officer <i>(Principal Financial and Accounting Officer)</i>	December 30, 2020
<u>/s/ Jonathan MacQuitty</u> Jonathan MacQuitty, Ph.D.	Chairman of the Board of Directors	December 30, 2020
<u>/s/ Patrick Balthrop</u> Patrick Balthrop	Director	December 30, 2020
<u>/s/ A. Blaine Bowman</u> A. Blaine Bowman	Director	December 30, 2020
<u>/s/ Alan Colowick</u> Alan Colowick, M.D.	Director	December 30, 2020
<u>/s/ Karin Eastham</u> Karin Eastham	Director	December 30, 2020

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<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Kenneth Ludlum</u> Kenneth Ludlum	Director	December 30, 2020
<u>/s/ Paul Ricci</u> Paul Ricci	Director	December 30, 2020

PERSONALIS, INC.,
Issuer

AND

[TRUSTEE],
Trustee

INDENTURE

Dated as of [●], 20

Debt Securities

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INDENTURE

INDENTURE, dated as of [●], 20 , among PERSONALIS, INC., a Delaware corporation (the “Company”), and [TRUSTEE], as trustee (the “Trustee”):

WHEREAS, for its lawful corporate purposes, the Company has duly authorized the execution and delivery of this Indenture to provide for the issuance of debt securities (hereinafter referred to as the “Securities”), in an unlimited aggregate principal amount to be issued from time to time in one or more series as in this Indenture provided, as registered Securities without coupons, to be authenticated by the certificate of the Trustee;

WHEREAS, to provide the terms and conditions upon which the Securities are to be authenticated, issued and delivered, the Company has duly authorized the execution of this Indenture; and

WHEREAS, all things necessary to make this Indenture a valid agreement of the Company, in accordance with its terms, have been done.

NOW, THEREFORE, in consideration of the premises and the purchase of the Securities by the holders thereof, it is mutually covenanted and agreed as follows for the equal and ratable benefit of the holders of Securities:

ARTICLE 1

DEFINITIONS

Section 1.01 Definitions of Terms.

The terms defined in this Section (except as in this Indenture or any indenture supplemental hereto otherwise expressly provided or unless the context otherwise requires) for all purposes of this Indenture and of any indenture supplemental hereto shall have the respective meanings specified in this Section and shall include the plural as well as the singular. All other terms used in this Indenture that are defined in the Trust Indenture Act of 1939, as amended, or that are by reference in such Act defined in the Securities Act of 1933, as amended (except as herein or any indenture supplemental hereto otherwise expressly provided or unless the context otherwise requires), shall have the meanings assigned to such terms in said Trust Indenture Act and in said Securities Act as in force at the date of the execution of this instrument.

“*Authenticating Agent*” means the Trustee or an authenticating agent with respect to all or any of the series of Securities appointed by the Trustee pursuant to Section 2.10.

“*Bankruptcy Law*” means Title 11, U.S. Code, or any similar federal or state law for the relief of debtors.

“*Board of Directors*” means the Board of Directors (or the functional equivalent thereof) of the Company or any duly authorized committee of such Board.

“**Board Resolution**” means a copy of a resolution certified by the Secretary or an Assistant Secretary of the Company to have been duly adopted by the Board of Directors (or duly authorized committee thereof) and to be in full force and effect on the date of such certification.

“**Business Day**” means, with respect to any series of Securities, any day other than a day on which federal or state banking institutions in the Borough of Manhattan, the City of New York, or in the city of the Corporate Trust Office of the Trustee, are authorized or obligated by law, executive order or regulation to close.

“**Commission**” means the Securities and Exchange Commission, as from time to time constituted, created under the Exchange Act, or, if at any time after the execution of this instrument such Commission is not existing and performing the duties now assigned to it under the Trust Indenture Act, then the body performing such duties at such time.

“**Company**” means **PERSONALIS, INC.**, a corporation duly organized and existing under the laws of the State of Delaware, and, subject to the provisions of Article Ten, shall also include its successors and assigns.

“**Corporate Trust Office**” means the office of the Trustee at which, at any particular time, its corporate trust business shall be principally administered, which office at the date hereof is located at

“**Custodian**” means any receiver, trustee, assignee, liquidator or similar official under any Bankruptcy Law.

“**Defaulted Interest**” has the meaning set forth in Section 2.03.

“**Depository**” means, with respect to Securities of any series for which the Company shall determine that such Securities will be issued as a Global Security, The Depository Trust Company, another clearing agency, or any successor registered as a clearing agency under the Exchange Act, or other applicable statute or regulation, which, in each case, shall be designated by the Company pursuant to either Section 2.01 or 2.11.

“**Event of Default**” means, with respect to Securities of a particular series, any event specified in Section 6.01, continued for the period of time, if any, therein designated.

“**Exchange Act**” means the United States Securities and Exchange Act of 1934, as amended, and the rules and regulations promulgated by the Commission thereunder.

The term “**given**”, “**mailed**”, “**notify**” or “**sent**” with respect to any notice to be given to a Securityholder pursuant to this Indenture, shall mean notice (x) given to the Depository (or its designee) pursuant to the standing instructions from the Depository or its designee, including by electronic mail in accordance with accepted practices or procedures at the Depository (in the case of a Global Security) or (y) mailed to such Holder by first class mail, postage prepaid, at its address as it appears on the Security Register (in the case of a definitive Security). Notice so “given” shall be deemed to include any notice to be “mailed” or “delivered,” as applicable, under this Indenture.

“**Global Security**” means a Security issued to evidence all or a part of any series of Securities which is executed by the Company and authenticated and delivered by the Trustee to the Depository or pursuant to the Depository’s instruction, all in accordance with the Indenture, which shall be registered in the name of the Depository or its nominee.

“**Governmental Obligations**” means securities that are (a) direct obligations of the United States of America for the payment of which its full faith and credit is pledged or (b) obligations of a Person controlled or supervised by and acting as an agency or instrumentality of the United States of America, the payment of which is unconditionally guaranteed as a full faith and credit obligation by the United States of America that, in either case, are not callable or redeemable at the option of the issuer thereof at any time prior to the stated maturity of the Securities, and shall also include a depository receipt issued by a bank or trust company as custodian with respect to any such Governmental Obligation or a specific payment of principal of or interest on any such Governmental Obligation held by such custodian for the account of the holder of such depository receipt; provided, however, that (except as required by law) such custodian is not authorized to make any deduction from the amount payable to the holder of such depository receipt from any amount received by the custodian in respect of the Governmental Obligation or the specific payment of principal of or interest on the Governmental Obligation evidenced by such depository receipt.

“**herein**”, “**hereof**” and “**hereunder**”, and other words of similar import, refer to this Indenture as a whole and not to any particular Article, Section or other subdivision.

“**Indenture**” means this instrument as originally executed or as it may from time to time be supplemented or amended by one or more indentures supplemental hereto entered into in accordance with the terms hereof and shall include the terms of particular series of Securities established as contemplated by Section 2.01.

“**Interest Payment Date**”, when used with respect to any installment of interest on a Security of a particular series, means the date specified in such Security or in a Board Resolution or in an indenture supplemental hereto with respect to such series as the fixed date on which an installment of interest with respect to Securities of that series is due and payable.

“**Officer**” means, with respect to the Company, the chairman of the Board of Directors, a chief executive officer, a president, a chief financial officer, a chief operating officer, any executive vice president, any senior vice president, any vice president, the treasurer or any assistant treasurer, the controller or any assistant controller or the secretary or any assistant secretary.

“**Officer’s Certificate**” means a certificate signed by any Officer. Each such certificate shall include the statements provided for in Section 13.07, if and to the extent required by the provisions thereof.

“Opinion of Counsel” means an opinion in writing subject to customary exceptions of legal counsel, who may be an employee of or counsel for the Company, that is delivered to the Trustee in accordance with the terms hereof. Each such opinion shall include the statements provided for in Section 13.07, if and to the extent required by the provisions thereof.

“Outstanding”, when used with reference to Securities of any series, means, subject to the provisions of Section 8.04, as of any particular time, all Securities of that series theretofore authenticated and delivered by the Trustee under this Indenture, except (a) Securities theretofore canceled by the Trustee or any paying agent, or delivered to the Trustee or any paying agent for cancellation or that have previously been canceled; (b) Securities or portions thereof for the payment or redemption of which moneys or Governmental Obligations in the necessary amount shall have been deposited in trust with the Trustee or with any paying agent (other than the Company) or shall have been set aside and segregated in trust by the Company (if the Company shall act as its own paying agent); provided, however, that if such Securities or portions of such Securities are to be redeemed prior to the maturity thereof, notice of such redemption shall have been given as provided in Article Three, or provision satisfactory to the Trustee shall have been made for giving such notice; and (c) Securities in lieu of or in substitution for which other Securities shall have been authenticated and delivered pursuant to the terms of Section 2.07.

“Person” means any individual, corporation, partnership, joint venture, joint-stock company, limited liability company, association, trust, unincorporated organization, any other entity or organization, including a government or political subdivision or an agency or instrumentality thereof.

“Predecessor Security” of any particular Security means every previous Security evidencing all or a portion of the same debt as that evidenced by such particular Security; and, for the purposes of this definition, any Security authenticated and delivered under Section 2.07 in lieu of a lost, destroyed or stolen Security shall be deemed to evidence the same debt as the lost, destroyed or stolen Security.

“Responsible Officer” when used with respect to the Trustee means any officer within the Corporate Trust Office of the Trustee (or any successor group of the Trustee) or any other officer of the Trustee customarily performing functions similar to those performed by any of the above designated officers and also means, with respect to a particular corporate trust matter, any other officer to whom such matter is referred because of his or her knowledge of and familiarity with the particular subject and in each case who shall have direct responsibility for the administration of this Indenture.

“Securities” has the meaning stated in the first recital of this Indenture and more particularly means any Securities authenticated and delivered under this Indenture.

“Securities Act” means the Securities Act of 1933, as amended.

“Securityholder”, **“holder of Securities”**, **“registered holder”**, or other similar term, means the Person or Persons in whose name or names a particular Security is registered on the Security Register kept for that purpose in accordance with the terms of this Indenture.

“*Security Register*” and “*Security Registrar*” shall have the meanings as set forth in Section 2.05.

“*Subsidiary*” means, with respect to any Person, any corporation, association, partnership or other business entity of which more than 50% of the total voting power of shares of capital stock or other interests (including partnership interests) entitled (without regard to the occurrence of any contingency) to vote in the election of directors, managers, general partners or trustees thereof is at the time owned or controlled, directly or indirectly, by (i) such Person; (ii) such Person and one or more Subsidiaries of such Person; or (iii) one or more Subsidiaries of such Person.

“*Trustee*” means _____, and, subject to the provisions of Article Seven, shall also include its successors and assigns, and, if at any time there is more than one Person acting in such capacity hereunder, “Trustee” shall mean each such Person. The term “Trustee” as used with respect to a particular series of the Securities shall mean the trustee with respect to that series.

“*Trust Indenture Act*” means the Trust Indenture Act of 1939, as amended.

“*U.S.A. Patriot Act*” means the Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism Act of 2001, Pub. L. 107-56, as amended and signed into law October 26, 2001.

ARTICLE 2

ISSUE, DESCRIPTION, TERMS, EXECUTION, REGISTRATION AND EXCHANGE OF SECURITIES

Section 2.01 Designation and Terms of Securities.

(a) The aggregate principal amount of Securities that may be authenticated and delivered under this Indenture is unlimited. The Securities may be issued in one or more series up to the aggregate principal amount of Securities of that series from time to time authorized by or pursuant to a Board Resolution or pursuant to one or more indentures supplemental hereto. Prior to the initial issuance of Securities of any series, there shall be established in or pursuant to a Board Resolution, and set forth in an Officer’s Certificate, or established in one or more indentures supplemental hereto:

(1) the title of the Securities of the series (which shall distinguish the Securities of that series from all other Securities);

(2) any limit upon the aggregate principal amount of the Securities of that series that may be authenticated and delivered under this Indenture (except for Securities authenticated and delivered upon registration of transfer of, or in exchange for, or in lieu of, other Securities of that series);

- (3) the maturity date or dates on which the principal of the Securities of the series is payable;
- (4) the form of the Securities of the series including the form of the certificate of authentication for such series;
- (5) the applicability of any guarantees;
- (6) whether or not the Securities will be secured or unsecured, and the terms of any secured debt;
- (7) whether the Securities rank as senior debt, senior subordinated debt, subordinated debt or any combination thereof, and the terms of any subordination;
- (8) if the price (expressed as a percentage of the aggregate principal amount thereof) at which such Securities will be issued is a price other than the principal amount thereof, the portion of the principal amount thereof payable upon declaration of acceleration of the maturity thereof, or if applicable, the portion of the principal amount of such Securities that is convertible into another security or the method by which any such portion shall be determined;
- (9) the interest rate or rates, which may be fixed or variable, or the method for determining the rate and the date interest will begin to accrue, the dates interest will be payable and the regular record dates for interest payment dates or the method for determining such dates;
- (10) the Company's right, if any, to defer the payment of interest and the maximum length of any such deferral period;
- (11) if applicable, the date or dates after which, or the period or periods during which, and the price or prices at which, the Company may at its option, redeem the series of Securities pursuant to any optional or provisional redemption provisions and the terms of those redemption provisions;
- (12) the date or dates, if any, on which, and the price or prices at which the Company is obligated, pursuant to any mandatory sinking fund or analogous fund provisions or otherwise, to redeem, or at the Securityholder's option to purchase, the series of Securities and the currency or currency unit in which the Securities are payable;
- (13) the denominations in which the Securities of the series shall be issuable, if other than denominations of one thousand U.S. dollars (\$1,000) or any integral multiple thereof;
- (14) any and all terms, if applicable, relating to any auction or remarketing of the Securities of that series and any security for the obligations of the Company with respect to such Securities and any other terms which may be advisable in connection with the marketing of Securities of that series;

(15) whether the Securities of the series shall be issued in whole or in part in the form of a Global Security or Securities; the terms and conditions, if any, upon which such Global Security or Securities may be exchanged in whole or in part for other individual Securities; and the Depositary for such Global Security or Securities;

(16) if applicable, the provisions relating to conversion or exchange of any Securities of the series and the terms and conditions upon which such Securities will be so convertible or exchangeable, including the conversion or exchange price, as applicable, or how it will be calculated and may be adjusted, any mandatory or optional (at the Company's option or the holders' option) conversion or exchange features, the applicable conversion or exchange period and the manner of settlement for any conversion or exchange, which may, without limitation, include the payment of cash as well as the delivery of securities;

(17) if other than the full principal amount thereof, the portion of the principal amount of Securities of the series which shall be payable upon declaration of acceleration of the maturity thereof pursuant to Section 6.01;

(18) additions to or changes in the covenants applicable to the series of Securities being issued, including, among others, the consolidation, merger or sale covenant;

(19) additions to or changes in the Events of Default with respect to the Securities and any change in the right of the Trustee or the Securityholders to declare the principal, premium, if any, and interest, if any, with respect to such Securities to be due and payable;

(20) additions to or changes in or deletions of the provisions relating to covenant defeasance and legal defeasance;

(21) additions to or changes in the provisions relating to satisfaction and discharge of this Indenture;

(22) additions to or changes in the provisions relating to the modification of this Indenture both with and without the consent of Securityholders of Securities issued under this Indenture;

(23) the currency of payment of Securities if other than U.S. dollars and the manner of determining the equivalent amount in U.S. dollars;

(24) whether interest will be payable in cash or additional Securities at the Company's or the Securityholders' option and the terms and conditions upon which the election may be made;

(25) the terms and conditions, if any, upon which the Company shall pay amounts in addition to the stated interest, premium, if any and principal amounts of the Securities of the series to any Securityholder that is not a "United States person" for federal tax purposes;

(26) any restrictions on transfer, sale or assignment of the Securities of the series; and

(27) any other specific terms, preferences, rights or limitations of, or restrictions on, the Securities, any other additions or changes in the provisions of this Indenture, and any terms that may be required by us or advisable under applicable laws or regulations.

All Securities of any one series shall be substantially identical except as may otherwise be provided in or pursuant to any such Board Resolution or in any indentures supplemental hereto.

If any of the terms of the series are established by action taken pursuant to a Board Resolution of the Company, a copy of an appropriate record of such action shall be certified by the secretary or an assistant secretary of the Company and delivered to the Trustee at or prior to the delivery of the Officer's Certificate of the Company setting forth the terms of the series.

Securities of any particular series may be issued at various times, with different dates on which the principal or any installment of principal is payable, with different rates of interest, if any, or different methods by which rates of interest may be determined, with different dates on which such interest may be payable and with different redemption dates.

Section 2.02 Form of Securities and Trustee's Certificate.

The Securities of any series and the Trustee's certificate of authentication to be borne by such Securities shall be substantially of the tenor and purport as set forth in one or more indentures supplemental hereto or as provided in a Board Resolution, and set forth in an Officer's Certificate, and they may have such letters, numbers or other marks of identification or designation and such legends or endorsements printed, lithographed or engraved thereon as the Company may deem appropriate and as are not inconsistent with the provisions of this Indenture, or as may be required to comply with any law or with any rule or regulation made pursuant thereto or with any rule or regulation of any securities exchange on which Securities of that series may be listed, or to conform to usage.

Section 2.03 Denominations: Provisions for Payment.

The Securities shall be issuable as registered Securities and in the denominations of one thousand U.S. dollars (\$1,000) or any integral multiple thereof, subject to Section 2.01(a)(13). The Securities of a particular series shall bear interest payable on the dates and at the rate specified with respect to that series. Subject to Section 2.01(a)(23), the principal of and the interest on the Securities of any series, as well as any premium thereon in case of redemption or repurchase thereof prior to maturity, and any cash amount due upon conversion or exchange thereof, shall be payable in the coin or currency of the United States of America that at the time is legal tender for public and private debt, at the office or agency of the Company maintained for that purpose. Each Security shall be dated the date of its authentication. Interest on the Securities shall be computed on the basis of a 360-day year composed of twelve 30-day months.

The interest installment on any Security that is payable, and is punctually paid or duly provided for, on any Interest Payment Date for Securities of that series shall be paid to the Person in whose name said Security (or one or more Predecessor Securities) is registered at the close of business on the regular record date for such interest installment. In the event that any Security of a particular series or portion thereof is called for redemption and the redemption date is subsequent to a regular record date with respect to any Interest Payment Date and prior to such Interest Payment Date, interest on such Security will be paid upon presentation and surrender of such Security as provided in Section 3.03.

Any interest on any Security that is payable, but is not punctually paid or duly provided for, on any Interest Payment Date for Securities of the same series (herein called "Defaulted Interest") shall forthwith cease to be payable to the registered holder on the relevant regular record date by virtue of having been such holder; and such Defaulted Interest shall be paid by the Company, at its election, as provided in clause (1) or clause (2) below:

(1) The Company may make payment of any Defaulted Interest on Securities to the Persons in whose names such Securities (or their respective Predecessor Securities) are registered in the Security Register at the close of business on a special record date for the payment of such Defaulted Interest, which shall be fixed in the following manner: the Company shall notify the Trustee in writing of the amount of Defaulted Interest proposed to be paid on each such Security and the date of the proposed payment, and at the same time the Company shall deposit with the Trustee an amount of money equal to the aggregate amount proposed to be paid in respect of such Defaulted Interest or shall make arrangements satisfactory to the Trustee for such deposit prior to the date of the proposed payment, such money when deposited to be held in trust for the benefit of the Persons entitled to such Defaulted Interest as in this clause provided. Thereupon the Trustee shall fix a special record date for the payment of such Defaulted Interest which shall not be more than 15 nor less than 10 days prior to the date of the proposed payment and not less than 10 days after the receipt by the Trustee of the notice of the proposed payment. The Trustee shall promptly notify the Company of such special record date and, in the name and at the expense of the Company, shall cause notice of the proposed payment of such Defaulted Interest and the special record date therefor to be sent, to each Securityholder not less than 10 days prior to such special record date. Notice of the proposed payment of such Defaulted Interest and the special record date therefor having been sent as aforesaid, such Defaulted Interest shall be paid to the Persons in whose names such Securities (or their respective Predecessor Securities) are registered in the Security Register on such special record date.

(2) The Company may make payment of any Defaulted Interest on any Securities in any other lawful manner not inconsistent with the requirements of any securities exchange on which such Securities may be listed, and upon such notice as may be required by such exchange, if, after notice given by the Company to the Trustee of the proposed payment pursuant to this clause, such manner of payment shall be deemed practicable by the Trustee.

Unless otherwise set forth in a Board Resolution or one or more indentures supplemental hereto establishing the terms of any series of Securities pursuant to Section 2.01 hereof, the term "regular record date" as used in this Section with respect to a series of Securities and any Interest

Payment Date for such series shall mean either the fifteenth day of the month immediately preceding the month in which an Interest Payment Date established for such series pursuant to Section 2.01 hereof shall occur, if such Interest Payment Date is the first day of a month, or the first day of the month in which an Interest Payment Date established for such series pursuant to Section 2.01 hereof shall occur, if such Interest Payment Date is the fifteenth day of a month, whether or not such date is a Business Day.

Subject to the foregoing provisions of this Section, each Security of a series delivered under this Indenture upon transfer of or in exchange for or in lieu of any other Security of such series shall carry the rights to interest accrued and unpaid, and to accrue, that were carried by such other Security.

Section 2.04 Execution and Authentications.

The Securities shall be signed on behalf of the Company by one of its Officers. Signatures may be in the form of a manual or facsimile signature.

The Company may use the facsimile signature of any Person who shall have been an Officer (at the time of execution), notwithstanding the fact that at the time the Securities shall be authenticated and delivered or disposed of such Person shall have ceased to be such an officer of the Company. The Securities may contain such notations, legends or endorsements required by law, stock exchange rule or usage. Each Security shall be dated the date of its authentication by the Trustee.

A Security shall not be valid until authenticated manually by an authorized signatory of the Trustee, or by an Authenticating Agent. Such signature shall be conclusive evidence that the Security so authenticated has been duly authenticated and delivered hereunder and that the holder is entitled to the benefits of this Indenture. At any time and from time to time after the execution and delivery of this Indenture, the Company may deliver Securities of any series executed by the Company to the Trustee for authentication, together with a written order of the Company for the authentication and delivery of such Securities, signed by an Officer, and the Trustee in accordance with such written order shall authenticate and deliver such Securities.

Upon the Company's delivery of any such authentication order to the Trustee at any time after the initial issuance of Securities under this Indenture, the Trustee shall be provided with, and (subject to Sections 315(a) through 315(d) of the Trust Indenture Act) shall be fully protected in relying upon, (1) an Opinion of Counsel or reliance letter and (2) an Officer's Certificate stating that all conditions precedent to the execution, authentication and delivery of such Securities are in conformity with the provisions of this Indenture.

The Trustee shall not be required to authenticate such Securities if the issue of such Securities pursuant to this Indenture will affect the Trustee's own rights, duties or immunities under the Securities and this Indenture or otherwise in a manner that is not reasonably acceptable to the Trustee.

Section 2.05 Registration of Transfer and Exchange.

(a) Securities of any series may be exchanged upon presentation thereof at the office or agency of the Company designated for such purpose, for other Securities of such series of authorized denominations, and for a like aggregate principal amount, upon payment of a sum sufficient to cover any tax or other governmental charge in relation thereto, all as provided in this Section. In respect of any Securities so surrendered for exchange, the Company shall execute, the Trustee shall authenticate and such office or agency shall deliver in exchange therefor the Security or Securities of the same series that the Securityholder making the exchange shall be entitled to receive, bearing numbers not contemporaneously outstanding.

(b) The Company shall keep, or cause to be kept, at its office or agency designated for such purpose a register or registers (herein referred to as the "Security Register") in which, subject to such reasonable regulations as it may prescribe, the Company shall register the Securities and the transfers of Securities as in this Article provided and which at all reasonable times shall be open for inspection by the Trustee. The registrar for the purpose of registering Securities and transfer of Securities as herein provided shall be appointed as authorized by Board Resolution or Supplemental Indenture (the "Security Registrar").

Upon surrender for transfer of any Security at the office or agency of the Company designated for such purpose, the Company shall execute, the Trustee shall authenticate and such office or agency shall deliver in the name of the transferee or transferees a new Security or Securities of the same series as the Security presented for a like aggregate principal amount.

The Company initially appoints the Trustee as initial Security Registrar for each series of Securities.

All Securities presented or surrendered for exchange or registration of transfer, as provided in this Section, shall be accompanied (if so required by the Company or the Security Registrar) by a written instrument or instruments of transfer, in form satisfactory to the Company or the Security Registrar, duly executed by the registered holder or by such holder's duly authorized attorney in writing.

(c) Except as provided pursuant to Section 2.01 pursuant to a Board Resolution, and set forth in an Officer's Certificate, or established in one or more indentures supplemental to this Indenture, no service charge shall be made for any exchange or registration of transfer of Securities, or issue of new Securities in case of partial redemption of any series or repurchase, conversion or exchange of less than the entire principal amount of a Security, but the Company may require payment of a sum sufficient to cover any tax or other governmental charge in relation thereto, other than exchanges pursuant to Section 2.06, Section 3.03(b) and Section 9.04 not involving any transfer.

(d) The Company and the Security Registrar shall not be required (i) to issue, exchange or register the transfer of any Securities during a period beginning at the opening of business 15 days before the day of the sending of a notice of redemption of less than all the Outstanding Securities of the same series and ending at the close of business on the day of such sending, nor (ii) to register the transfer of or exchange any Securities of any series or portions

thereof called for redemption or surrendered for repurchase, but not validly withdrawn, other than the unredeemed portion of any such Securities being redeemed in part or not surrendered for repurchase, as the case may be. The provisions of this Section 2.05 are, with respect to any Global Security, subject to Section 2.11 hereof.

The Trustee shall have no obligation or duty to monitor, determine or inquire as to compliance with any restrictions on transfer imposed under this Indenture or under applicable law with respect to any transfer of any interest in any Security (including any transfers between or among Depository participants or beneficial owners of interests in any Global Security) other than to require delivery of such certificates and other documentation or evidence as are expressly required by, and to do so if and when expressly required by the terms of, this Indenture, and to examine the same to determine substantial compliance as to form with the express requirements hereof.

Section 2.06 Temporary Securities.

Pending the preparation of definitive Securities of any series, the Company may execute, and the Trustee shall authenticate and deliver, temporary Securities (printed, lithographed or typewritten) of any authorized denomination. Such temporary Securities shall be substantially in the form of the definitive Securities in lieu of which they are issued, but with such omissions, insertions and variations as may be appropriate for temporary Securities, all as may be determined by the Company. Every temporary Security of any series shall be executed by the Company and be authenticated by the Trustee upon the same conditions and in substantially the same manner, and with like effect, as the definitive Securities of such series. Without unnecessary delay the Company will execute and will furnish definitive Securities of such series and thereupon any or all temporary Securities of such series may be surrendered in exchange therefor (without charge to the Securityholders), at the office or agency of the Company designated for the purpose, and the Trustee shall authenticate and such office or agency shall deliver in exchange for such temporary Securities an equal aggregate principal amount of definitive Securities of such series, unless the Company advises the Trustee to the effect that definitive Securities need not be executed and furnished until further notice from the Company. Until so exchanged, the temporary Securities of such series shall be entitled to the same benefits under this Indenture as definitive Securities of such series authenticated and delivered hereunder.

Section 2.07 Mutilated, Destroyed, Lost or Stolen Securities.

In case any temporary or definitive Security shall become mutilated or be destroyed, lost or stolen, the Company (subject to the next succeeding sentence) shall execute, and upon the Company's request the Trustee (subject as aforesaid) shall authenticate and deliver, a new Security of the same series, bearing a number not contemporaneously outstanding, in exchange and substitution for the mutilated Security, or in lieu of and in substitution for the Security so destroyed, lost or stolen. In every case the applicant for a substituted Security shall furnish to the Company and the Trustee such security or indemnity as may be required by them to save each of them harmless, and, in every case of destruction, loss or theft, the applicant shall also furnish to the Company and the Trustee evidence to their satisfaction of the destruction, loss or theft of the applicant's Security and of the ownership thereof. The Trustee may authenticate any such substituted Security and deliver the same upon the written request or authorization of any officer

of the Company. Upon the issuance of any substituted Security, the Company may require the payment of a sum sufficient to cover any tax or other governmental charge that may be imposed in relation thereto and any other expenses (including the fees and expenses of the Trustee) connected therewith.

In case any Security that has matured or is about to mature shall become mutilated or be destroyed, lost or stolen, the Company may, instead of issuing a substitute Security, pay or authorize the payment of the same (without surrender thereof except in the case of a mutilated Security) if the applicant for such payment shall furnish to the Company and the Trustee such security or indemnity as they may require to save them harmless, and, in case of destruction, loss or theft, evidence to the satisfaction of the Company and the Trustee of the destruction, loss or theft of such Security and of the ownership thereof.

Every replacement Security issued pursuant to the provisions of this Section shall constitute an additional contractual obligation of the Company whether or not the mutilated, destroyed, lost or stolen Security shall be found at any time, or be enforceable by anyone, and shall be entitled to all the benefits of this Indenture equally and proportionately with any and all other Securities of the same series duly issued hereunder. All Securities shall be held and owned upon the express condition that the foregoing provisions are exclusive with respect to the replacement or payment of mutilated, destroyed, lost or stolen Securities, and shall preclude (to the extent lawful) any and all other rights or remedies, notwithstanding any law or statute existing or hereafter enacted to the contrary with respect to the replacement or payment of negotiable instruments or other securities without their surrender.

Section 2.08 Cancellation.

All Securities surrendered for the purpose of payment, redemption, repurchase, exchange, registration of transfer or conversion shall, if surrendered to the Company or any paying agent (or any other applicable agent), be delivered to the Trustee for cancellation, or, if surrendered to the Trustee, shall be cancelled by it, and no Securities shall be issued in lieu thereof except as expressly required or permitted by any of the provisions of this Indenture. On request of the Company at the time of such surrender, the Trustee shall deliver to the Company canceled Securities held by the Trustee. In the absence of such request the Trustee may dispose of canceled Securities in accordance with its standard procedures and deliver a certificate of disposition to the Company. If the Company shall otherwise acquire any of the Securities, however, such acquisition shall not operate as a redemption or satisfaction of the indebtedness represented by such Securities unless and until the same are delivered to the Trustee for cancellation.

Section 2.09 Benefits of Indenture.

Nothing in this Indenture or in the Securities, express or implied, shall give or be construed to give to any Person, other than the parties hereto and the holders of the Securities any legal or equitable right, remedy or claim under or in respect of this Indenture, or under any covenant, condition or provision herein contained; all such covenants, conditions and provisions being for the sole benefit of the parties hereto and of the holders of the Securities.

Section 2.10 Authenticating Agent.

So long as any of the Securities of any series remain Outstanding there may be an Authenticating Agent for any or all such series of Securities which the Trustee shall have the right to appoint. Said Authenticating Agent shall be authorized to act on behalf of the Trustee to authenticate Securities of such series issued upon exchange, transfer or partial redemption, repurchase or conversion thereof, and Securities so authenticated shall be entitled to the benefits of this Indenture and shall be valid and obligatory for all purposes as if authenticated by the Trustee hereunder. All references in this Indenture to the authentication of Securities by the Trustee shall be deemed to include authentication by an Authenticating Agent for such series. Each Authenticating Agent shall be acceptable to the Company and shall be a corporation that has a combined capital and surplus, as most recently reported or determined by it, sufficient under the laws of any jurisdiction under which it is organized or in which it is doing business to conduct a trust business, and that is otherwise authorized under such laws to conduct such business and is subject to supervision or examination by federal or state authorities. If at any time any Authenticating Agent shall cease to be eligible in accordance with these provisions, it shall resign immediately.

Any Authenticating Agent may at any time resign by giving written notice of resignation to the Trustee and to the Company. The Trustee may at any time (and upon request by the Company shall) terminate the agency of any Authenticating Agent by giving written notice of termination to such Authenticating Agent and to the Company. Upon resignation, termination or cessation of eligibility of any Authenticating Agent, the Trustee may appoint an eligible successor Authenticating Agent acceptable to the Company. Any successor Authenticating Agent, upon acceptance of its appointment hereunder, shall become vested with all the rights, powers and duties of its predecessor hereunder as if originally named as an Authenticating Agent pursuant hereto.

Section 2.11 Global Securities.

(a) If the Company shall establish pursuant to Section 2.01 that the Securities of a particular series are to be issued as a Global Security, then the Company shall execute and the Trustee shall, in accordance with Section 2.04, authenticate and deliver, a Global Security that (i) shall represent, and shall be denominated in an amount equal to the aggregate principal amount of, all of the Outstanding Securities of such series, (ii) shall be registered in the name of the Depository or its nominee, (iii) shall be delivered by the Trustee to the Depository or pursuant to the Depository's instruction (or if the Depository names the Trustee as its custodian, retained by the Trustee), and (iv) shall bear a legend substantially to the following effect: "Except as otherwise provided in Section 2.11 of the Indenture, this Security may be transferred, in whole but not in part, only to another nominee of the Depository or to a successor Depository or to a nominee of such successor Depository."

(b) Notwithstanding the provisions of Section 2.05, the Global Security of a series may be transferred, in whole but not in part and in the manner provided in Section 2.05, only to another nominee of the Depository for such series, or to a successor Depository for such series selected or approved by the Company or to a nominee of such successor Depository.

(c) If at any time the Depository for a series of the Securities notifies the Company that it is unwilling or unable to continue as Depository for such series or if at any time the Depository for such series shall no longer be registered or in good standing under the Exchange Act, or other applicable statute or regulation, and a successor Depository for such series is not appointed by the Company within 90 days after the Company receives such notice or becomes aware of such condition, as the case may be, or if an Event of Default has occurred and is continuing and the Company has received a request from the Depository or from the Trustee, this Section 2.11 shall no longer be applicable to the Securities of such series and the Company will execute, and subject to Section 2.04, the Trustee will authenticate and deliver the Securities of such series in definitive registered form without coupons, in authorized denominations, and in an aggregate principal amount equal to the principal amount of the Global Security of such series in exchange for such Global Security. In addition, the Company may at any time determine that the Securities of any series shall no longer be represented by a Global Security and that the provisions of this Section 2.11 shall no longer apply to the Securities of such series. In such event the Company will execute and, subject to Section 2.04, the Trustee, upon receipt of an Officer's Certificate evidencing such determination by the Company, will authenticate and deliver the Securities of such series in definitive registered form without coupons, in authorized denominations, and in an aggregate principal amount equal to the principal amount of the Global Security of such series in exchange for such Global Security. Upon the exchange of the Global Security for such Securities in definitive registered form without coupons, in authorized denominations, the Global Security shall be canceled by the Trustee. Such Securities in definitive registered form issued in exchange for the Global Security pursuant to this Section 2.11(c) shall be registered in such names and in such authorized denominations as the Depository, pursuant to instructions from its direct or indirect participants or otherwise, shall instruct the Trustee. The Trustee shall deliver such Securities to the Depository for delivery to the Persons in whose names such Securities are so registered.

Section 2.12 CUSIP Numbers.

The Company in issuing the Securities may use "CUSIP" numbers (if then generally in use), and, if so, the Trustee shall use "CUSIP" numbers in notices of redemption as a convenience to Holders; provided that any such notice may state that no representation is made as to the correctness of such numbers either as printed on the Securities or as contained in any notice of a redemption and that reliance may be placed only on the other elements of identification printed on the Securities, and any such redemption shall not be affected by any defect in or omission of such numbers. The Company will promptly notify the Trustee of any change in the "CUSIP" numbers.

ARTICLE 3

REDEMPTION OF SECURITIES AND SINKING FUND PROVISIONS

Section 3.01 Redemption.

The Company may redeem the Securities of any series issued hereunder on and after the dates and in accordance with the terms established for such series pursuant to Section 2.01 hereof.

Section 3.02 Notice of Redemption.

(a) In case the Company shall desire to exercise such right to redeem all or, as the case may be, a portion of the Securities of any series in accordance with any right the Company reserved for itself to do so pursuant to Section 2.01 hereof, the Company shall, or shall cause the Trustee to, give notice of such redemption to holders of the Securities of such series to be redeemed by mailing, first class postage prepaid (or with regard to any Global Security held in book entry form, by electronic mail in accordance with the applicable procedures of the Depository), a notice of such redemption not less than 30 days and not more than 90 days before the date fixed for redemption of that series to such Securityholders, unless a shorter period is specified in the Securities to be redeemed. Any notice that is mailed in the manner herein provided shall be conclusively presumed to have been duly given, whether or not the registered holder receives the notice. In any case, failure duly to give such notice to the holder of any Security of any series designated for redemption in whole or in part, or any defect in the notice, shall not affect the validity of the proceedings for the redemption of any other Securities of such series or any other series. In the case of any redemption of Securities prior to the expiration of any restriction on such redemption provided in the terms of such Securities or elsewhere in this Indenture, the Company shall furnish the Trustee with an Officer's Certificate evidencing compliance with any such restriction.

Each such notice of redemption shall identify the Securities to be redeemed (including CUSIP numbers, if any), specify the date fixed for redemption and the redemption price at which Securities of that series are to be redeemed, and shall state that payment of the redemption price of such Securities to be redeemed will be made at the office or agency of the Company, upon presentation and surrender of such Securities, that interest accrued to the date fixed for redemption will be paid as specified in said notice, that from and after said date interest will cease to accrue and that the redemption is from a sinking fund, if such is the case. If less than all the Securities of a series are to be redeemed, the notice to the holders of Securities of that series to be redeemed in part shall specify the particular Securities to be so redeemed.

In case any Security is to be redeemed in part only, the notice that relates to such Security shall state the portion of the principal amount thereof to be redeemed, and shall state that on and after the redemption date, upon surrender of such Security, a new Security or Securities of such series in principal amount equal to the unredeemed portion thereof will be issued.

(b) If less than all the Securities of a series are to be redeemed, the Company shall give the Trustee at least 45 days' notice (unless a shorter notice shall be satisfactory to the Trustee) in advance of the date fixed for redemption as to the aggregate principal amount of Securities of the series to be redeemed, and thereupon the Securities to be redeemed shall be selected, by lot, on a pro rata basis, or in such other manner as the Company shall deem appropriate and fair in its discretion and that may provide for the selection of a portion or portions (equal to one thousand U.S. dollars (\$1,000) or any integral multiple thereof) of the principal amount of such Securities of a denomination larger than \$1,000, the Securities to be redeemed and shall thereafter promptly notify the Company in writing of the numbers of the Securities to be redeemed, in whole or in part. The Company may, if and whenever it shall so elect, by delivery of instructions signed on its behalf by an Officer, instruct the Trustee or any

paying agent to call all or any part of the Securities of a particular series for redemption and to give notice of redemption in the manner set forth in this Section, such notice to be in the name of the Company or its own name as the Trustee or such paying agent may deem advisable. In any case in which notice of redemption is to be given by the Trustee or any such paying agent, the Company shall deliver or cause to be delivered to, or permit to remain with, the Trustee or such paying agent, as the case may be, such Security Register, transfer books or other records, or suitable copies or extracts therefrom, sufficient to enable the Trustee or such paying agent to give any notice by mail that may be required under the provisions of this Section.

Section 3.03 Payment Upon Redemption.

(a) If the giving of notice of redemption shall have been completed as above provided, the Securities or portions of Securities of the series to be redeemed specified in such notice shall become due and payable on the date and at the place stated in such notice at the applicable redemption price, together with interest accrued to, but excluding, the date fixed for redemption and interest on such Securities or portions of Securities shall cease to accrue on and after the date fixed for redemption, unless the Company shall default in the payment of such redemption price and accrued interest with respect to any such Security or portion thereof. On presentation and surrender of such Securities on or after the date fixed for redemption at the place of payment specified in the notice, said Securities shall be paid and redeemed at the applicable redemption price for such series, together with interest accrued thereon to, but excluding, the date fixed for redemption (but if the date fixed for redemption is an Interest Payment Date, the interest installment payable on such date shall be payable to the registered holder at the close of business on the applicable record date pursuant to Section 2.03).

(b) Upon presentation of any Security of such series that is to be redeemed in part only, the Company shall execute and the Trustee shall authenticate and the office or agency where the Security is presented shall deliver to the Securityholder thereof, at the expense of the Company, a new Security of the same series of authorized denominations in principal amount equal to the unredeemed portion of the Security so presented.

Section 3.04 Sinking Fund.

The provisions of Sections 3.04, 3.05 and 3.06 shall be applicable to any sinking fund for the retirement of Securities of a series, except as otherwise specified as contemplated by Section 2.01 for Securities of such series.

The minimum amount of any sinking fund payment provided for by the terms of Securities of any series is herein referred to as a "mandatory sinking fund payment," and any payment in excess of such minimum amount provided for by the terms of Securities of any series is herein referred to as an "optional sinking fund payment". If provided for by the terms of Securities of any series, the cash amount of any sinking fund payment may be subject to reduction as provided in Section 3.05. Each sinking fund payment shall be applied to the redemption of Securities of any series as provided for by the terms of Securities of such series.

Section 3.05 Satisfaction of Sinking Fund Payments with Securities.

The Company (i) may deliver Outstanding Securities of a series and (ii) may apply as a credit Securities of a series that have been redeemed either at the election of the Company pursuant to the terms of such Securities or through the application of permitted optional sinking fund payments pursuant to the terms of such Securities, in each case in satisfaction of all or any part of any sinking fund payment with respect to the Securities of such series required to be made pursuant to the terms of such Securities as provided for by the terms of such series, provided that such Securities have not been previously so credited. Such Securities shall be received and credited for such purpose by the Trustee at the redemption price specified in such Securities for redemption through operation of the sinking fund and the amount of such sinking fund payment shall be reduced accordingly.

Section 3.06 Redemption of Securities for Sinking Fund.

Not less than 45 days prior to each sinking fund payment date for any series of Securities (unless a shorter period shall be satisfactory to the Trustee), the Company will deliver to the Trustee an Officer's Certificate specifying the amount of the next ensuing sinking fund payment for that series pursuant to the terms of the series, the portion thereof, if any, that is to be satisfied by delivering and crediting Securities of that series pursuant to Section 3.05 and the basis for such credit and will, together with such Officer's Certificate, deliver to the Trustee any Securities to be so delivered. Not less than 30 days before each such sinking fund payment date the Securities to be redeemed upon such sinking fund payment date shall be selected in the manner specified in Section 3.02 and the Company shall cause notice of the redemption thereof to be given in the name of and at the expense of the Company in the manner provided in Section 3.02. Such notice having been duly given, the redemption of such Securities shall be made upon the terms and in the manner stated in Section 3.03.

ARTICLE 4

COVENANTS

Section 4.01 Payment of Principal, Premium and Interest.

The Company will duly and punctually pay or cause to be paid the principal of (and premium, if any) and interest on the Securities of that series at the time and place and in the manner provided herein and established with respect to such Securities. Payments of principal on the Securities may be made at the time provided herein and established with respect to such Securities by U.S. dollar check drawn on and mailed to the address of the Securityholder entitled thereto as such address shall appear in the Security Register, or U.S. dollar wire transfer to, a U.S. dollar account if such Securityholder shall have furnished wire instructions to the Trustee no later than 15 days prior to the relevant payment date. Payments of interest on the Securities may be made at the time provided herein and established with respect to such Securities by U.S. dollar check mailed to the address of the Securityholder entitled thereto as such address shall appear in the Security Register, or U.S. dollar wire transfer to, a U.S. dollar account if such Securityholder shall have furnished wire instructions in writing to the Security Registrar and the Trustee no later than 15 days prior to the relevant payment date.

Section 4.02 Maintenance of Office or Agency.

So long as any series of the Securities remain Outstanding, the Company agrees to maintain an office or agency with respect to each such series and at such other location or locations as may be designated as provided in this Section 4.02, where (i) Securities of that series may be presented for payment, (ii) Securities of that series may be presented as herein above authorized for registration of transfer and exchange and (iii) notices and demands to or upon the Company in respect of the Securities of that series and this Indenture may be given or served, such designation to continue with respect to such office or agency until the Company shall, by written notice signed by any officer authorized to sign an Officer's Certificate and delivered to the Trustee, designate some other office or agency for such purposes or any of them. If at any time the Company shall fail to maintain any such required office or agency or shall fail to furnish the Trustee with the address thereof, such presentations, notices and demands may be made or served at the Corporate Trust Office of the Trustee, and the Company hereby appoints the Trustee as its agent to receive all such presentations, notices and demands. The Company initially appoints the Corporate Trust Office of the Trustee as its paying agent with respect to the Securities.

Section 4.03 Paying Agents.

(a) If the Company shall appoint one or more paying agents for all or any series of the Securities, other than the Trustee, the Company will cause each such paying agent to execute and deliver to the Trustee an instrument in which such agent shall agree with the Trustee, subject to the provisions of this Section:

(1) that it will hold all sums held by it as such agent for the payment of the principal of (and premium, if any) or interest on the Securities of that series (whether such sums have been paid to it by the Company or by any other obligor of such Securities) in trust for the benefit of the Persons entitled thereto;

(2) that it will give the Trustee notice of any failure by the Company (or by any other obligor of such Securities) to make any payment of the principal of (and premium, if any) or interest on the Securities of that series when the same shall be due and payable;

(3) that it will, at any time during the continuance of any failure referred to in the preceding paragraph (a)(2) above, upon the written request of the Trustee, forthwith pay to the Trustee all sums so held in trust by such paying agent; and

(4) that it will perform all other duties of paying agent as set forth in this Indenture.

(b) If the Company shall act as its own paying agent with respect to any series of the Securities, it will on or before each due date of the principal of (and premium, if any) or interest on Securities of that series, set aside, segregate and hold in trust for the benefit of the Persons entitled thereto a sum sufficient to pay such principal (and premium, if any) or interest so becoming due on Securities of that series until such sums shall be paid to such Persons or

otherwise disposed of as herein provided and will promptly notify the Trustee of such action, or any failure (by it or any other obligor on such Securities) to take such action. Whenever the Company shall have one or more paying agents for any series of Securities, it will, prior to each due date of the principal of (and premium, if any) or interest on any Securities of that series, deposit with the paying agent a sum sufficient to pay the principal (and premium, if any) or interest so becoming due, such sum to be held in trust for the benefit of the Persons entitled to such principal, premium or interest, and (unless such paying agent is the Trustee) the Company will promptly notify the Trustee of this action or failure so to act.

(c) Notwithstanding anything in this Section to the contrary, (i) the agreement to hold sums in trust as provided in this Section is subject to the provisions of Section 11.05, and (ii) the Company may at any time, for the purpose of obtaining the satisfaction and discharge of this Indenture or for any other purpose, pay, or direct any paying agent to pay, to the Trustee all sums held in trust by the Company or such paying agent, such sums to be held by the Trustee upon the same terms and conditions as those upon which such sums were held by the Company or such paying agent; and, upon such payment by the Company or any paying agent to the Trustee, the Company or such paying agent shall be released from all further liability with respect to such money.

Section 4.04 Appointment to Fill Vacancy in Office of Trustee.

The Company, whenever necessary to avoid or fill a vacancy in the office of Trustee, will appoint, in the manner provided in Section 7.10, a Trustee, so that there shall at all times be a Trustee hereunder.

ARTICLE 5

SECURITYHOLDERS' LISTS AND REPORTS BY THE COMPANY AND THE TRUSTEE

Section 5.01 Company to Furnish Trustee Names and Addresses of Securityholders.

The Company will furnish or cause to be furnished to the Trustee (a) within 15 days after each regular record date (as defined in Section 2.03) a list, in such form as the Trustee may reasonably require, of the names and addresses of the holders of each series of Securities as of such regular record date, provided that the Company shall not be obligated to furnish or cause to furnish such list at any time that the list shall not differ in any respect from the most recent list furnished to the Trustee by the Company and (b) at such other times as the Trustee may request in writing within 30 days after the receipt by the Company of any such request, a list of similar form and content as of a date not more than 15 days prior to the time such list is furnished; provided, however, that, in either case, no such list need be furnished for any series for which the Trustee shall be the Security Registrar.

Section 5.02 Preservation of Information; Communications with Securityholders.

(a) The Trustee shall preserve, in as current a form as is reasonably practicable, all information as to the names and addresses of the holders of Securities contained in the most recent list furnished to it as provided in Section 5.01 and as to the names and addresses of holders of Securities received by the Trustee in its capacity as Security Registrar (if acting in such capacity).

(b) The Trustee may destroy any list furnished to it as provided in Section 5.01 upon receipt of a new list so furnished.

(c) Securityholders may communicate as provided in Section 312(b) of the Trust Indenture Act with other Securityholders with respect to their rights under this Indenture or under the Securities, and, in connection with any such communications, the Trustee shall satisfy its obligations under Section 312(b) of the Trust Indenture Act in accordance with the provisions of Section 312(b) of the Trust Indenture Act.

Section 5.03 Reports by the Company.

(a) The Company will at all times comply with Section 314(a) of the Trust Indenture Act. The Company covenants and agrees to provide (which delivery may be via electronic mail) to the Trustee within 30 days, after the Company files the same with the Commission, copies of the annual reports and of the information, documents and other reports (or copies of such portions of any of the foregoing as the Commission may from time to time by rules and regulations prescribe) that the Company is required to file with the Commission pursuant to Section 13 or Section 15(d) of the Exchange Act; provided, however, the Company shall not be required to deliver to the Trustee any correspondence filed with the Commission or any materials for which the Company has sought and received confidential treatment by the Commission; and provided further, that so long as such filings by the Company are available on the Commission's Electronic Data Gathering, Analysis and Retrieval System (EDGAR), or any successor system, such filings shall be deemed to have been filed with the Trustee for purposes hereof without any further action required by the Company. For the avoidance of doubt, a failure by the Company to file annual reports, information and other reports with the Commission within the time period prescribed thereof by the Commission shall not be deemed a breach of this Section 5.03.

(b) Delivery of reports, information and documents to the Trustee under Section 5.03 is for informational purposes only and the information and the Trustee's receipt of the foregoing shall not constitute constructive notice of any information contained therein, or determinable from information contained therein including the Company's compliance with any of their covenants thereunder (as to which the Trustee is entitled to rely exclusively on an Officer's Certificate). The Trustee is under no duty to examine any such reports, information or documents delivered to the Trustee or filed with the Commission via EDGAR to ensure compliance with the provision of this Indenture or to ascertain the correctness or otherwise of the information or the statements contained therein. The Trustee shall have no responsibility or duty whatsoever to ascertain or determine whether the above referenced filings with the Commission on EDGAR (or any successor system) has occurred.

Section 5.04 Reports by the Trustee.

(a) If required by Section 313(a) of the Trust Indenture Act, the Trustee, within sixty (60) days after each May 1, shall send to the Securityholders a brief report dated as of such May 1, which complies with Section 313(a) of the Trust Indenture Act.

(b) The Trustee shall comply with Section 313(b) and 313(c) of the Trust Indenture Act.

(c) A copy of each such report shall, at the time of such transmission to Securityholders, be filed by the Trustee with the Company, with each securities exchange upon which any Securities are listed (if so listed) and also with the Commission. The Company agrees to notify the Trustee when any Securities become listed on any securities exchange.

ARTICLE 6

REMEDIES OF THE TRUSTEE AND SECURITYHOLDERS ON EVENT OF DEFAULT

Section 6.01 Events of Default.

(a) Whenever used herein with respect to Securities of a particular series, "Event of Default" means any one or more of the following events that has occurred and is continuing:

(1) the Company defaults in the payment of any installment of interest upon any of the Securities of that series, as and when the same shall become due and payable, and such default continues for a period of 90 days; provided, however, that a valid extension of an interest payment period by the Company in accordance with the terms of any indenture supplemental hereto shall not constitute a default in the payment of interest for this purpose;

(2) the Company defaults in the payment of the principal of (or premium, if any, on) any of the Securities of that series as and when the same shall become due and payable whether at maturity, upon redemption, by declaration or otherwise, or in any payment required by any sinking or analogous fund established with respect to that series; provided, however, that a valid extension of the maturity of such Securities in accordance with the terms of any indenture supplemental hereto shall not constitute a default in the payment of principal or premium, if any;

(3) the Company fails to observe or perform any other of its covenants or agreements with respect to that series contained in this Indenture or otherwise established with respect to that series of Securities pursuant to Section 2.01 hereof (other than a covenant or agreement that has been expressly included in this Indenture solely for the benefit of one or more series of Securities other than such series) for a period of 90 days after the date on which written notice of such failure, requiring the same to be remedied and stating that such notice is a "Notice of Default" hereunder, shall have been given to the Company by the Trustee, by registered or certified mail, or to the Company and the Trustee by the holders of at least 25% in principal amount of the Securities of that series at the time Outstanding;

(4) the Company pursuant to or within the meaning of any Bankruptcy Law (i) commences a voluntary case, (ii) consents to the entry of an order for relief against it in an involuntary case, (iii) consents to the appointment of a Custodian of it or for all or substantially all of its property or (iv) makes a general assignment for the benefit of its creditors; or

(5) a court of competent jurisdiction enters an order under any Bankruptcy Law that (i) is for relief against the Company in an involuntary case, (ii) appoints a Custodian of the Company for all or substantially all of its property or (iii) orders the liquidation of the Company, and the order or decree remains unstayed and in effect for 90 days.

(b) In each and every such case (other than an Event of Default specified in clause (4) or clause (5) above), unless the principal of all the Securities of that series shall have already become due and payable, either the Trustee or the holders of not less than 25% in aggregate principal amount of the Securities of that series then Outstanding hereunder, by notice in writing to the Company (and to the Trustee if given by such Securityholders), may declare the principal of (and premium, if any, on) and accrued and unpaid interest on all the Securities of that series to be due and payable immediately, and upon any such declaration the same shall become and shall be immediately due and payable. If an Event of Default specified in clause (4) or clause (5) above occurs, the principal of and accrued and unpaid interest on all the Securities of that series shall automatically be immediately due and payable without any declaration or other act on the part of the Trustee or the holders of the Securities.

(c) At any time after the principal of (and premium, if any, on) and accrued and unpaid interest on the Securities of that series shall have been so declared due and payable, and before any judgment or decree for the payment of the moneys due shall have been obtained or entered as hereinafter provided, the holders of a majority in aggregate principal amount of the Securities of that series then Outstanding hereunder, by written notice to the Company and the Trustee, may rescind and annul such declaration and its consequences if: (i) the Company has paid or deposited with the Trustee a sum sufficient to pay all matured installments of interest upon all the Securities of that series and the principal of (and premium, if any, on) any and all Securities of that series that shall have become due otherwise than by acceleration (with interest upon such principal and premium, if any, and, to the extent that such payment is enforceable under applicable law, upon overdue installments of interest, at the rate per annum expressed in the Securities of that series to the date of such payment or deposit) and the amount payable to the Trustee under Section 7.06, and (ii) any and all Events of Default under the Indenture with respect to such series, other than the nonpayment of principal on (and premium, if any, on) and accrued and unpaid interest on Securities of that series that shall not have become due by their terms, shall have been remedied or waived as provided in Section 6.06.

No such rescission and annulment shall extend to or shall affect any subsequent default or impair any right consequent thereon.

(d) In case the Trustee shall have proceeded to enforce any right with respect to Securities of that series under this Indenture and such proceedings shall have been discontinued or abandoned because of such rescission or annulment or for any other reason or shall have been determined adversely to the Trustee, then and in every such case, subject to any determination in such proceedings, the Company and the Trustee shall be restored respectively to their former positions and rights hereunder, and all rights, remedies and powers of the Company and the Trustee shall continue as though no such proceedings had been taken.

Section 6.02 Collection of Indebtedness and Suits for Enforcement by Trustee.

(a) The Company covenants that (i) in case it shall default in the payment of any installment of interest on any of the Securities of a series, or in any payment required by any sinking or analogous fund established with respect to that series as and when the same shall have become due and payable, and such default shall have continued for a period of 90 days, or (ii) in case it shall default in the payment of the principal of (or premium, if any, on) any of the Securities of a series when the same shall have become due and payable, whether upon maturity of the Securities of a series or upon redemption or upon declaration or otherwise then, upon demand of the Trustee, the Company will pay to the Trustee, for the benefit of the holders of the Securities of that series, the whole amount that then shall have become due and payable on all such Securities for principal (and premium, if any) or interest, or both, as the case may be, with interest upon the overdue principal (and premium, if any) and (to the extent that payment of such interest is enforceable under applicable law) upon overdue installments of interest at the rate per annum expressed in the Securities of that series; and, in addition thereto, such further amount as shall be sufficient to cover the costs and expenses of collection, and the amount payable to the Trustee under Section 7.06.

(b) If the Company shall fail to pay such amounts forthwith upon such demand, the Trustee, in its own name and as trustee of an express trust, shall be entitled and empowered to institute any action or proceedings at law or in equity for the collection of the sums so due and unpaid, and may prosecute any such action or proceeding to judgment or final decree, and may enforce any such judgment or final decree against the Company or other obligor upon the Securities of that series and collect the moneys adjudged or decreed to be payable in the manner provided by law or equity out of the property of the Company or other obligor upon the Securities of that series, wherever situated.

(c) In case of any receivership, insolvency, liquidation, bankruptcy, reorganization, readjustment, arrangement, composition or judicial proceedings affecting the Company, or its creditors or property, the Trustee shall have power to intervene in such proceedings and take any action therein that may be permitted by the court and shall (except as may be otherwise provided by law) be entitled to file such proofs of claim and other papers and documents as may be necessary or advisable in order to have the claims of the Trustee and of the holders of Securities of such series allowed for the entire amount due and payable by the Company under the Indenture at the date of institution of such proceedings and for any additional amount that may become due and payable by the Company after such date, and to collect and receive any moneys or other property payable or deliverable on any such claim, and to distribute the same after the deduction of the amount payable to the Trustee under Section

7.06; and any receiver, assignee or trustee in bankruptcy or reorganization is hereby authorized by each of the holders of Securities of such series to make such payments to the Trustee, and, in the event that the Trustee shall consent to the making of such payments directly to such Securityholders, to pay to the Trustee any amount due it under Section 7.06.

(d) All rights of action and of asserting claims under this Indenture, or under any of the terms established with respect to Securities of that series, may be enforced by the Trustee without the possession of any of such Securities, or the production thereof at any trial or other proceeding relative thereto, and any such suit or proceeding instituted by the Trustee shall be brought in its own name as trustee of an express trust, and any recovery of judgment shall, after provision for payment to the Trustee of any amounts due under Section 7.06, be for the ratable benefit of the holders of the Securities of such series.

In case of an Event of Default hereunder, the Trustee may in its discretion proceed to protect and enforce the rights vested in it by this Indenture by such appropriate judicial proceedings as the Trustee shall deem most effectual to protect and enforce any of such rights, either at law or in equity or in bankruptcy or otherwise, whether for the specific enforcement of any covenant or agreement contained in the Indenture or in aid of the exercise of any power granted in this Indenture, or to enforce any other legal or equitable right vested in the Trustee by this Indenture or by law.

Nothing contained herein shall be deemed to authorize the Trustee to authorize or consent to or accept or adopt on behalf of any Securityholder any plan of reorganization, arrangement, adjustment or composition affecting the Securities of that series or the rights of any Securityholder thereof or to authorize the Trustee to vote in respect of the claim of any Securityholder in any such proceeding.

Section 6.03 Application of Moneys Collected.

Any moneys collected by the Trustee pursuant to this Article with respect to a particular series of Securities shall be applied in the following order, at the date or dates fixed by the Trustee and, in case of the distribution of such moneys on account of principal (or premium, if any) or interest, upon presentation of the Securities of that series, and notation thereon of the payment, if only partially paid, and upon surrender thereof if fully paid:

FIRST: To the payment of costs and expenses of collection and of all amounts payable to the Trustee under Section 7.06;

SECOND: To the payment of the amounts then due and unpaid upon Securities of such series for principal (and premium, if any) and interest, in respect of which or for the benefit of which such money has been collected, ratably, without preference or priority of any kind, according to the amounts due and payable on such Securities for principal (and premium, if any) and interest, respectively; and

THIRD: To the payment of the remainder, if any, to the Company or any other Person lawfully entitled thereto.

Section 6.04 Limitation on Suits.

No holder of any Security of any series shall have any right by virtue or by availing of any provision of this Indenture to institute any suit, action or proceeding in equity or at law upon or under or with respect to this Indenture or for the appointment of a receiver or trustee, or for any other remedy hereunder, unless (i) such Securityholder previously shall have given to the Trustee written notice of an Event of Default and of the continuance thereof with respect to the Securities of such series specifying such Event of Default, as hereinbefore provided; (ii) the holders of not less than 25% in aggregate principal amount of the Securities of such series then Outstanding shall have made written request upon the Trustee to institute such action, suit or proceeding in its own name as Trustee hereunder; (iii) such Securityholder or Securityholders shall have offered to the Trustee indemnity satisfactory to it against the costs, expenses and liabilities to be incurred in compliance with such request; (iv) the Trustee for 90 days after its receipt of such notice, request and offer of indemnity, shall have failed to institute any such action, suit or proceeding and (v) during such 90 day period, the holders of a majority in principal amount of the Securities of that series do not give the Trustee a direction inconsistent with the request.

Notwithstanding anything contained herein to the contrary or any other provisions of this Indenture, the right of any holder of any Security to receive payment of the principal of (and premium, if any) and interest on such Security, as therein provided, on or after the respective due dates expressed in such Security (or in the case of redemption, on the redemption date), or to institute suit for the enforcement of any such payment on or after such respective dates or redemption date, shall not be impaired or affected without the consent of such holder and by accepting a Security hereunder it is expressly understood, intended and covenanted by the taker and holder of every Security of such series with every other such taker and holder and the Trustee, that no one or more holders of Securities of such series shall have any right in any manner whatsoever by virtue or by availing of any provision of this Indenture to affect, disturb or prejudice the rights of the holders of any other of such Securities, or to obtain or seek to obtain priority over or preference to any other such holder, or to enforce any right under this Indenture, except in the manner herein provided and for the equal, ratable and common benefit of all holders of Securities of such series. For the protection and enforcement of the provisions of this Section, each and every Securityholder and the Trustee shall be entitled to such relief as can be given either at law or in equity.

Section 6.05 Rights and Remedies Cumulative; Delay or Omission Not Waiver.

(a) Except as otherwise provided in Section 2.07, all powers and remedies given by this Article to the Trustee or to the Securityholders shall, to the extent permitted by law, be deemed cumulative and not exclusive of any other powers and remedies available to the Trustee or the holders of the Securities, by judicial proceedings or otherwise, to enforce the performance or observance of the covenants and agreements contained in this Indenture or otherwise established with respect to such Securities.

(b) No delay or omission of the Trustee or of any holder of any of the Securities to exercise any right or power accruing upon any Event of Default occurring and continuing as aforesaid shall impair any such right or power, or shall be construed to be a waiver

of any such default or an acquiescence therein; and, subject to the provisions of Section 6.04, every power and remedy given by this Article or by law to the Trustee or the Securityholders may be exercised from time to time, and as often as shall be deemed expedient, by the Trustee or by the Securityholders.

Section 6.06 Control by Securityholders.

The holders of a majority in aggregate principal amount of the Securities of any series at the time Outstanding, determined in accordance with Section 8.04, shall have the right to direct the time, method and place of conducting any proceeding for any remedy available to the Trustee, or exercising any trust or power conferred on the Trustee with respect to such series; provided, however, that such direction shall not be in conflict with any rule of law or with this Indenture or subject the Trustee in its sole discretion to personal liability. Subject to the provisions of Section 7.01, the Trustee shall have the right to decline to follow any such direction if the Trustee in good faith shall, by a Responsible Officer or officers of the Trustee, determine that the proceeding so directed, subject to the Trustee's duties under the Trust Indenture Act, would involve the Trustee in personal liability or might be unduly prejudicial to the Securityholders not involved in the proceeding. The holders of a majority in aggregate principal amount of the Securities of any series at the time Outstanding affected thereby, determined in accordance with Section 8.04, may on behalf of the holders of all of the Securities of such series waive any past default in the performance of any of the covenants contained herein or established pursuant to Section 2.01 with respect to such series and its consequences, except a default in the payment of the principal of, or premium, if any, or interest on, any of the Securities of that series as and when the same shall become due by the terms of such Securities otherwise than by acceleration (unless such default has been cured and a sum sufficient to pay all matured installments of interest and principal and any premium has been deposited with the Trustee (in accordance with Section 6.01(c)). Upon any such waiver, the default covered thereby shall be deemed to be cured for all purposes of this Indenture and the Company, the Trustee and the holders of the Securities of such series shall be restored to their former positions and rights hereunder, respectively; but no such waiver shall extend to any subsequent or other default or impair any right consequent thereon.

Section 6.07 Undertaking to Pay Costs.

All parties to this Indenture agree, and each holder of any Securities by such holder's acceptance thereof shall be deemed to have agreed, that any court may in its discretion require, in any suit for the enforcement of any right or remedy under this Indenture, or in any suit against the Trustee for any action taken or omitted by it as Trustee, the filing by any party litigant in such suit of an undertaking to pay the costs of such suit, and that such court may in its discretion assess reasonable costs, including reasonable attorneys' fees and expenses, against any party litigant in such suit, having due regard to the merits and good faith of the claims or defenses made by such party litigant; but the provisions of this Section shall not apply to any suit instituted by the Trustee, to any suit instituted by any Securityholder, or group of Securityholders, holding more than 10% in aggregate principal amount of the Outstanding Securities of any series, or to any suit instituted by any Securityholder for the enforcement of the payment of the principal of (or premium, if any) or interest on any Security of such series, on or after the respective due dates expressed in such Security or established pursuant to this Indenture.

ARTICLE 7

CONCERNING THE TRUSTEE

Section 7.01 Certain Duties and Responsibilities of Trustee.

(a) The Trustee, prior to the occurrence of an Event of Default with respect to the Securities of a series and after the curing of all Events of Default with respect to the Securities of that series that may have occurred, shall undertake to perform with respect to the Securities of such series such duties and only such duties as are specifically set forth in this Indenture, and no implied covenants shall be read into this Indenture against the Trustee. In case an Event of Default with respect to the Securities of a series has occurred (that has not been cured or waived), the Trustee shall exercise with respect to Securities of that series such of the rights and powers vested in it by this Indenture, and use the same degree of care and skill in their exercise, as a prudent man would exercise or use under the circumstances in the conduct of his or her own affairs.

(b) No provision of this Indenture shall be construed to relieve the Trustee from liability for its own negligent action, its own negligent failure to act, or its own willful misconduct, except that:

(i) prior to the occurrence of an Event of Default with respect to the Securities of a series and after the curing or waiving of all such Events of Default with respect to that series that may have occurred:

(A) the duties and obligations of the Trustee shall with respect to the Securities of such series be determined solely by the express provisions of this Indenture, and the Trustee shall not be liable with respect to the Securities of such series except for the performance of such duties and obligations as are specifically set forth in this Indenture, and no implied covenants or obligations shall be read into this Indenture against the Trustee; and

(B) in the absence of bad faith on the part of the Trustee, the Trustee may with respect to the Securities of such series conclusively rely, as to the truth of the statements and the correctness of the opinions expressed therein, upon any certificates or opinions furnished to the Trustee and conforming to the requirements of this Indenture; but in the case of any such certificates or opinions that by any provision hereof are specifically required to be furnished to the Trustee, the Trustee shall be under a duty to examine the same to determine whether or not they conform to the requirements of this Indenture;

(ii) the Trustee shall not be liable to any Securityholder or to any other Person for any error of judgment made in good faith by a Responsible Officer or Responsible Officers of the Trustee, unless it shall be proved that the Trustee was negligent in ascertaining the pertinent facts;

(iii) the Trustee shall not be liable with respect to any action taken or omitted to be taken by it in good faith in accordance with the direction of the holders of not less than a majority in principal amount of the Securities of any series at the time Outstanding relating to the time, method and place of conducting any proceeding for any remedy available to the Trustee, or exercising any trust or power conferred upon the Trustee under this Indenture with respect to the Securities of that series;

(iv) none of the provisions contained in this Indenture shall require the Trustee to expend or risk its own funds or otherwise incur personal financial liability in the performance of any of its duties or in the exercise of any of its rights or powers if there is reasonable ground for believing that the repayment of such funds or liability is not reasonably assured to it under the terms of this Indenture or adequate indemnity against such risk is not reasonably assured to it;

(v) The Trustee shall not be required to give any bond or surety in respect of the performance of its powers or duties hereunder;

(vi) The permissive right of the Trustee to do things enumerated in this Indenture shall not be construed as a duty of the Trustee; and

(vii) No Trustee shall have any duty or responsibility for any act or omission of any other Trustee appointed with respect to a series of Securities hereunder.

Section 7.02 Certain Rights of Trustee.

Except as otherwise provided in Section 7.01:

(a) The Trustee may conclusively rely and shall be protected in acting or refraining from acting upon any resolution, certificate, statement, instrument, opinion, report, notice, request, consent, order, approval, bond, security or other paper or document believed by it to be genuine and to have been signed or presented by the proper party or parties;

(b) Any request, direction, order or demand of the Company mentioned herein shall be sufficiently evidenced by a Board Resolution or an instrument signed in the name of the Company by any authorized Officer of the Company (unless other evidence in respect thereof is specifically prescribed herein);

(c) The Trustee may consult with counsel and the opinion or written advice of such counsel or, if requested, any Opinion of Counsel shall be full and complete authorization and protection in respect of any action taken or suffered or omitted hereunder in good faith and in reliance thereon;

(d) The Trustee shall be under no obligation to exercise any of the rights or powers vested in it by this Indenture at the request, order or direction of any of the Securityholders pursuant to the provisions of this Indenture, unless such Securityholders shall have offered to the Trustee security or indemnity reasonably acceptable to the Trustee against the costs, expenses and liabilities that may be incurred therein or thereby; nothing contained herein

shall, however, relieve the Trustee of the obligation, upon the occurrence of an Event of Default with respect to a series of the Securities (that has not been cured or waived), to exercise with respect to Securities of that series such of the rights and powers vested in it by this Indenture, and to use the same degree of care and skill in their exercise, as a prudent man would exercise or use under the circumstances in the conduct of his or her own affairs;

(e) The Trustee shall not be liable for any action taken or omitted to be taken by it in good faith and believed by it to be authorized or within the discretion or rights or powers conferred upon it by this Indenture;

(f) The Trustee shall not be bound to make any investigation into the facts or matters stated in any resolution, certificate, statement, instrument, opinion, report, notice, request, consent, order, approval, bond, security, or other papers or documents or inquire as to the performance by the Company of one of its covenants under this Indenture, unless requested in writing so to do by the holders of not less than a majority in principal amount of the Outstanding Securities of the particular series affected thereby (determined as provided in Section 8.04); provided, however, that if the payment within a reasonable time to the Trustee of the costs, expenses or liabilities likely to be incurred by it in the making of such investigation is, in the opinion of the Trustee, not reasonably assured to the Trustee by the security afforded to it by the terms of this Indenture, the Trustee may require security or indemnity reasonably acceptable to the Trustee against such costs, expenses or liabilities as a condition to so proceeding. The reasonable expense of every such examination shall be paid by the Company or, if paid by the Trustee, shall be repaid by the Company upon demand;

(g) The Trustee may execute any of the trusts or powers hereunder or perform any duties hereunder either directly or by or through agents or attorneys and the Trustee shall not be responsible for any misconduct or negligence on the part of any agent or attorney appointed with due care by it hereunder;

(h) In no event shall the Trustee be responsible or liable for any failure or delay in the performance of its obligations hereunder arising out of or caused by, directly or indirectly, forces beyond its control, including, without limitation, strikes, work stoppages, accidents, acts of war or terrorism, civil or military disturbances, nuclear or natural catastrophes or acts of God, and interruptions, loss or malfunctions of utilities, communications or computer (software and hardware) services; it being understood that the Trustee shall use reasonable efforts which are consistent with accepted practices in the banking industry to resume performance as soon as practicable under the circumstances;

(i) In no event shall the Trustee be responsible or liable for special, indirect, punitive or consequential loss or damage of any kind whatsoever (including, but not limited to, loss of profit) irrespective of whether the Trustee has been advised of the likelihood of such loss or damage and regardless of the form of action; and

(j) The Trustee agrees to accept and act upon instructions or directions pursuant to this Indenture sent by unsecured e-mail, facsimile transmission or other similar unsecured electronic methods; provided, however, that such instructions or directions shall be signed by an authorized representative of the party providing such instructions or directions. If

the party elects to give the Trustee e-mail or facsimile instructions (or instructions by a similar electronic method) and the Trustee in its discretion elects to act upon such instructions, the Trustee's understanding of such instructions shall be deemed controlling. The Trustee shall not be liable for any losses, costs or expenses arising directly or indirectly from the Trustee's reliance upon and compliance with such instructions notwithstanding such instructions conflict or are inconsistent with a subsequent written instruction. The party providing electronic instructions agrees to assume all risks arising out of the use of such electronic methods to submit instructions and directions to the Trustee, including without limitation the risk of the Trustee acting on unauthorized instructions, and the risk of interception and misuse by third parties. The Trustee may request that the Company deliver an Officer's Certificate setting forth the names of individuals and/or titles of officers authorized at such time to furnish the Trustee with Officer's Certificates, Company Orders and any other matters or directions pursuant to this Indenture.

(k) The rights, privileges, protections, immunities and benefits given to the Trustee, including, without limitation, its right to be indemnified, are extended to, and shall be enforceable by, the Trustee in each of its capacities hereunder and under the Securities, and each agent, custodian or other person employed to act under this Indenture.

(l) The Trustee shall not be deemed to have knowledge of any Default or Event of Default (other than an Event of Default constituting the failure to pay the interest on, or the principal of, the Securities if the Trustee also serves as the paying agent for such Securities) until the Trustee shall have received written notification in the manner set forth in this Indenture or a Responsible Officer of the Trustee shall have obtained actual knowledge.

Section 7.03 Trustee Not Responsible for Recitals or Issuance of Securities.

(a) The recitals contained herein and in the Securities shall be taken as the statements of the Company, and the Trustee assumes no responsibility for the correctness of the same. The Trustee shall not be responsible for any statement in any registration statement, prospectus, or any other document in connection with the sale of Securities. The Trustee shall not be responsible for any rating on the Securities or any action or omission of any rating agency.

(b) The Trustee makes no representations as to the validity or sufficiency of this Indenture or of the Securities.

(c) The Trustee shall not be accountable for the use or application by the Company of any of the Securities or of the proceeds of such Securities, or for the use or application of any moneys paid over by the Trustee in accordance with any provision of this Indenture or established pursuant to Section 2.01, or for the use or application of any moneys received by any paying agent other than the Trustee.

Section 7.04 May Hold Securities.

The Trustee or any paying agent or Security Registrar, in its individual or any other capacity, may become the owner or pledgee of Securities with the same rights it would have if it were not Trustee, paying agent or Security Registrar.

Section 7.05 Moneys Held in Trust.

Subject to the provisions of Section 11.05, all moneys received by the Trustee shall, until used or applied as herein provided, be held in trust for the purposes for which they were received, but need not be segregated from other funds except to the extent required by law. The Trustee shall be under no liability for interest on any moneys received by it hereunder except such as it may agree with the Company to pay thereon.

Section 7.06 Compensation and Reimbursement.

(a) The Company shall pay to the Trustee for each of its capacities hereunder from time to time compensation for its services as the Company and the Trustee shall from time to time agree upon in writing. The Trustee's compensation shall not be limited by any law on compensation of a trustee of an express trust. The Company shall reimburse the Trustee upon request for all reasonable out-of-pocket expenses incurred by it. Such expenses shall include the reasonable compensation and expenses of the Trustee's agents and counsel.

(b) The Company shall indemnify each of the Trustee in each of its capacities hereunder against any loss, liability or expense (including the cost of defending itself and including the reasonable compensation and expenses of the Trustee's agents and counsel) incurred by it except as set forth in Section 7.06(c) in the exercise or performance of its powers, rights or duties under this Indenture as Trustee or Agent. The Trustee shall notify the Company promptly of any claim for which it may seek indemnity. The Company shall defend the claim and the Trustee shall cooperate in the defense. The Trustee may have one separate counsel and the Company shall pay the reasonable fees and expenses of such counsel. The Company need not pay for any settlement made without its consent, which consent shall not be unreasonably withheld. This indemnification shall apply to officers, directors, employees, shareholders and agents of the Trustee.

(c) The Company need not reimburse any expense or indemnify against any loss or liability incurred by the Trustee or by any officer, director, employee, shareholder or agent of the Trustee through negligence or bad faith.

(d) To ensure the Company's payment obligations in this Section, the Trustee shall have a lien prior to the Securities on all funds or property held or collected by the Trustee, except that held in trust to pay principal of or interest on particular Securities. When the Trustee incurs expenses or renders services in connection with an Event of Default specified in Section 6.01(4) or (5), the expenses (including the reasonable fees and expenses of its counsel) and the compensation for services in connection therewith are to constitute expenses of administration under any bankruptcy law. The provisions of this Section 7.06 shall survive the termination of this Indenture and the resignation or removal of the Trustee.

Section 7.07 Reliance on Officer's Certificate.

Except as otherwise provided in Section 7.01, whenever in the administration of the provisions of this Indenture the Trustee shall deem it reasonably necessary or desirable that a matter be proved or established prior to taking or suffering or omitting to take any action

hereunder, such matter (unless other evidence in respect thereof be herein specifically prescribed) may, in the absence of negligence or bad faith on the part of the Trustee, be deemed to be conclusively proved and established by an Officer's Certificate delivered to the Trustee and such certificate, in the absence of negligence or bad faith on the part of the Trustee, shall be full warrant to the Trustee for any action taken, suffered or omitted to be taken by it under the provisions of this Indenture upon the faith thereof.

Section 7.08 Disqualification; Conflicting Interests.

If the Trustee has or shall acquire any "conflicting interest" within the meaning of Section 310(b) of the Trust Indenture Act, the Trustee and the Company shall in all respects comply with the provisions of Section 310(b) of the Trust Indenture Act.

Section 7.09 Corporate Trustee Required; Eligibility.

There shall at all times be a Trustee with respect to the Securities issued hereunder which shall at all times be a corporation organized and doing business under the laws of the United States of America or any state or territory thereof or of the District of Columbia, or a corporation or other Person permitted to act as trustee by the Commission, authorized under such laws to exercise corporate trust powers, having a combined capital and surplus of at least fifty million U.S. dollars (\$50,000,000), and subject to supervision or examination by federal, state, territorial, or District of Columbia authority.

If such corporation or other Person publishes reports of condition at least annually, pursuant to law or to the requirements of the aforesaid supervising or examining authority, then for the purposes of this Section, the combined capital and surplus of such corporation or other Person shall be deemed to be its combined capital and surplus as set forth in its most recent report of condition so published. The Company may not, nor may any Person directly or indirectly controlling, controlled by or under common control with the Company, serve as Trustee. In case at any time the Trustee shall cease to be eligible in accordance with the provisions of this Section, the Trustee shall resign immediately in the manner and with the effect specified in Section 7.10.

Section 7.10 Resignation and Removal; Appointment of Successor.

(a) The Trustee or any successor hereafter appointed may at any time resign with respect to the Securities of one or more series by giving written notice thereof to the Company and the Securityholders of such series. Upon receiving such notice of resignation, the Company shall promptly appoint a successor trustee with respect to Securities of such series by written instrument, in duplicate, executed by order of the Board of Directors, one copy of which instrument shall be delivered to the resigning Trustee and one copy to the successor trustee. If no successor trustee shall have been so appointed and have accepted appointment within 30 days after the sending of such notice of resignation, the resigning Trustee may petition any court of competent jurisdiction for the appointment of a successor trustee with respect to Securities of such series, or any Securityholder of that series who has been a bona fide holder of a Security or Securities for at least six months may on behalf of himself and all others similarly situated, petition any such court for the appointment of a successor trustee. Such court may thereupon after such notice, if any, as it may deem proper and prescribe, appoint a successor trustee.

(b) In case at any time any one of the following shall occur:

(i) the Trustee shall fail to comply with the provisions of Section 7.08 after written request therefor by the Company or by any Securityholder who has been a bona fide holder of a Security or Securities for at least six months; or

(ii) the Trustee shall cease to be eligible in accordance with the provisions of Section 7.09 and shall fail to resign after written request therefor by the Company or by any such Securityholder; or

(iii) the Trustee shall become incapable of acting, or shall be adjudged a bankrupt or insolvent, or commence a voluntary bankruptcy proceeding, or a receiver of the Trustee or of its property shall be appointed or consented to, or any public officer shall take charge or control of the Trustee or of its property or affairs for the purpose of rehabilitation, conservation or liquidation;

then, in any such case, the Company may remove the Trustee with respect to all Securities and appoint a successor trustee by written instrument, in duplicate, executed by order of the Board of Directors, one copy of which instrument shall be delivered to the Trustee so removed and one copy to the successor trustee, or any Securityholder who has been a bona fide holder of a Security or Securities for at least six months may, on behalf of that holder and all others similarly situated, petition any court of competent jurisdiction for the removal of the Trustee and the appointment of a successor trustee. Such court may thereupon after such notice, if any, as it may deem proper and prescribe, remove the Trustee and appoint a successor trustee.

(c) The holders of a majority in aggregate principal amount of the Securities of any series at the time Outstanding may at any time remove the Trustee with respect to such series by so notifying the Trustee and the Company and may appoint a successor Trustee for such series with the consent of the Company.

(d) Any resignation or removal of the Trustee and appointment of a successor trustee with respect to the Securities of a series pursuant to any of the provisions of this Section shall become effective upon acceptance of appointment by the successor trustee as provided in Section 7.11.

(e) Any successor trustee appointed pursuant to this Section may be appointed with respect to the Securities of one or more series or all of such series, and at any time there shall be only one Trustee with respect to the Securities of any particular series.

Section 7.11 Acceptance of Appointment by Successor.

(a) In case of the appointment hereunder of a successor trustee with respect to all Securities, every such successor trustee so appointed shall execute, acknowledge and deliver to the Company and to the retiring Trustee an instrument accepting such appointment, and

thereupon the resignation or removal of the retiring Trustee shall become effective and such successor trustee, without any further act, deed or conveyance, shall become vested with all the rights, powers, trusts and duties of the retiring Trustee; but, on the request of the Company or the successor trustee, such retiring Trustee shall, upon payment of any amounts due to it pursuant to the provisions of Section 7.06, execute and deliver an instrument transferring to such successor trustee all the rights, powers, and trusts of the retiring Trustee and shall duly assign, transfer and deliver to such successor trustee all property and money held by such retiring Trustee hereunder.

(b) In case of the appointment hereunder of a successor trustee with respect to the Securities of one or more (but not all) series, the Company, the retiring Trustee and each successor trustee with respect to the Securities of one or more series shall execute and deliver an indenture supplemental hereto wherein each successor trustee shall accept such appointment and which (i) shall contain such provisions as shall be necessary or desirable to transfer and confirm to, and to vest in, each successor trustee all the rights, powers, trusts and duties of the retiring Trustee with respect to the Securities of that or those series to which the appointment of such successor trustee relates, (ii) shall contain such provisions as shall be deemed necessary or desirable to confirm that all the rights, powers, trusts and duties of the retiring Trustee with respect to the Securities of that or those series as to which the retiring Trustee is not retiring shall continue to be vested in the retiring Trustee, and (iii) shall add to or change any of the provisions of this Indenture as shall be necessary to provide for or facilitate the administration of the trusts hereunder by more than one Trustee, it being understood that nothing herein or in such supplemental indenture shall constitute such Trustees co-trustees of the same trust, that each such Trustee shall be trustee of a trust or trusts hereunder separate and apart from any trust or trusts hereunder administered by any other such Trustee and that no Trustee shall be responsible for any act or failure to act on the part of any other Trustee hereunder; and upon the execution and delivery of such supplemental indenture the resignation or removal of the retiring Trustee shall become effective to the extent provided therein, such retiring Trustee shall with respect to the Securities of that or those series to which the appointment of such successor trustee relates have no further responsibility for the exercise of rights and powers or for the performance of the duties and obligations vested in the Trustee under this Indenture, and each such successor trustee, without any further act, deed or conveyance, shall become vested with all the rights, powers, trusts and duties of the retiring Trustee with respect to the Securities of that or those series to which the appointment of such successor trustee relates; but, on request of the Company or any successor trustee, such retiring Trustee shall duly assign, transfer and deliver to such successor trustee, to the extent contemplated by such supplemental indenture, the property and money held by such retiring Trustee hereunder with respect to the Securities of that or those series to which the appointment of such successor trustee relates.

(c) Upon request of any such successor trustee, the Company shall execute any and all instruments for more fully and certainly vesting in and confirming to such successor trustee all such rights, powers and trusts referred to in paragraph (a) or (b) of this Section, as the case may be.

(d) No successor trustee shall accept its appointment unless at the time of such acceptance such successor trustee shall be qualified and eligible under this Article.

(e) Upon acceptance of appointment by a successor trustee as provided in this Section, the Company shall send notice of the succession of such trustee hereunder to the Securityholders. If the Company fails to transmit such notice within ten days after acceptance of appointment by the successor trustee, the successor trustee shall cause such notice to be transmitted at the expense of the Company.

Section 7.12 Merger, Conversion, Consolidation or Succession to Business.

Any corporation into which the Trustee may be merged or converted or with which it may be consolidated, or any corporation resulting from any merger, conversion or consolidation to which the Trustee shall be a party, or any corporation succeeding to all or substantially all the corporate trust business of the Trustee, including the administration of the trust created by this Indenture, shall be the successor of the Trustee hereunder, provided that such corporation shall be qualified under the provisions of Section 7.08 and eligible under the provisions of Section 7.09, without the execution or filing of any paper or any further act on the part of any of the parties hereto, anything herein to the contrary notwithstanding. In case any Securities shall have been authenticated, but not delivered, by the Trustee then in office, any successor by merger, conversion or consolidation to such authenticating Trustee may adopt such authentication and deliver the Securities so authenticated with the same effect as if such successor Trustee had itself authenticated such Securities.

Section 7.13 Preferential Collection of Claims Against the Company.

The Trustee shall comply with Section 311(a) of the Trust Indenture Act, excluding any creditor relationship described in Section 311(b) of the Trust Indenture Act. A Trustee who has resigned or been removed shall be subject to Section 311(a) of the Trust Indenture Act to the extent included therein.

Section 7.14 Notice of Default.

If any Event of Default occurs and is continuing and if such Event of Default is known to a Responsible Officer of the Trustee, the Trustee shall send to each Securityholder in the manner and to the extent provided in Section 313(c) of the Trust Indenture Act notice of the Event of Default within the earlier of 90 days after it occurs and 30 days after it is known to a Responsible Officer of the Trustee or written notice of it is received by the Trustee, unless such Event of Default has been cured; *provided, however*, that, except in the case of a default in the payment of the principal of (or premium, if any) or interest on any Security, the Trustee shall be protected in withholding such notice if and so long as the Responsible Officers of the Trustee in good faith determine that the withholding of such notice is in the interest of the Securityholders.

ARTICLE 8

CONCERNING THE SECURITYHOLDERS

Section 8.01 Evidence of Action by Securityholders.

Whenever in this Indenture it is provided that the holders of a majority or specified percentage in aggregate principal amount of the Securities of a particular series may take any action (including the making of any demand or request, the giving of any notice, consent or waiver or the taking of any other action), the fact that at the time of taking any such action the holders of such majority or specified percentage of that series have joined therein may be evidenced by any instrument or any number of instruments of similar tenor executed by such holders of Securities of that series in person or by agent or proxy appointed in writing.

If the Company shall solicit from the Securityholders of any series any request, demand, authorization, direction, notice, consent, waiver or other action, the Company may, at its option, as evidenced by an Officer's Certificate, fix in advance a record date for such series for the determination of Securityholders entitled to give such request, demand, authorization, direction, notice, consent, waiver or other action, but the Company shall have no obligation to do so. If such a record date is fixed, such request, demand, authorization, direction, notice, consent, waiver or other action may be given before or after the record date, but only the Securityholders of record at the close of business on the record date shall be deemed to be Securityholders for the purposes of determining whether Securityholders of the requisite proportion of Outstanding Securities of that series have authorized or agreed or consented to such request, demand, authorization, direction, notice, consent, waiver or other action, and for that purpose the Outstanding Securities of that series shall be computed as of the record date; provided, however, that no such authorization, agreement or consent by such Securityholders on the record date shall be deemed effective unless it shall become effective pursuant to the provisions of this Indenture not later than six months after the record date.

Section 8.02 Proof of Execution by Securityholders.

Subject to the provisions of Section 7.01, proof of the execution of any instrument by a Securityholder (such proof will not require notarization) or his or her agent or proxy and proof of the holding by any Person of any of the Securities shall be sufficient if made in the following manner:

- (a) The fact and date of the execution by any such Person of any instrument may be proved in any reasonable manner acceptable to the Trustee.
- (b) The ownership of Securities shall be proved by the Security Register of such Securities or by a certificate of the Security Registrar thereof.

The Trustee may require such additional proof of any matter referred to in this Section as it shall deem necessary.

Section 8.03 Who May be Deemed Owners.

Prior to the due presentment for registration of transfer of any Security, the Company, the Trustee, any paying agent and any Security Registrar may deem and treat the Person in whose name such Security shall be registered upon the books of the Security Registrar as the absolute owner of such Security (whether or not such Security shall be overdue and notwithstanding any notice of ownership or writing thereon made by anyone other than the Security Registrar) for the purpose of receiving payment of or on account of the principal of, premium, if any, and (subject to Section 2.03) interest on such Security and for all other purposes; and neither the Company nor the Trustee nor any paying agent nor any Security Registrar shall be affected by any notice to the contrary.

Section 8.04 Certain Securities Owned by Company Disregarded.

In determining whether the holders of the requisite aggregate principal amount of Securities of a particular series have concurred in any direction, consent or waiver under this Indenture, the Securities of that series that are owned by the Company or any other obligor on the Securities of that series or by any Person directly or indirectly controlling or controlled by or under common control with the Company or any other obligor on the Securities of that series shall be disregarded and deemed not to be Outstanding for the purpose of any such determination, except that for the purpose of determining whether the Trustee shall be protected in relying on any such direction, consent or waiver, only Securities of such series that the Trustee actually knows are so owned shall be so disregarded. The Securities so owned that have been pledged in good faith may be regarded as Outstanding for the purposes of this Section, if the pledgee shall establish to the satisfaction of the Trustee the pledgee's right so to act with respect to such Securities and that the pledgee is not a Person directly or indirectly controlling or controlled by or under direct or indirect common control with the Company or any such other obligor. In case of a dispute as to such right, any decision by the Trustee taken upon the advice of counsel shall be full protection to the Trustee.

Section 8.05 Actions Binding on Future Securityholders.

At any time prior to (but not after) the evidencing to the Trustee, as provided in Section 8.01, of the taking of any action by the holders of the majority or percentage in aggregate principal amount of the Securities of a particular series specified in this Indenture in connection with such action, any holder of a Security of that series that is shown by the evidence to be included in the Securities the holders of which have consented to such action may, by filing written notice with the Trustee, and upon proof of holding as provided in Section 8.02, revoke such action so far as concerns such Security. Except as aforesaid any such action taken by the holder of any Security shall be conclusive and binding upon such holder and upon all future holders and owners of such Security, and of any Security issued in exchange therefor, on registration of transfer thereof or in place thereof, irrespective of whether or not any notation in regard thereto is made upon such Security. Any action taken by the holders of the majority or percentage in aggregate principal amount of the Securities of a particular series specified in this Indenture in connection with such action shall be conclusively binding upon the Company, the Trustee and the holders of all the Securities of that series.

ARTICLE 9

SUPPLEMENTAL INDENTURES

Section 9.01 Supplemental Indentures without the Consent of Securityholders.

In addition to any supplemental indenture otherwise authorized by this Indenture, the Company and the Trustee may from time to time and at any time enter into an indenture or indentures supplemental hereto (which shall conform to the provisions of the Trust Indenture Act as then in effect), without the consent of the Securityholders, for one or more of the following purposes:

- (a) to cure any ambiguity, defect, or inconsistency herein or in the Securities of any series;
- (b) to comply with Article Ten;
- (c) to provide for uncertificated Securities in addition to or in place of certificated Securities;

(d) to add to the covenants, restrictions, conditions or provisions relating to the Company for the benefit of the holders of all or any series of Securities (and if such covenants, restrictions, conditions or provisions are to be for the benefit of less than all series of Securities, stating that such covenants, restrictions, conditions or provisions are expressly being included solely for the benefit of such series), to make the occurrence, or the occurrence and the continuance, of a default in any such additional covenants, restrictions, conditions or provisions an Event of Default, or to surrender any right or power herein conferred upon the Company;

(e) to add to, delete from or revise the conditions, limitations and restrictions on the authorized amount, terms or purposes of issue, authentication and delivery of Securities, as herein set forth;

- (f) to make any change that does not adversely affect the rights of any Securityholder in any material respect;

(g) to provide for the issuance of and establish the form and terms and conditions of the Securities of any series as provided in Section 2.01, to establish the form of any certifications required to be furnished pursuant to the terms of this Indenture or any series of Securities, or to add to the rights of the holders of any series of Securities;

- (h) to evidence and provide for the acceptance of appointment hereunder by a successor trustee; or

(i) to comply with any requirements of the Commission or any successor in connection with the qualification of this Indenture under the Trust Indenture Act.

The Trustee is hereby authorized to join with the Company in the execution of any such supplemental indenture, and to make any further appropriate agreements and stipulations that

may be therein contained, but the Trustee shall not be obligated to enter into any such supplemental indenture that affects the Trustee's own rights, duties or immunities under this Indenture or otherwise.

Any supplemental indenture authorized by the provisions of this Section may be executed by the Company and the Trustee without the consent of the holders of any of the Securities at the time Outstanding, notwithstanding any of the provisions of Section 9.02.

Section 9.02 Supplemental Indentures with Consent of Securityholders.

With the consent (evidenced as provided in Section 8.01) of the holders of not less than a majority in aggregate principal amount of the Securities of each series affected by such supplemental indenture or indentures at the time Outstanding, the Company, when authorized by a Board Resolution, and the Trustee may from time to time and at any time enter into an indenture or indentures supplemental hereto (which shall conform to the provisions of the Trust Indenture Act as then in effect) for the purpose of adding any provisions to or changing in any manner or eliminating any of the provisions of this Indenture or of any supplemental indenture or of modifying in any manner not covered by Section 9.01 the rights of the holders of the Securities of such series under this Indenture; provided, however, that no such supplemental indenture shall, without the consent of the holders of each Security then Outstanding and affected thereby, (a) extend the fixed maturity of any Securities of any series, or reduce the principal amount thereof, or reduce the rate or extend the time of payment of interest thereon, or reduce any premium payable upon the redemption thereof or (b) reduce the aforesaid percentage of Securities, the holders of which are required to consent to any such supplemental indenture.

It shall not be necessary for the consent of the Securityholders of any series affected thereby under this Section to approve the particular form of any proposed supplemental indenture, but it shall be sufficient if such consent shall approve the substance thereof.

Section 9.03 Effect of Supplemental Indentures.

Upon the execution of any supplemental indenture pursuant to the provisions of this Article or of Section 10.01, this Indenture shall, with respect to such series, be and be deemed to be modified and amended in accordance therewith and the respective rights, limitations of rights, obligations, duties and immunities under this Indenture of the Trustee, the Company and the holders of Securities of the series affected thereby shall thereafter be determined, exercised and enforced hereunder subject in all respects to such modifications and amendments, and all the terms and conditions of any such supplemental indenture shall be and be deemed to be part of the terms and conditions of this Indenture for any and all purposes.

Section 9.04 Securities Affected by Supplemental Indentures.

Securities of any series affected by a supplemental indenture, authenticated and delivered after the execution of such supplemental indenture pursuant to the provisions of this Article or of Section 10.01, may bear a notation in form approved by the Company, provided such form meets the requirements of any securities exchange upon which such series may be listed, as to any matter provided for in such supplemental indenture. If the Company shall so determine, new

Securities of that series so modified as to conform, in the opinion of the Board of Directors, to any modification of this Indenture contained in any such supplemental indenture may be prepared by the Company, authenticated by the Trustee and delivered in exchange for the Securities of that series then Outstanding.

Section 9.05 Execution of Supplemental Indentures.

Upon the request of the Company, accompanied by its Board Resolutions authorizing the execution of any such supplemental indenture, and upon the filing with the Trustee of evidence of the consent of Securityholders required to consent thereto as aforesaid, the Trustee shall join with the Company in the execution of such supplemental indenture unless such supplemental indenture affects the Trustee's own rights, duties or immunities under this Indenture or otherwise, in which case the Trustee may in its discretion but shall not be obligated to enter into such supplemental indenture. The Trustee, subject to the provisions of Section 7.01, shall receive an Officer's Certificate or an Opinion of Counsel as conclusive evidence that any supplemental indenture executed pursuant to this Article is authorized or permitted by the terms of this Article and that all conditions precedent to the execution of the supplemental indenture have been complied with; provided, however, that such Officer's Certificate or Opinion of Counsel need not be provided in connection with the execution of a supplemental indenture that establishes the terms of a series of Securities pursuant to Section 2.01 hereof.

Promptly after the execution by the Company and the Trustee of any supplemental indenture pursuant to the provisions of this Section, the Company shall (or shall direct the Trustee to) send a notice, setting forth in general terms the substance of such supplemental indenture, to the Securityholders of all series affected thereby as their names and addresses appear upon the Security Register. Any failure of the Company to send, or cause the sending of, such notice, or any defect therein, shall not, however, in any way impair or affect the validity of any such supplemental indenture.

ARTICLE 10

SUCCESSOR ENTITY

Section 10.01 Company May Consolidate, Etc.

Nothing contained in this Indenture shall prevent any consolidation or merger of the Company with or into any other Person (whether or not affiliated with the Company) or successive consolidations or mergers in which the Company or its successor or successors shall be a party or parties, or shall prevent any sale, conveyance, transfer or other disposition of the property of the Company or its successor or successors as an entirety, or substantially as an entirety, to any other Person (whether or not affiliated with the Company or its successor or successors); provided, however, the Company hereby covenants and agrees that, upon any such consolidation or merger (in each case, if the Company is not the survivor of such transaction) or any such sale, conveyance, transfer or other disposition (other than a sale, conveyance, transfer or other disposition to a Subsidiary of the Company), the due and punctual payment of the principal of (premium, if any) and interest on all of the Securities of all series in accordance with the terms of each series, according to their tenor, and the due and punctual performance and

observance of all the covenants and conditions of this Indenture with respect to each series or established with respect to such series pursuant to Section 2.01 to be kept or performed by the Company shall be expressly assumed, by supplemental indenture (which shall conform to the provisions of the Trust Indenture Act, as then in effect) reasonably satisfactory in form to the Trustee executed and delivered to the Trustee by the entity formed by such consolidation, or into which the Company shall have been merged, or by the entity which shall have acquired such property.

Section 10.02 Successor Entity Substituted.

(a) In case of any such consolidation, merger, sale, conveyance, transfer or other disposition and upon the assumption by the successor entity by supplemental indenture, executed and delivered to the Trustee and satisfactory in form to the Trustee, of the obligations set forth under Section 10.01 on all of the Securities of all series Outstanding, such successor entity shall succeed to and be substituted for the Company with the same effect as if it had been named as the Company herein, and thereupon the predecessor corporation shall be relieved of all obligations and covenants under this Indenture and the Securities.

(b) In case of any such consolidation, merger, sale, conveyance, transfer or other disposition, such changes in phraseology and form (but not in substance) may be made in the Securities thereafter to be issued as may be appropriate.

(c) Nothing contained in this Article shall require any action by the Company in the case of a consolidation or merger of any Person into the Company where the Company is the survivor of such transaction, or the acquisition by the Company, by purchase or otherwise, of all or any part of the property of any other Person (whether or not affiliated with the Company).

ARTICLE 11

SATISFACTION AND DISCHARGE

Section 11.01 Satisfaction and Discharge of Indenture.

If at any time: (a) the Company shall have delivered to the Trustee for cancellation all Securities of a series theretofore authenticated and not delivered to the Trustee for cancellation (other than any Securities that shall have been destroyed, lost or stolen and that shall have been replaced or paid as provided in Section 2.07 and Securities for whose payment money or Governmental Obligations have theretofore been deposited in trust or segregated and held in trust by the Company and thereupon repaid to the Company or discharged from such trust, as provided in Section 11.05); or (b) all such Securities of a particular series not theretofore delivered to the Trustee for cancellation shall have become due and payable, or are by their terms to become due and payable within one year or are to be called for redemption within one year under arrangements satisfactory to the Trustee for the giving of notice of redemption, and the Company shall deposit or cause to be deposited with the Trustee as trust funds the entire amount in moneys or Governmental Obligations or a combination thereof, sufficient in the opinion of a nationally recognized firm of independent public accountants expressed in a written certification thereof delivered to the Trustee, to pay at maturity or upon redemption all Securities of that

series not theretofore delivered to the Trustee for cancellation, including principal (and premium, if any) and interest due or to become due to such date of maturity or date fixed for redemption, as the case may be, and if the Company shall also pay or cause to be paid all other sums payable hereunder with respect to such series by the Company then this Indenture shall thereupon cease to be of further effect with respect to such series except for the provisions of Sections 2.03, 2.05, 2.07, 4.01, 4.02, 4.03, 7.10, 11.05 and 13.04, that shall survive until the date of maturity or redemption date, as the case may be, and Sections 7.06 and 11.05, that shall survive to such date and thereafter, and the Trustee, on demand of the Company and at the cost and expense of the Company shall execute proper instruments acknowledging satisfaction of and discharging this Indenture with respect to such series.

Section 11.02 Discharge of Obligations.

If at any time all such Securities of a particular series not heretofore delivered to the Trustee for cancellation or that have not become due and payable as described in Section 11.01 shall have been paid by the Company by depositing irrevocably with the Trustee as trust funds moneys or an amount of Governmental Obligations sufficient to pay at maturity or upon redemption all such Securities of that series not theretofore delivered to the Trustee for cancellation, including principal (and premium, if any) and interest due or to become due to such date of maturity or date fixed for redemption, as the case may be, and if the Company shall also pay or cause to be paid all other sums payable hereunder by the Company with respect to such series, then after the date such moneys or Governmental Obligations, as the case may be, are deposited with the Trustee the obligations of the Company under this Indenture with respect to such series shall cease to be of further effect except for the provisions of Sections 2.03, 2.05, 2.07, 4.01, 4.02, 4.03, 7.06, 7.10, 11.05 and 13.04 hereof that shall survive until such Securities shall mature and be paid.

Thereafter, Sections 7.06 and 11.05 shall survive.

Section 11.03 Deposited Moneys to be Held in Trust.

All moneys or Governmental Obligations deposited with the Trustee pursuant to Sections 11.01 or 11.02 shall be held in trust and shall be available for payment as due, either directly or through any paying agent (including the Company acting as its own paying agent), to the holders of the particular series of Securities for the payment or redemption of which such moneys or Governmental Obligations have been deposited with the Trustee.

Section 11.04 Payment of Moneys Held by Paying Agents.

In connection with the satisfaction and discharge of this Indenture all moneys or Governmental Obligations then held by any paying agent under the provisions of this Indenture shall, upon demand of the Company, be paid to the Trustee and thereupon such paying agent shall be released from all further liability with respect to such moneys or Governmental Obligations.

Section 11.05 Repayment to Company.

Any moneys or Governmental Obligations deposited with any paying agent or the Trustee, or then held by the Company, in trust for payment of principal of or premium, if any, or interest on the Securities of a particular series that are not applied but remain unclaimed by the holders of such Securities for at least two years after the date upon which the principal of (and premium, if any) or interest on such Securities shall have respectively become due and payable, or such other shorter period set forth in applicable escheat or abandoned or unclaimed property law, shall be repaid to the Company on May 31 of each year or upon the Company's request or (if then held by the Company) shall be discharged from such trust; and thereupon the paying agent and the Trustee shall be released from all further liability with respect to such moneys or Governmental Obligations, and the holder of any of the Securities entitled to receive such payment shall thereafter, as a general creditor, look only to the Company for the payment thereof.

ARTICLE 12

IMMUNITY OF INCORPORATORS, STOCKHOLDERS, OFFICERS AND DIRECTORS

Section 12.01 No Recourse.

No recourse under or upon any obligation, covenant or agreement of this Indenture, or of any Security, or for any claim based thereon or otherwise in respect thereof, shall be had against any incorporator, stockholder, officer or director, past, present or future as such, of the Company or of any predecessor or successor corporation, either directly or through the Company or any such predecessor or successor corporation, whether by virtue of any constitution, statute or rule of law, or by the enforcement of any assessment or penalty or otherwise; it being expressly understood that this Indenture and the obligations issued hereunder are solely corporate obligations, and that no such personal liability whatever shall attach to, or is or shall be incurred by, the incorporators, stockholders, officers or directors as such, of the Company or of any predecessor or successor corporation, or any of them, because of the creation of the indebtedness hereby authorized, or under or by reason of the obligations, covenants or agreements contained in this Indenture or in any of the Securities or implied therefrom; and that any and all such personal liability of every name and nature, either at common law or in equity or by constitution or statute, of, and any and all such rights and claims against, every such incorporator, stockholder, officer or director as such, because of the creation of the indebtedness hereby authorized, or under or by reason of the obligations, covenants or agreements contained in this Indenture or in any of the Securities or implied therefrom, are hereby expressly waived and released as a condition of, and as a consideration for, the execution of this Indenture and the issuance of such Securities.

ARTICLE 13

MISCELLANEOUS PROVISIONS

Section 13.01 Effect on Successors and Assigns.

All the covenants, stipulations, promises and agreements in this Indenture made by or on behalf of the Company shall bind its successors and assigns, whether so expressed or not.

Section 13.02 Actions by Successor.

Any act or proceeding by any provision of this Indenture authorized or required to be done or performed by any board, committee or officer of the Company shall and may be done and performed with like force and effect by the corresponding board, committee or officer of any corporation that shall at the time be the lawful successor of the Company.

Section 13.03 Surrender of Company Powers.

The Company by instrument in writing executed by authority of its Board of Directors and delivered to the Trustee may surrender any of the powers reserved to the Company, and thereupon such power so surrendered shall terminate both as to the Company and as to any successor corporation.

Section 13.04 Notices.

Except as otherwise expressly provided herein, any notice, request or demand that by any provision of this Indenture is required or permitted to be given, made or served by the Trustee, the Security Registrar, any paying or other agent under this Indenture or by the holders of Securities or by any other Person pursuant to this Indenture to or on the Company may be given or served by being deposited in first class mail, postage prepaid, addressed (until another address is filed in writing by the Company with the Trustee), as follows: . Any notice, election, request or demand by the Company or any Securityholder or by any other Person pursuant to this Indenture to or upon the Trustee shall be deemed to have been sufficiently given or made, for all purposes, if given or made in writing at the Corporate Trust Office of the Trustee.

Section 13.05 Governing Law; Jury Trial Waiver.

This Indenture and each Security shall be governed by, and construed in accordance with, the internal laws of the State of New York, except to the extent that the Trust Indenture Act is applicable.

EACH PARTY HERETO, AND EACH HOLDER OF A SECURITY BY ACCEPTANCE THEREOF, HEREBY WAIVES, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, ANY RIGHT IT MAY HAVE TO A TRIAL BY JURY IN RESPECT OF ANY LITIGATION DIRECTLY OR INDIRECTLY ARISING OUT OF, UNDER OR IN CONNECTION WITH THIS INDENTURE.

Section 13.06 Treatment of Securities as Debt.

It is intended that the Securities will be treated as indebtedness and not as equity for federal income tax purposes. The provisions of this Indenture shall be interpreted to further this intention.

Section 13.07 Certificates and Opinions as to Conditions Precedent.

(a) Upon any application or demand by the Company to the Trustee to take any action under any of the provisions of this Indenture, the Company shall furnish to the Trustee an Officer's Certificate stating that all conditions precedent provided for in this Indenture (other than the certificate to be delivered pursuant to Section 13.12) relating to the proposed action have been complied with and, if requested, an Opinion of Counsel stating that in the opinion of such counsel all such conditions precedent have been complied with, except that in the case of any such application or demand as to which the furnishing of such documents is specifically required by any provision of this Indenture relating to such particular application or demand, no additional certificate or opinion need be furnished.

(b) Each certificate or opinion provided for in this Indenture and delivered to the Trustee with respect to compliance with a condition or covenant in this Indenture (other than the certificate to be delivered pursuant to Section 13.12 of this Indenture or Section 314(a)(1) of the Trust Indenture Act) shall include (i) a statement that the Person making such certificate or opinion has read such covenant or condition; (ii) a brief statement as to the nature and scope of the examination or investigation upon which the statements or opinions contained in such certificate or opinion are based; (iii) a statement that, in the opinion of such Person, he has made such examination or investigation as is reasonably necessary to enable him to express an informed opinion as to whether or not such covenant or condition has been complied with; and (iv) a statement as to whether or not, in the opinion of such Person, such condition or covenant has been complied with.

Section 13.08 Payments on Business Days.

Except as provided pursuant to Section 2.01 pursuant to a Board Resolution, and set forth in an Officer's Certificate, or established in one or more indentures supplemental to this Indenture, in any case where the date of maturity of interest or principal of any Security or the date of redemption of any Security shall not be a Business Day, then payment of interest or principal (and premium, if any) may be made on the next succeeding Business Day with the same force and effect as if made on the nominal date of maturity or redemption, and no interest shall accrue for the period after such nominal date.

Section 13.09 Conflict with Trust Indenture Act.

If and to the extent that any provision of this Indenture limits, qualifies or conflicts with the duties imposed by Section 318(c) of the Trust Indenture Act, such imposed duties shall control.

Section 13.10 Counterparts.

This Indenture may be executed in any number of counterparts, each of which shall be an original, but such counterparts shall together constitute but one and the same instrument. The exchange of copies of this Indenture and of signature pages by facsimile or PDF transmission shall constitute effective execution and delivery of this Indenture as to the parties hereto and may be used in lieu of the original Indenture for all purposes. Signatures of the parties hereto transmitted by facsimile or PDF shall be deemed to be their original signatures for all purposes.

Section 13.11 Severability.

In case any one or more of the provisions contained in this Indenture or in the Securities of any series shall for any reason be held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability shall not affect any other provisions of this Indenture or of such Securities, but this Indenture and such Securities shall be construed as if such invalid or illegal or unenforceable provision had never been contained herein or therein.

Section 13.12 Compliance Certificates.

The Company shall deliver to the Trustee, within 120 days after the end of each fiscal year during which any Securities of any series were outstanding, an officer's certificate stating whether or not the signers know of any Event of Default that occurred during such fiscal year. Such certificate shall contain a certification from the principal executive officer, principal financial officer or principal accounting officer of the Company that a review has been conducted of the activities of the Company and the Company's performance under this Indenture and that the Company has complied with all conditions and covenants under this Indenture. For purposes of this Section 13.12, such compliance shall be determined without regard to any period of grace or requirement of notice provided under this Indenture. If the officer of the Company signing such certificate has knowledge of such an Event of Default, the certificate shall describe any such Event of Default and its status.

Section 13.13 U.S.A. Patriot Act.

The parties hereto acknowledge that in accordance with Section 326 of the U.S.A. Patriot Act, the Trustee, like all financial institutions and in order to help fight the funding of terrorism and money laundering, is required to obtain, verify, and record information that identifies each person or legal entity that establishes a relationship or opens an account with the Trustee. The parties to this Indenture agree that they will provide the Trustee with such information as it may request in order for the Trustee to satisfy the requirements of the U.S.A. Patriot Act.

Section 13.14 Force Majeure.

In no event shall the Trustee, the Security Registrar, any paying agent or any other agent under this Indenture be responsible or liable for any failure or delay in the performance of its obligations hereunder arising out of or caused by, directly or indirectly, forces beyond its control, including without limitation, strikes, work stoppages, accidents, acts of war or terrorism, civil or military disturbances, nuclear or natural catastrophes or acts of God, and interruptions, loss or malfunctions or utilities, communications or computer (software and hardware) services; it being understood that the Trustee, the Security Registrar, any paying agent or any other agent under this Indenture shall use reasonable efforts which are consistent with accepted practices in the banking industry to resume performance as soon as practicable under the circumstances.

Section 13.15 Table of Contents; Headings.

The table of contents and headings of the articles and sections of this Indenture have been inserted for convenience of reference only, are not intended to be considered a part hereof, and will not modify or restrict any of the terms or provisions hereof.

IN WITNESS WHEREOF, the parties hereto have caused this Indenture to be duly executed all as of the day and year first above written.

PERSONALIS, INC.

By: _____

Name: _____

Title: _____

[TRUSTEE], as Trustee

By: _____

Name: _____

Title: _____

CROSS-REFERENCE TABLE (1)

<u>Section of Trust Indenture Act of 1939, as Amended</u>	<u>Section of Indenture</u>
310(a)	7.09
310(b)	7.08 7.10
310(c)	Inapplicable
311(a)	7.13
311(b)	7.13
311(c)	Inapplicable
312(a)	5.01 5.02(a) 5.02(c)
312(b)	5.02(c)
312(c)	5.02(c)
313(a)	5.04(a)
313(b)	5.04(b)
313(c)	5.04(a) 5.04(b)
313(d)	5.04(c)
314(a)	5.03 13.12
314(b)	Inapplicable
314(c)	13.07(a)
314(d)	Inapplicable
314(e)	13.07(b)
314(f)	Inapplicable
315(a)	7.01(a) 7.01(b)
315(b)	7.14
315(c)	7.01
315(d)	7.01(b)
315(e)	6.07
316(a)	6.06 8.04
316(b)	6.04
316(c)	8.01
317(a)	6.02
317(b)	4.03
318(a)	13.09

(1) This Cross-Reference Table does not constitute part of the Indenture and shall not have any bearing on the interpretation of any of its terms or provisions.

PERSONALIS, INC.

AND

, AS WARRANT AGENT

**FORM OF COMMON STOCK
WARRANT AGREEMENT**

DATED AS OF

PERSONALIS, INC. FORM OF COMMON STOCK WARRANT AGREEMENT

THIS COMMON STOCK WARRANT AGREEMENT (this “*Agreement*”), dated as of [●], between PERSONALIS, INC., a Delaware corporation (the “*Company*”), and [●], a [corporation] [national banking association] organized and existing under the laws of [●] and having a corporate trust office in [●], as warrant agent (the “*Warrant Agent*”).

WHEREAS, the Company proposes to sell [*If Warrants are sold with other securities* — [title of such other securities being offered] (the “*Other Securities*”) with] warrant certificates evidencing one or more warrants (the “*Warrants*” or, individually, a “*Warrant*”) representing the right to purchase Common Stock of the Company, par value \$0.0001 per share (the “*Warrant Securities*”), such warrant certificates and other warrant certificates issued pursuant to this Agreement being herein called the “*Warrant Certificates*”; and

WHEREAS, the Company desires the Warrant Agent to act on behalf of the Company, and the Warrant Agent is willing so to act, in connection with the issuance, registration, transfer, exchange, exercise and replacement of the Warrant Certificates, and in this Agreement wishes to set forth, among other things, the form and provisions of the Warrant Certificates and the terms and conditions on which they may be issued, registered, transferred, exchanged, exercised and replaced.

NOW THEREFORE, in consideration of the premises and of the mutual agreements herein contained, the parties hereto agree as follows:

ARTICLE 1

ISSUANCE OF WARRANTS AND EXECUTION AND
DELIVERY OF WARRANT CERTIFICATES

1.1 Issuance of Warrants. [*If Warrants alone* — Upon issuance, each Warrant Certificate shall evidence one or more Warrants.] [*If Other Securities and Warrants* — Warrant Certificates will be issued in connection with the issuance of the Other Securities but shall be separately transferable and each Warrant Certificate shall evidence one or more Warrants.] Each Warrant evidenced thereby shall represent the right, subject to the provisions contained herein and therein, to purchase one Warrant Security. [*If Other Securities and Warrants* — Warrant Certificates will be issued with the Other Securities and each Warrant Certificate will evidence [●] Warrants for each [\$(●)] principal amount] [[●] shares] of Other Securities issued.]

1.2 Execution and Delivery of Warrant Certificates. Each Warrant Certificate, whenever issued, shall be in registered form substantially in the form set forth in Exhibit A hereto, shall be dated the date of its countersignature by the Warrant Agent and may have such letters, numbers, or other marks of identification or designation and such legends or endorsements printed, lithographed or engraved thereon as the officers of the Company executing the same may approve (execution thereof to be conclusive evidence of such approval) and as are not inconsistent with the provisions of this Agreement, or as may be required to comply with any law or with any rule or regulation made pursuant thereto or with any rule or regulation of any securities exchange on which the Warrants may be listed, or to conform to usage. The Warrant Certificates shall be signed on behalf of the Company by any of its present or future chief executive officers, presidents, senior vice presidents, vice presidents, chief financial officers, chief legal officers, treasurers, assistant treasurers, controllers, assistant controllers, secretaries or assistant secretaries under its corporate seal reproduced thereon. Such signatures may be manual or facsimile signatures of such authorized officers and may be imprinted or otherwise reproduced on the Warrant Certificates. The seal of the Company may be in the form of a facsimile thereof and may be impressed, affixed, imprinted or otherwise reproduced on the Warrant Certificates.

No Warrant Certificate shall be valid for any purpose, and no Warrant evidenced thereby shall be exercisable, until such Warrant Certificate has been countersigned by the manual signature of the Warrant Agent. Such signature by the Warrant Agent upon any Warrant Certificate executed by the Company shall be conclusive evidence that the Warrant Certificate so countersigned has been duly issued hereunder.

In case any officer of the Company who shall have signed any of the Warrant Certificates either manually or by facsimile signature shall cease to be such officer before the Warrant Certificates so signed shall have been countersigned and delivered by the Warrant Agent, such Warrant Certificates may be countersigned and delivered notwithstanding that the person who signed such Warrant Certificates ceased to be such officer of the Company; and any Warrant Certificate may be signed on behalf of the Company by such persons as, at the actual date of the execution of such Warrant Certificate, shall be the proper officers of the Company, although at the date of the execution of this Agreement any such person was not such officer.

The term “*holder*” or “*holder of a Warrant Certificate*” as used herein shall mean any person in whose name at the time any Warrant Certificate shall be registered upon the books to be maintained by the Warrant Agent for that purpose.

1.3 Issuance of Warrant Certificates. Warrant Certificates evidencing the right to purchase Warrant Securities may be executed by the Company and delivered to the Warrant Agent upon the execution of this Agreement or from time to time thereafter. The Warrant Agent shall, upon receipt of Warrant Certificates duly executed on behalf of the Company, countersign such Warrant Certificates and shall deliver such Warrant Certificates to or upon the order of the Company.

ARTICLE 2

WARRANT PRICE, DURATION AND EXERCISE OF WARRANTS

2.1 Warrant Price. During the period specified in Section 2.2, each Warrant shall, subject to the terms of this Agreement and the applicable Warrant Certificate, entitle the holder thereof to purchase the number of Warrant Securities specified in the applicable Warrant Certificate at an exercise price of \$[●] per Warrant Security, subject to adjustment upon the occurrence of certain events, as hereinafter provided. Such purchase price per Warrant Security is referred to in this Agreement as the “*Warrant Price*.”

2.2 Duration of Warrants. Each Warrant may be exercised in whole or in part at any time, as specified herein, on or after [the date thereof] [●] and at or before [●] p.m., [City] time, on [●] or such later date as the Company may designate by notice to the Warrant Agent and the holders of Warrant Certificates mailed to their addresses as set forth in the record books of the Warrant Agent (the “*Expiration Date*”). Each Warrant not exercised at or before [●] p.m., [City] time, on the Expiration Date shall become void, and all rights of the holder of the Warrant Certificate evidencing such Warrant under this Agreement shall cease.

2.3 Exercise of Warrants.

(a) During the period specified in Section 2.2, the Warrants may be exercised to purchase a whole number of Warrant Securities in registered form by providing certain information as set forth on the reverse side of the Warrant Certificate and by paying in full, in lawful money of the United States of America, [in cash or by certified check or official bank check in New York Clearing House funds]

[by bank wire transfer in immediately available funds] the Warrant Price for each Warrant Security with respect to which a Warrant is being exercised to the Warrant Agent at its corporate trust office, provided that such exercise is subject to receipt within five business days of such payment by the Warrant Agent of the Warrant Certificate with the form of election to purchase Warrant Securities set forth on the reverse side of the Warrant Certificate properly completed and duly executed. The date on which payment in full of the Warrant Price is received by the Warrant Agent shall, subject to receipt of the Warrant Certificate as aforesaid, be deemed to be the date on which the Warrant is exercised; provided, however, that if, at the date of receipt of such Warrant Certificates and payment in full of the Warrant Price, the transfer books for the Warrant Securities purchasable upon the exercise of such Warrants shall be closed, no such receipt of such Warrant Certificates and no such payment of such Warrant Price shall be effective to constitute the person so designated to be named as the holder of record of such Warrant Securities on such date, but shall be effective to constitute such person as the holder of record of such Warrant Securities for all purposes at the opening of business on the next succeeding day on which the transfer books for the Warrant Securities purchasable upon the exercise of such Warrants shall be opened, and the certificates for the Warrant Securities in respect of which such Warrants are then exercised shall be issuable as of the date on such next succeeding day on which the transfer books shall next be opened, and until such date the Company shall be under no duty to deliver any certificate for such Warrant Securities. The Warrant Agent shall deposit all funds received by it in payment of the Warrant Price in an account of the Company maintained with it and shall advise the Company by telephone at the end of each day on which a payment for the exercise of Warrants is received of the amount so deposited to its account. The Warrant Agent shall promptly confirm such telephone advice to the Company in writing.

(b) The Warrant Agent shall, from time to time, as promptly as practicable, advise the Company of (i) the number of Warrant Securities with respect to which Warrants were exercised, (ii) the instructions of each holder of the Warrant Certificates evidencing such Warrants with respect to delivery of the Warrant Securities to which such holder is entitled upon such exercise, (iii) delivery of Warrant Certificates evidencing the balance, if any, of the Warrants for the remaining Warrant Securities after such exercise, and (iv) such other information as the Company shall reasonably require.

(c) As soon as practicable after the exercise of any Warrant, the Company shall issue to or upon the order of the holder of the Warrant Certificate evidencing such Warrant the Warrant Securities to which such holder is entitled, in fully registered form, registered in such name or names as may be directed by such holder. If fewer than all of the Warrants evidenced by such Warrant Certificate are exercised, the Company shall execute, and an authorized officer of the Warrant Agent shall manually countersign and deliver, a new Warrant Certificate evidencing Warrants for the number of Warrant Securities remaining unexercised.

(d) The Company shall not be required to pay any stamp or other tax or other governmental charge required to be paid in connection with any transfer involved in the issue of the Warrant Securities, and in the event that any such transfer is involved, the Company shall not be required to issue or deliver any Warrant Security until such tax or other charge shall have been paid or it has been established to the Company's satisfaction that no such tax or other charge is due.

(e) Prior to the issuance of any Warrants there shall have been reserved, and the Company shall at all times through the Expiration Date keep reserved, out of its authorized but unissued Warrant Securities, a number of shares sufficient to provide for the exercise of the Warrants.

ARTICLE 3

OTHER PROVISIONS RELATING TO RIGHTS OF HOLDERS OF WARRANT CERTIFICATES

3.1 No Rights as Warrant Securityholder Conferred by Warrants or Warrant Certificates. No Warrant Certificate or Warrant evidenced thereby shall entitle the holder thereof to any of the rights of a holder of Warrant Securities, including, without limitation, the right to receive the payment of dividends or distributions, if any, on the Warrant Securities or to exercise any voting rights, except to the extent expressly set forth in this Agreement or the applicable Warrant Certificate.

3.2 Lost, Stolen, Mutilated or Destroyed Warrant Certificates. Upon receipt by the Warrant Agent of evidence reasonably satisfactory to it and the Company of the ownership of and the loss, theft, destruction or mutilation of any Warrant Certificate and/or indemnity reasonably satisfactory to the Warrant Agent and the Company and, in the case of mutilation, upon surrender of the mutilated Warrant Certificate to the Warrant Agent for cancellation, then, in the absence of notice to the Company or the Warrant Agent that such Warrant Certificate has been acquired by a bona fide purchaser, the Company shall execute, and an authorized officer of the Warrant Agent shall manually countersign and deliver, in exchange for or in lieu of the lost, stolen, destroyed or mutilated Warrant Certificate, a new Warrant Certificate of the same tenor and evidencing Warrants for a like number of Warrant Securities. Upon the issuance of any new Warrant Certificate under this Section 3.2, the Company may require the payment of a sum sufficient to cover any tax or other governmental charge that may be imposed in relation thereto and any other expenses (including the fees and expenses of the Warrant Agent) in connection therewith. Every substitute Warrant Certificate executed and delivered pursuant to this Section 3.2 in lieu of any lost, stolen or destroyed Warrant Certificate shall represent an additional contractual obligation of the Company, whether or not the lost, stolen or destroyed Warrant Certificate shall be at any time enforceable by anyone, and shall be entitled to the benefits of this Agreement equally and proportionately with any and all other Warrant Certificates duly executed and delivered hereunder. The provisions of this Section 3.2 are exclusive and shall preclude (to the extent lawful) all other rights and remedies with respect to the replacement of mutilated, lost, stolen or destroyed Warrant Certificates.

3.3 Holder of Warrant Certificate May Enforce Rights. Notwithstanding any of the provisions of this Agreement, any holder of a Warrant Certificate, without the consent of the Warrant Agent, the holder of any Warrant Securities or the holder of any other Warrant Certificate, may, in such holder's own behalf and for such holder's own benefit, enforce, and may institute and maintain any suit, action or proceeding against the Company suitable to enforce, or otherwise in respect of, such holder's right to exercise the Warrants evidenced by such holder's Warrant Certificate in the manner provided in such holder's Warrant Certificate and in this Agreement.

3.4 Adjustments.

(a) In case the Company shall at any time subdivide its outstanding shares of Common Stock into a greater number of shares, the Warrant Price in effect immediately prior to such subdivision shall be proportionately reduced and the number of Warrant Securities purchasable under the Warrants shall be proportionately increased. Conversely, in case the outstanding shares of Common Stock of the Company shall be combined into a smaller number of shares, the Warrant Price in effect immediately prior to such combination shall be proportionately increased and the number of Warrant Securities purchasable under the Warrants shall be proportionately decreased.

(b) If at any time or from time to time the holders of Common Stock (or any shares of stock or other securities at the time receivable upon the exercise of the Warrants) shall have received or become entitled to receive, without payment therefor,

(i) Common Stock or any shares of stock or other securities which are at any time directly or indirectly convertible into or exchangeable for Common Stock, or any rights or options to subscribe for, purchase or otherwise acquire any of the foregoing by way of dividend or other distribution;

(ii) any cash paid or payable otherwise than as a cash dividend paid or payable out of the Company's current or retained earnings;

(iii) any evidence of the Company's indebtedness or rights to subscribe for or purchase the Company's indebtedness; or

(iv) Common Stock or additional stock or other securities or property (including cash) by way of spinoff, split-up, reclassification, combination of shares or similar corporate rearrangement (other than shares of Common Stock issued as a stock split or adjustments in respect of which shall be covered by the terms of Section 3.4(a) above), then and in each such case, the holder of each Warrant shall, upon the exercise of the Warrant, be entitled to receive, in addition to the number of Warrant Securities receivable thereupon, and without payment of any additional consideration therefore, the amount of stock and other securities and property (including cash and indebtedness or rights to subscribe for or purchase indebtedness) which such holder would hold on the date of such exercise had such holder been the holder of record of such Warrant Securities as of the date on which holders of Common Stock received or became entitled to receive such shares or all other additional stock and other securities and property.

(c) In case of (i) any reclassification, capital reorganization, or change in the Common Stock of the Company (other than as a result of a subdivision, combination, or stock dividend provided for in Section 3.4(a) or Section 3.4(b) above), (ii) share exchange, merger or similar transaction of the Company with or into another person or entity (other than a share exchange, merger or similar transaction in which the Company is the acquiring or surviving corporation and which does not result in any change in the Common Stock other than the issuance of additional shares of Common Stock) or (iii) the sale, exchange, lease, transfer or other disposition of all or substantially all of the properties and assets of the Company as an entirety (in any such case, a "**Reorganization Event**"), then, as a condition of such Reorganization Event, lawful provisions shall be made, and duly executed documents evidencing the same from the Company or its successor shall be delivered to the holders of the Warrants, so that the holders of the Warrants shall have the right at any time prior to the expiration of the Warrants to purchase, at a total price equal to that payable upon the exercise of the Warrants, the kind and amount of shares of stock and other securities and property receivable in connection with such Reorganization Event by a holder of the same number of Warrant Securities as were purchasable by the holders of the Warrants immediately prior to such Reorganization Event. In any such case appropriate provisions shall be made with respect to the rights and interests of the holders of the Warrants so that the provisions hereof shall thereafter be applicable with respect to any shares of stock or other securities and property deliverable upon exercise the Warrants, and appropriate adjustments shall be made to the Warrant Price payable hereunder provided the aggregate purchase price shall remain the same. In the case of any transaction described in clauses (ii) and (iii) above, the Company shall thereupon be relieved of any further obligation hereunder or under the Warrants, and the Company as the predecessor corporation may thereupon or at any time thereafter be dissolved, wound up or liquidated. Such successor or assuming entity thereupon may cause to be signed, and may issue either in its own name or in the name of the Company, any or all of the Warrants issuable hereunder which heretofore shall not have been signed by the Company, and may execute and deliver securities in its own name, in fulfillment of its obligations to deliver Warrant Securities upon exercise of the Warrants. All the Warrants so issued shall in all respects have the same legal rank and benefit under this Agreement as the

Warrants theretofore or thereafter issued in accordance with the terms of this Agreement as though all of such Warrants had been issued at the date of the execution hereof. In any case of any such Reorganization Event, such changes in phraseology and form (but not in substance) may be made in the Warrants thereafter to be issued as may be appropriate. The Warrant Agent may receive a written opinion of legal counsel as conclusive evidence that any such Reorganization Event complies with the provisions of this Section 3.4.

(d) The Company may, at its option, at any time until the Expiration Date, reduce the then current Warrant Price to any amount deemed appropriate by the Board of Directors of the Company for any period not exceeding twenty consecutive days (as evidenced in a resolution adopted by such Board of Directors), but only upon giving the notices required by Section 3.5 at least ten days prior to taking such action.

(e) Except as herein otherwise expressly provided, no adjustment in the Warrant Price shall be made by reason of the issuance of shares of Common Stock, or securities convertible into or exchangeable for shares of Common Stock, or securities carrying the right to purchase any of the foregoing or for any other reason whatsoever.

(f) No fractional Warrant Securities shall be issued upon the exercise of Warrants. If more than one Warrant shall be exercised at one time by the same holder, the number of full Warrant Securities which shall be issuable upon such exercise shall be computed on the basis of the aggregate number of Warrant Securities purchased pursuant to the Warrants so exercised. Instead of any fractional Warrant Security which would otherwise be issuable upon exercise of any Warrant, the Company shall pay a cash adjustment in respect of such fraction in an amount equal to the same fraction of the last reported sale price (or bid price if there were no sales) per Warrant Security, in either case as reported on the principal registered national securities exchange on which the Warrant Securities are listed or admitted to trading on the business day that next precedes the day of exercise or, if the Warrant Securities are not then listed or admitted to trading on any registered national securities exchange, the average of the closing high bid and low asked prices as reported on the OTC Bulletin Board Service (the "*OTC Bulletin Board*") operated by the Financial Industry Regulatory Authority, Inc. ("*FINRA*") or, if not available on the OTC Bulletin Board, then the average of the closing high bid and low asked prices as reported on any other U.S. quotation medium or inter-dealer quotation system on such date, or if on any such date the Warrant Securities are not listed or admitted to trading on a registered national securities exchange, are not included in the OTC Bulletin Board, and are not quoted on any other U.S. quotation medium or inter-dealer quotation system, an amount equal to the same fraction of the average of the closing bid and asked prices as furnished by any FINRA member firm selected from time to time by the Company for that purpose at the close of business on the business day that next precedes the day of exercise.

(g) Whenever the Warrant Price then in effect is adjusted as herein provided, the Company shall mail to each holder of the Warrants at such holder's address as it shall appear on the books of the Company a statement setting forth the adjusted Warrant Price then and thereafter effective under the provisions hereof, together with the facts, in reasonable detail, upon which such adjustment is based.

(h) Notwithstanding anything to the contrary herein, in no event shall the Warrant Price, as adjusted in accordance with the terms hereof, be less than the par value per share of Common Stock.

3.5 Notice to Warrant Holders. In case the Company shall (a) effect any dividend or distribution described in Section 3.4(b), (b) effect any Reorganization Event, (c) make any distribution on or in respect of the Common Stock in connection with the dissolution, liquidation or winding up of the Company or (d) reduce the then current Warrant Price pursuant to Section 3.4(d), then the Company shall mail to each holder of Warrants at such holder's address as it shall appear on the books of the Warrant

Agent, at least ten days prior to the applicable date hereinafter specified, a notice stating (x) the record date for such dividend or distribution, or, if a record is not to be taken, the date as of which the holders of record of Common Stock that will be entitled to such dividend or distribution are to be determined, (y) the date on which such Reorganization Event, dissolution, liquidation or winding up is expected to become effective, and the date as of which it is expected that holders of Common Stock of record shall be entitled to exchange their shares of Common Stock for securities or other property deliverable upon such Reorganization Event, dissolution, liquidation or winding up or (z) the first date on which the then current Warrant Price shall be reduced pursuant to Section 3.4(d). No failure to mail such notice nor any defect therein or in the mailing thereof shall affect any such transaction or any adjustment in the Warrant Price required by Section 3.4.

3.6 [If the Warrants are subject to acceleration by the Company — Acceleration of Warrants by the Company.]

(a) At any time on or after [●], the Company shall have the right to accelerate any or all Warrants at any time by causing them to expire at the close of business on the day next preceding a specified date (the “**Acceleration Date**”), if the Market Price (as hereinafter defined) of the Common Stock equals or exceeds [●] percent ([●]%) of the then effective Warrant Price on any twenty Trading Days (as hereinafter defined) within a period of thirty consecutive Trading Days ending no more than five Trading Days prior to the date on which the Company gives notice to the Warrant Agent of its election to accelerate the Warrants.

(b) “**Market Price**” for each Trading Day shall be, if the Common Stock is listed or admitted to trading on any registered national securities exchange, the last reported sale price, regular way (or, if no such price is reported, the average of the reported closing bid and asked prices, regular way) of Common Stock, in either case as reported on the principal registered national securities exchange on which the Common Stock is listed or admitted to trading or, if not listed or admitted to trading on any registered national securities exchange, the average of the closing high bid and low asked prices as reported on the OTC Bulletin Board operated by FINRA, or if not available on the OTC Bulletin Board, then the average of the closing high bid and low asked prices as reported on any other U.S. quotation medium or inter-dealer quotation system, or if on any such date the shares of Common Stock are not listed or admitted to trading on a registered national securities exchange, are not included in the OTC Bulletin Board, and are not quoted on any other U.S. quotation medium or inter-dealer quotation system, the average of the closing bid and asked prices as furnished by any FINRA member firm selected from time to time by the Company for that purpose. “Trading Day” shall be each Monday through Friday, other than any day on which securities are not traded in the system or on the exchange that is the principal market for the Common Stock, as determined by the Board of Directors of the Company. In the event of an acceleration of less than all of the Warrants, the Warrant Agent shall select the Warrants to be accelerated by lot, pro rata or in such other manner as it deems, in its discretion, to be fair and appropriate.

(c) Notice of an acceleration specifying the Acceleration Date shall be sent by mail first class, postage prepaid, to each registered holder of a Warrant Certificate representing a Warrant accelerated at such holder’s address appearing on the books of the Warrant Agent not more than sixty days nor less than thirty days before the Acceleration Date. Such notice of an acceleration also shall be given no more than twenty days, and no less than ten days, prior to the mailing of notice to registered holders of Warrants pursuant to this Section 3.6, by publication at least once in a newspaper of general circulation in the City of New York.

(d) Any Warrant accelerated may be exercised until [●] p.m., [City] time, on the business day next preceding the Acceleration Date. The Warrant Price shall be payable as provided in Section 2.]

ARTICLE 4

EXCHANGE AND TRANSFER OF WARRANT CERTIFICATES

4.1 Exchange and Transfer of Warrant Certificates. Upon surrender at the corporate trust office of the Warrant Agent, Warrant Certificates evidencing Warrants may be exchanged for Warrant Certificates in other denominations evidencing such Warrants or the transfer thereof may be registered in whole or in part; provided that such other Warrant Certificates evidence Warrants for the same aggregate number of Warrant Securities as the Warrant Certificates so surrendered. The Warrant Agent shall keep, at its corporate trust office, books in which, subject to such reasonable regulations as it may prescribe, it shall register Warrant Certificates and exchanges and transfers of outstanding Warrant Certificates, upon surrender of the Warrant Certificates to the Warrant Agent at its corporate trust office for exchange or registration of transfer, properly endorsed or accompanied by appropriate instruments of registration of transfer and written instructions for transfer, all in form satisfactory to the Company and the Warrant Agent. No service charge shall be made for any exchange or registration of transfer of Warrant Certificates, but the Company may require payment of a sum sufficient to cover any stamp or other tax or other governmental charge that may be imposed in connection with any such exchange or registration of transfer. Whenever any Warrant Certificates are so surrendered for exchange or registration of transfer, an authorized officer of the Warrant Agent shall manually countersign and deliver to the person or persons entitled thereto a Warrant Certificate or Warrant Certificates duly authorized and executed by the Company, as so requested. The Warrant Agent shall not be required to effect any exchange or registration of transfer which will result in the issuance of a Warrant Certificate evidencing a Warrant for a fraction of a Warrant Security or a number of Warrants for a whole number of Warrant Securities and a fraction of a Warrant Security. All Warrant Certificates issued upon any exchange or registration of transfer of Warrant Certificates shall be the valid obligations of the Company, evidencing the same obligations and entitled to the same benefits under this Agreement as the Warrant Certificate surrendered for such exchange or registration of transfer.

4.2 Treatment of Holders of Warrant Certificates. The Company, the Warrant Agent and all other persons may treat the registered holder of a Warrant Certificate as the absolute owner thereof for any purpose and as the person entitled to exercise the rights represented by the Warrants evidenced thereby, any notice to the contrary notwithstanding.

4.3 Cancellation of Warrant Certificates. Any Warrant Certificate surrendered for exchange, registration of transfer or exercise of the Warrants evidenced thereby shall, if surrendered to the Company, be delivered to the Warrant Agent and all Warrant Certificates surrendered or so delivered to the Warrant Agent shall be promptly canceled by the Warrant Agent and shall not be reissued and, except as expressly permitted by this Agreement, no Warrant Certificate shall be issued hereunder in exchange therefor or in lieu thereof. The Warrant Agent shall deliver to the Company from time to time or otherwise dispose of canceled Warrant Certificates in a manner satisfactory to the Company.

ARTICLE 5

CONCERNING THE WARRANT AGENT

5.1 Warrant Agent. The Company hereby appoints [●] as Warrant Agent of the Company in respect of the Warrants and the Warrant Certificates upon the terms and subject to the conditions herein set forth, and [●] hereby accepts such appointment. The Warrant Agent shall have the powers and authority granted to and conferred upon it in the Warrant Certificates and hereby and such further powers and authority to act on behalf of the Company as the Company may hereafter grant to or confer upon it. All of the terms and provisions with respect to such powers and authority contained in the Warrant Certificates are subject to and governed by the terms and provisions hereof.

5.2 Conditions of Warrant Agent's Obligations. The Warrant Agent accepts its obligations herein set forth upon the terms and conditions hereof, including the following to all of which the Company agrees and to all of which the rights hereunder of the holders from time to time of the Warrant Certificates shall be subject:

(a) **Compensation and Indemnification.** The Company agrees promptly to pay the Warrant Agent the compensation to be agreed upon with the Company for all services rendered by the Warrant Agent and to reimburse the Warrant Agent for reasonable out-of-pocket expenses (including reasonable counsel fees) incurred without negligence, bad faith or willful misconduct by the Warrant Agent in connection with the services rendered hereunder by the Warrant Agent. The Company also agrees to indemnify the Warrant Agent for, and to hold it harmless against, any loss, liability or expense incurred without negligence, bad faith or willful misconduct on the part of the Warrant Agent, arising out of or in connection with its acting as Warrant Agent hereunder, including the reasonable costs and expenses of defending against any claim of such liability.

(b) **Agent for the Company.** In acting under this Agreement and in connection with the Warrant Certificates, the Warrant Agent is acting solely as agent of the Company and does not assume any obligations or relationship of agency or trust for or with any of the holders of Warrant Certificates or beneficial owners of Warrants.

(c) **Counsel.** The Warrant Agent may consult with counsel satisfactory to it, which may include counsel for the Company, and the written advice of such counsel shall be full and complete authorization and protection in respect of any action taken, suffered or omitted by it hereunder in good faith and in accordance with the advice of such counsel.

(d) **Documents.** The Warrant Agent shall be protected and shall incur no liability for or in respect of any action taken or omitted by it in reliance upon any Warrant Certificate, notice, direction, consent, certificate, affidavit, statement or other paper or document reasonably believed by it to be genuine and to have been presented or signed by the proper parties.

(e) **Certain Transactions.** The Warrant Agent, and its officers, directors and employees, may become the owner of, or acquire any interest in, Warrants, with the same rights that it or they would have if it were not the Warrant Agent hereunder, and, to the extent permitted by applicable law, it or they may engage or be interested in any financial or other transaction with the Company and may act on, or as depository, trustee or agent for, any committee or body of holders of Warrant Securities or other obligations of the Company as freely as if it were not the Warrant Agent hereunder. Nothing in this Agreement shall be deemed to prevent the Warrant Agent from acting as trustee under any indenture to which the Company is a party.

(f) No Liability for Interest. Unless otherwise agreed with the Company, the Warrant Agent shall have no liability for interest on any monies at any time received by it pursuant to any of the provisions of this Agreement or of the Warrant Certificates.

(g) No Liability for Invalidity. The Warrant Agent shall have no liability with respect to any invalidity of this Agreement or any of the Warrant Certificates (except as to the Warrant Agent's countersignature thereon).

(h) No Responsibility for Representations. The Warrant Agent shall not be responsible for any of the recitals or representations herein or in the Warrant Certificates (except as to the Warrant Agent's countersignature thereon), all of which are made solely by the Company.

(i) No Implied Obligations. The Warrant Agent shall be obligated to perform only such duties as are herein and in the Warrant Certificates specifically set forth and no implied duties or obligations shall be read into this Agreement or the Warrant Certificates against the Warrant Agent. The Warrant Agent shall not be under any obligation to take any action hereunder which may tend to involve it in any expense or liability, the payment of which within a reasonable time is not, in its reasonable opinion, assured to it. The Warrant Agent shall not be accountable or under any duty or responsibility for the use by the Company of any of the Warrant Certificates authenticated by the Warrant Agent and delivered by it to the Company pursuant to this Agreement or for the application by the Company of the proceeds of the Warrant Certificates. The Warrant Agent shall have no duty or responsibility in case of any default by the Company in the performance of its covenants or agreements contained herein or in the Warrant Certificates or in the case of the receipt of any written demand from a holder of a Warrant Certificate with respect to such default, including, without limiting the generality of the foregoing, any duty or responsibility to initiate or attempt to initiate any proceedings at law or otherwise or, except as provided in Section 6.2 hereof, to make any demand upon the Company.

5.3 Resignation, Removal and Appointment of Successors.

(a) The Company agrees, for the benefit of the holders from time to time of the Warrant Certificates, that there shall at all times be a Warrant Agent hereunder until all the Warrants have been exercised or are no longer exercisable.

(b) The Warrant Agent may at any time resign as agent by giving written notice to the Company of such intention on its part, specifying the date on which its desired resignation shall become effective; provided that such date shall not be less than three months after the date on which such notice is given unless the Company otherwise agrees. The Warrant Agent hereunder may be removed at any time by the filing with it of an instrument in writing signed by or on behalf of the Company and specifying such removal and the intended date when it shall become effective. Such resignation or removal shall take effect upon the appointment by the Company, as hereinafter provided, of a successor Warrant Agent (which shall be a bank or trust company authorized under the laws of the jurisdiction of its organization to exercise corporate trust powers) and the acceptance of such appointment by such successor Warrant Agent. The obligation of the Company under Section 5.2(a) shall continue to the extent set forth therein notwithstanding the resignation or removal of the Warrant Agent.

(c) In case at any time the Warrant Agent shall resign, or shall be removed, or shall become incapable of acting, or shall be adjudged a bankrupt or insolvent, or shall commence a voluntary case under the Federal bankruptcy laws, as now or hereafter constituted, or under any other applicable

Federal or state bankruptcy, insolvency or similar law or shall consent to the appointment of or taking possession by a receiver, custodian, liquidator, assignee, trustee, sequestrator (or other similar official) of the Warrant Agent or its property or affairs, or shall make an assignment for the benefit of creditors, or shall admit in writing its inability to pay its debts generally as they become due, or shall take corporate action in furtherance of any such action, or a decree or order for relief by a court having jurisdiction in the premises shall have been entered in respect of the Warrant Agent in an involuntary case under the Federal bankruptcy laws, as now or hereafter constituted, or any other applicable Federal or state bankruptcy, insolvency or similar law, or a decree or order by a court having jurisdiction in the premises shall have been entered for the appointment of a receiver, custodian, liquidator, assignee, trustee, sequestrator (or similar official) of the Warrant Agent or of its property or affairs, or any public officer shall take charge or control of the Warrant Agent or of its property or affairs for the purpose of rehabilitation, conservation, winding up or liquidation, a successor Warrant Agent, qualified as aforesaid, shall be appointed by the Company by an instrument in writing, filed with the successor Warrant Agent. Upon the appointment as aforesaid of a successor Warrant Agent and acceptance by the successor Warrant Agent of such appointment, the Warrant Agent shall cease to be Warrant Agent hereunder.

(d) Any successor Warrant Agent appointed hereunder shall execute, acknowledge and deliver to its predecessor and to the Company an instrument accepting such appointment hereunder, and thereupon such successor Warrant Agent, without any further act, deed or conveyance, shall become vested with all the authority, rights, powers, trusts, immunities, duties and obligations of such predecessor with like effect as if originally named as Warrant Agent hereunder, and such predecessor, upon payment of its charges and disbursements then unpaid, shall thereupon become obligated to transfer, deliver and pay over, and such successor Warrant Agent shall be entitled to receive, all monies, securities and other property on deposit with or held by such predecessor, as Warrant Agent hereunder.

(e) Any corporation into which the Warrant Agent hereunder may be merged or converted or any corporation with which the Warrant Agent may be consolidated, or any corporation resulting from any merger, conversion or consolidation to which the Warrant Agent shall be a party, or any corporation to which the Warrant Agent shall sell or otherwise transfer all or substantially all the assets and business of the Warrant Agent, provided that it shall be qualified as aforesaid, shall be the successor Warrant Agent under this Agreement without the execution or filing of any paper or any further act on the part of any of the parties hereto.

ARTICLE 6

MISCELLANEOUS

6.1 Amendment. This Agreement may be amended by the parties hereto, without the consent of the holder of any Warrant Certificate, for the purpose of curing any ambiguity, or of curing, correcting or supplementing any defective provision contained herein, or making any other provisions with respect to matters or questions arising under this Agreement as the Company and the Warrant Agent may deem necessary or desirable; provided that such action shall not materially adversely affect the interests of the holders of the Warrant Certificates.

6.2 Notices and Demands to the Company and Warrant Agent. If the Warrant Agent shall receive any notice or demand addressed to the Company by the holder of a Warrant Certificate pursuant to the provisions of the Warrant Certificates, the Warrant Agent shall promptly forward such notice or demand to the Company.

6.3 Addresses. Any communication from the Company to the Warrant Agent with respect to this Agreement shall be addressed to [●], Attention: [●] and any communication from the Warrant Agent to

the Company with respect to this Agreement shall be addressed to Personalis, Inc., 1330 O'Brien Drive, Menlo Park, CA 94025, Attention: [●] (or such other address as shall be specified in writing by the Warrant Agent or by the Company).

6.4 Governing Law. This Agreement and each Warrant Certificate issued hereunder shall be governed by and construed in accordance with the laws of the State of New York.

6.5 Delivery of Prospectus. The Company shall furnish to the Warrant Agent sufficient copies of a prospectus meeting the requirements of the Securities Act of 1933, as amended, relating to the Warrant Securities deliverable upon exercise of the Warrants (the "*Prospectus*"), and the Warrant Agent agrees that upon the exercise of any Warrant, the Warrant Agent will deliver to the holder of the Warrant Certificate evidencing such Warrant, prior to or concurrently with the delivery of the Warrant Securities issued upon such exercise, a Prospectus. The Warrant Agent shall not, by reason of any such delivery, assume any responsibility for the accuracy or adequacy of such Prospectus.

6.6 Obtaining of Governmental Approvals. The Company will from time to time take all action which may be necessary to obtain and keep effective any and all permits, consents and approvals of governmental agencies and authorities and securities act filings under United States Federal and state laws (including without limitation a registration statement in respect of the Warrants and Warrant Securities under the Securities Act of 1933, as amended), which may be or become requisite in connection with the issuance, sale, transfer, and delivery of the Warrant Securities issued upon exercise of the Warrants, the issuance, sale, transfer and delivery of the Warrants or upon the expiration of the period during which the Warrants are exercisable.

6.7 Persons Having Rights under the Agreement. Nothing in this Agreement shall give to any person other than the Company, the Warrant Agent and the holders of the Warrant Certificates any right, remedy or claim under or by reason of this Agreement.

6.8 Headings. The descriptive headings of the several Articles and Sections of this Agreement are inserted for convenience only and shall not control or affect the meaning or construction of any of the provisions hereof.

6.9 Counterparts. This Agreement may be executed in any number of counterparts, each of which as so executed shall be deemed to be an original, but such counterparts shall together constitute but one and the same instrument.

6.10 Inspection of Agreement. A copy of this Agreement shall be available at all reasonable times at the principal corporate trust office of the Warrant Agent for inspection by the holder of any Warrant Certificate. The Warrant Agent may require such holder to submit such holder's Warrant Certificate for inspection by it.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be duly executed as of the day and year first above written.

PERSONALIS, INC., as Company

By: _____
Name: _____
Title: _____

ATTEST: _____

COUNTERSIGNED

[●], as Warrant Agent

By: _____
Name: _____
Title: _____

ATTEST: _____

[SIGNATURE PAGE TO PERSONALIS, INC. COMMON STOCK WARRANT AGREEMENT]

EXHIBIT A

**FORM OF WARRANT CERTIFICATE
[FACE OF WARRANT CERTIFICATE]**

[Form of Legend if Warrants are not immediately exercisable.]

[Prior to [●], Warrants evidenced by this
Warrant Certificate cannot be exercised.]

EXERCISABLE ONLY IF COUNTERSIGNED BY THE WARRANT AGENT AS PROVIDED HEREIN

VOID AFTER [●] P.M., [City] time, ON [●].

PERSONALIS, INC.
WARRANT CERTIFICATE REPRESENTING
WARRANTS TO PURCHASE
COMMON STOCK, PAR VALUE \$0.0001 PER SHARE

No. [●]

[●] Warrants

This certifies that [●] or registered assigns is the registered owner of the above indicated number of Warrants, each Warrant entitling such owner to purchase, at any time [after [●] p.m., [City] time, [on [●] and] on or before [●] p.m., [City] time, on [●], [●] shares of Common Stock, par value \$0.0001 per share (the “*Warrant Securities*”), of Personalis, Inc. (the “*Company*”) on the following basis: during the period from [●], through and including [●], the exercise price per Warrant Security will be \$[●], subject to adjustment as provided in the Warrant Agreement (as hereinafter defined) (the “*Warrant Price*”). The Holder may exercise the Warrants evidenced hereby by providing certain information set forth on the back hereof and by paying in full, in lawful money of the United States of America, [in cash or by certified check or official bank check in New York Clearing House funds] [by bank wire transfer in immediately available funds], the Warrant Price for each Warrant Security with respect to which this Warrant is exercised to the Warrant Agent (as hereinafter defined) and by surrendering this Warrant Certificate, with the purchase form on the back hereof duly executed, at the corporate trust office of [name of Warrant Agent], or its successor as warrant agent (the “*Warrant Agent*”), which is, on the date hereof, at the address specified on the reverse hereof, and upon compliance with and subject to the conditions set forth herein and in the Warrant Agreement (as hereinafter defined).

The term “*Holder*” as used herein shall mean the person in whose name at the time this Warrant Certificate shall be registered upon the books to be maintained by the Warrant Agent for that purpose pursuant to Section 4 of the Warrant Agreement.

The Warrants evidenced by this Warrant Certificate may be exercised to purchase a whole number of Warrant Securities in registered form. Upon any exercise of fewer than all of the Warrants evidenced by this Warrant Certificate, there shall be issued to the Holder hereof a new Warrant Certificate evidencing Warrants for the number of Warrant Securities remaining unexercised.

This Warrant Certificate is issued under and in accordance with the Warrant Agreement dated as of [●] (the “*Warrant Agreement*”), between the Company and the Warrant Agent and is subject to the terms and provisions contained in the Warrant Agreement, to all of which terms and provisions the Holder of this Warrant Certificate consents by acceptance hereof. Copies of the Warrant Agreement are on file at the above-mentioned office of the Warrant Agent.

Transfer of this Warrant Certificate may be registered when this Warrant Certificate is surrendered at the corporate trust office of the Warrant Agent by the registered owner or such owner’s assigns, in the manner and subject to the limitations provided in the Warrant Agreement.

After countersignature by the Warrant Agent and prior to the expiration of this Warrant Certificate, this Warrant Certificate may be exchanged at the corporate trust office of the Warrant Agent for Warrant Certificates representing Warrants for the same aggregate number of Warrant Securities.

This Warrant Certificate shall not entitle the Holder hereof to any of the rights of a holder of the Warrant Securities, including, without limitation, the right to receive payments of dividends or distributions, if any, on the Warrant Securities (except to the extent set forth in the Warrant Agreement) or to exercise any voting rights.

Reference is hereby made to the further provisions of this Warrant Certificate set forth on the reverse hereof, which further provisions shall for all purposes have the same effect as if set forth at this place.

This Warrant Certificate shall not be valid or obligatory for any purpose until countersigned by the Warrant Agent.

IN WITNESS WHEREOF, the Company has caused this Warrant to be executed in its name and on its behalf by the facsimile signatures of its duly authorized officers.

Dated:

PERSONALIS, INC., as Company

By: _____
Name: _____
Title: _____

ATTEST: _____

COUNTERSIGNED

[•], as Warrant Agent

By: _____
Name: _____
Title: _____

ATTEST: _____

[REVERSE OF WARRANT CERTIFICATE]

(Instructions for Exercise of Warrant)

To exercise any Warrants evidenced hereby for Warrant Securities (as hereinafter defined), the Holder must pay, in lawful money of the United States of America, [in cash or by certified check or official bank check in New York Clearing House funds] [by bank wire transfer in immediately available funds], the Warrant Price in full for Warrants exercised, to [●] [address of Warrant Agent], Attention: [●], which payment must specify the name of the Holder and the number of Warrants exercised by such Holder. In addition, the Holder must complete the information required below and present this Warrant Certificate in person or by mail (certified or registered mail is recommended) to the Warrant Agent at the appropriate address set forth above. This Warrant Certificate, completed and duly executed, must be received by the Warrant Agent within five business days of the payment.

(To be executed upon exercise of Warrants)

The undersigned hereby irrevocably elects to exercise _____ Warrants, evidenced by this Warrant Certificate, to purchase _____ shares of the Common Stock, par value \$0.0001 per share (the "**Warrant Securities**"), of Personalis, Inc. and represents that the undersigned has tendered payment for such Warrant Securities, in lawful money of the United States of America, [in cash or by certified check or official bank check in New York Clearing House funds] [by bank wire transfer in immediately available funds], to the order of Personalis, Inc., c/o [insert name and address of Warrant Agent], in the amount of \$ _____ in accordance with the terms hereof. The undersigned requests that said Warrant Securities be in fully registered form in the authorized denominations, registered in such names and delivered all as specified in accordance with the instructions set forth below.

If the number of Warrants exercised is less than all of the Warrants evidenced hereby, the undersigned requests that a new Warrant Certificate evidencing the Warrants for the number of Warrant Securities remaining unexercised be issued and delivered to the undersigned unless otherwise specified in the instructions below.

Dated: _____ Name: _____
Please Print

Address: _____

(Insert Social Security or Other Identifying Number of Holder)

Signature Guaranteed: _____
Signature

(Signature must conform in all respects to name of holder as specified on the face of this Warrant Certificate and must bear a signature guarantee by a FINRA member firm).

This Warrant may be exercised at the following addresses: By hand at:

[●]

By mail at:

[Instructions as to form and delivery of Warrant Securities and, if applicable, Warrant Certificates evidencing Warrants for the number of Warrant Securities remaining unexercised — complete as appropriate.]

ASSIGNMENT

[Form of assignment to be executed if Warrant Holder desires to transfer Warrant]

FOR VALUE RECEIVED, _____ hereby sells, assigns and transfers unto:

(Please print name and address including zip code)

Please print Social Security or other identifying number

the right represented by the within Warrant to purchase _____ shares of [Title of Warrant Securities] of Personalis, Inc. to which the within Warrant relates and appoints _____ attorney to transfer such right on the books of the Warrant Agent with full power of substitution in the premises.

Dated: _____

Name: _____

Signature

(Signature must conform in all respects to name of holder as specified on the face of the Warrant)

Signature Guaranteed

PERSONALIS, INC.

AND

, AS WARRANT AGENT

**FORM OF PREFERRED STOCK
WARRANT AGREEMENT**

DATED AS OF

PERSONALIS, INC. FORM OF PREFERRED STOCK WARRANT AGREEMENT

THIS PREFERRED STOCK WARRANT AGREEMENT (this “*Agreement*”), dated as of [●], between **PERSONALIS, INC.**, a Delaware corporation (the “*Company*”), and [●], a [corporation] [national banking association] organized and existing under the laws of [●] and having a corporate trust office in [●], as warrant agent (the “*Warrant Agent*”).

WHEREAS, the Company proposes to sell [*If Warrants are sold with other securities* — [title of such other securities being offered] (the “*Other Securities*”) with] warrant certificates evidencing one or more warrants (the “*Warrants*” or, individually, a “*Warrant*”) representing the right to purchase [title of Preferred Stock purchasable through exercise of Warrants] of the Company, par value \$0.0001 per share (the “*Warrant Securities*”), such warrant certificates and other warrant certificates issued pursuant to this Agreement being herein called the “*Warrant Certificates*”; and

WHEREAS, The Company desires the Warrant Agent to act on behalf of the Company, and the Warrant Agent is willing so to act, in connection with the issuance, registration, transfer, exchange, exercise and replacement of the Warrant Certificates, and in this Agreement wishes to set forth, among other things, the form and provisions of the Warrant Certificates and the terms and conditions on which they may be issued, registered, transferred, exchanged, exercised and replaced.

NOW THEREFORE, in consideration of the premises and of the mutual agreements herein contained, the parties hereto agree as follows:

ARTICLE 1

ISSUANCE OF WARRANTS AND EXECUTION AND DELIVERY OF WARRANT CERTIFICATES

1.1 Issuance of Warrants. [*If Warrants alone* — Upon issuance, each Warrant Certificate shall evidence one or more Warrants.] [*If Other Securities and Warrants* — Warrant Certificates will be issued in connection with the issuance of the Other Securities but shall be separately transferable and each Warrant Certificate shall evidence one or more Warrants.] Each Warrant evidenced thereby shall represent the right, subject to the provisions contained herein and therein, to purchase one Warrant Security. [*If Other Securities and Warrants* — Warrant Certificates will be issued with the Other Securities and each Warrant Certificate will evidence [●] Warrants for each [\$[●] principal amount] [[●] shares] of Other Securities issued.]

1.2 Execution and Delivery of Warrant Certificates. Each Warrant Certificate, whenever issued, shall be in registered form substantially in the form set forth in **Exhibit A** hereto, shall be dated the date of its countersignature by the Warrant Agent and may have such letters, numbers, or other marks of identification or designation and such legends or endorsements printed, lithographed or engraved thereon as the officers of the Company executing the same may approve (execution thereof to be conclusive evidence of such approval) and as are not inconsistent with the provisions of this Agreement, or as may be required to comply with any law or with any rule or regulation made pursuant thereto or with any rule or regulation of any securities exchange on which the Warrants may be listed, or to conform to usage. The Warrant Certificates shall be signed on behalf of the Company by any of its present or future chief executive officers, presidents, senior vice presidents, vice presidents, chief financial officers, chief legal officers, treasurers, assistant treasurers, controllers, assistant controllers, secretaries or assistant secretaries under its corporate seal reproduced thereon. Such signatures may be manual or facsimile signatures of such authorized officers and may be imprinted or otherwise reproduced on the Warrant Certificates. The seal of the Company may be in the form of a facsimile thereof and may be impressed, affixed, imprinted or otherwise reproduced on the Warrant Certificates.

No Warrant Certificate shall be valid for any purpose, and no Warrant evidenced thereby shall be exercisable, until such Warrant Certificate has been countersigned by the manual signature of the Warrant Agent. Such signature by the Warrant Agent upon any Warrant Certificate executed by the Company shall be conclusive evidence that the Warrant Certificate so countersigned has been duly issued hereunder.

In case any officer of the Company who shall have signed any of the Warrant Certificates either manually or by facsimile signature shall cease to be such officer before the Warrant Certificates so signed shall have been countersigned and delivered by the Warrant Agent, such Warrant Certificates may be countersigned and delivered notwithstanding that the person who signed such Warrant Certificates ceased to be such officer of the Company; and any Warrant Certificate may be signed on behalf of the Company by such persons as, at the actual date of the execution of such Warrant Certificate, shall be the proper officers of the Company, although at the date of the execution of this Agreement any such person was not such officer.

The term “*holder*” or “*holder of a Warrant Certificate*” as used herein shall mean any person in whose name at the time any Warrant Certificate shall be registered upon the books to be maintained by the Warrant Agent for that purpose.

1.3 Issuance of Warrant Certificates. Warrant Certificates evidencing the right to purchase Warrant Securities may be executed by the Company and delivered to the Warrant Agent upon the execution of this Agreement or from time to time thereafter. The Warrant Agent shall, upon receipt of Warrant Certificates duly executed on behalf of the Company, countersign such Warrant Certificates and shall deliver such Warrant Certificates to or upon the order of the Company.

ARTICLE 2

WARRANT PRICE, DURATION AND EXERCISE OF WARRANTS

2.1 Warrant Price. During the period specified in Section 2.2, each Warrant shall, subject to the terms of this Agreement and the applicable Warrant Certificate, entitle the holder thereof to purchase the number of Warrant Securities specified in the applicable Warrant Certificate at an exercise price of \$[●] per Warrant Security, subject to adjustment upon the occurrence of certain events, as hereinafter provided. Such purchase price per Warrant Security is referred to in this Agreement as the “*Warrant Price*.”

2.2 Duration of Warrants. Each Warrant may be exercised in whole or in part at any time, as specified herein, on or after [the date thereof] [●] and at or before [●] p.m., [City] time, on [●] or such later date as the Company may designate by notice to the Warrant Agent and the holders of Warrant Certificates mailed to their addresses as set forth in the record books of the Warrant Agent (the “*Expiration Date*”). Each Warrant not exercised at or before [●] p.m., [City] time, on the Expiration Date shall become void, and all rights of the holder of the Warrant Certificate evidencing such Warrant under this Agreement shall cease.

2.3 Exercise of Warrants.

(a) During the period specified in Section 2.2, the Warrants may be exercised to purchase a whole number of Warrant Securities in registered form by providing certain information as set forth on the reverse side of the Warrant Certificate and by paying in full, in lawful money of the United States of America, [in cash or by certified check or official bank check in New York Clearing House funds]

[by bank wire transfer in immediately available funds] the Warrant Price for each Warrant Security with respect to which a Warrant is being exercised to the Warrant Agent at its corporate trust office, provided that such exercise is subject to receipt within five business days of such payment by the Warrant Agent of the Warrant Certificate with the form of election to purchase Warrant Securities set forth on the reverse side of the Warrant Certificate properly completed and duly executed. The date on which payment in full of the Warrant Price is received by the Warrant Agent shall, subject to receipt of the Warrant Certificate as aforesaid, be deemed to be the date on which the Warrant is exercised; provided, however, that if, at the date of receipt of such Warrant Certificates and payment in full of the Warrant Price, the transfer books for the Warrant Securities purchasable upon the exercise of such Warrants shall be closed, no such receipt of such Warrant Certificates and no such payment of such Warrant Price shall be effective to constitute the person so designated to be named as the holder of record of such Warrant Securities on such date, but shall be effective to constitute such person as the holder of record of such Warrant Securities for all purposes at the opening of business on the next succeeding day on which the transfer books for the Warrant Securities purchasable upon the exercise of such Warrants shall be opened, and the certificates for the Warrant Securities in respect of which such Warrants are then exercised shall be issuable as of the date on such next succeeding day on which the transfer books shall next be opened, and until such date the Company shall be under no duty to deliver any certificate for such Warrant Securities. The Warrant Agent shall deposit all funds received by it in payment of the Warrant Price in an account of the Company maintained with it and shall advise the Company by telephone at the end of each day on which a payment for the exercise of Warrants is received of the amount so deposited to its account. The Warrant Agent shall promptly confirm such telephone advice to the Company in writing.

(b) The Warrant Agent shall, from time to time, as promptly as practicable, advise the Company of (i) the number of Warrant Securities with respect to which Warrants were exercised, (ii) the instructions of each holder of the Warrant Certificates evidencing such Warrants with respect to delivery of the Warrant Securities to which such holder is entitled upon such exercise, (iii) delivery of Warrant Certificates evidencing the balance, if any, of the Warrants for the remaining Warrant Securities after such exercise, and (iv) such other information as the Company shall reasonably require.

(c) As soon as practicable after the exercise of any Warrant, the Company shall issue to or upon the order of the holder of the Warrant Certificate evidencing such Warrant the Warrant Securities to which such holder is entitled, in fully registered form, registered in such name or names as may be directed by such holder. If fewer than all of the Warrants evidenced by such Warrant Certificate are exercised, the Company shall execute, and an authorized officer of the Warrant Agent shall manually countersign and deliver, a new Warrant Certificate evidencing Warrants for the number of Warrant Securities remaining unexercised.

(d) The Company shall not be required to pay any stamp or other tax or other governmental charge required to be paid in connection with any transfer involved in the issue of the Warrant Securities, and in the event that any such transfer is involved, the Company shall not be required to issue or deliver any Warrant Security until such tax or other charge shall have been paid or it has been established to the Company's satisfaction that no such tax or other charge is due.

(e) Prior to the issuance of any Warrants there shall have been reserved, and the Company shall at all times through the Expiration Date keep reserved, out of its authorized but unissued Warrant Securities, a number of shares sufficient to provide for the exercise of the Warrants.

ARTICLE 3

OTHER PROVISIONS RELATING TO RIGHTS OF HOLDERS OF WARRANT CERTIFICATES

3.1 No Rights as Warrant Securityholder Conferred by Warrants or Warrant Certificates. No Warrant Certificate or Warrant evidenced thereby shall entitle the holder thereof to any of the rights of a holder of Warrant Securities, including, without limitation, the right to receive the payment of dividends or distributions, if any, on the Warrant Securities or to exercise any voting rights, except to the extent expressly set forth in this Agreement or the applicable Warrant Certificate.

3.2 Lost, Stolen, Mutilated or Destroyed Warrant Certificates. Upon receipt by the Warrant Agent of evidence reasonably satisfactory to it and the Company of the ownership of and the loss, theft, destruction or mutilation of any Warrant Certificate and/or indemnity reasonably satisfactory to the Warrant Agent and the Company and, in the case of mutilation, upon surrender of the mutilated Warrant Certificate to the Warrant Agent for cancellation, then, in the absence of notice to the Company or the Warrant Agent that such Warrant Certificate has been acquired by a bona fide purchaser, the Company shall execute, and an authorized officer of the Warrant Agent shall manually countersign and deliver, in exchange for or in lieu of the lost, stolen, destroyed or mutilated Warrant Certificate, a new Warrant Certificate of the same tenor and evidencing Warrants for a like number of Warrant Securities. Upon the issuance of any new Warrant Certificate under this Section 3.2, the Company may require the payment of a sum sufficient to cover any tax or other governmental charge that may be imposed in relation thereto and any other expenses (including the fees and expenses of the Warrant Agent) in connection therewith. Every substitute Warrant Certificate executed and delivered pursuant to this Section 3.2 in lieu of any lost, stolen or destroyed Warrant Certificate shall represent an additional contractual obligation of the Company, whether or not the lost, stolen or destroyed Warrant Certificate shall be at any time enforceable by anyone, and shall be entitled to the benefits of this Agreement equally and proportionately with any and all other Warrant Certificates duly executed and delivered hereunder. The provisions of this Section 3.2 are exclusive and shall preclude (to the extent lawful) all other rights and remedies with respect to the replacement of mutilated, lost, stolen or destroyed Warrant Certificates.

3.3 Holder of Warrant Certificate May Enforce Rights. Notwithstanding any of the provisions of this Agreement, any holder of a Warrant Certificate, without the consent of the Warrant Agent, the holder of any Warrant Securities or the holder of any other Warrant Certificate, may, in such holder's own behalf and for such holder's own benefit, enforce, and may institute and maintain any suit, action or proceeding against the Company suitable to enforce, or otherwise in respect of, such holder's right to exercise the Warrants evidenced by such holder's Warrant Certificate in the manner provided in such holder's Warrant Certificate and in this Agreement.

3.4 Adjustments.

(a) In case the Company shall at any time subdivide its outstanding shares of [title of Preferred Stock purchasable through exercise of Warrants] into a greater number of shares, the Warrant Price in effect immediately prior to such subdivision shall be proportionately reduced and the number of Warrant Securities purchasable under the Warrants shall be proportionately increased. Conversely, in case the outstanding shares of [title of Preferred Stock purchasable through exercise of Warrants] shall be combined into a smaller number of shares, the Warrant Price in effect immediately prior to such combination shall be proportionately increased and the number of Warrant Securities purchasable under the Warrants shall be proportionately decreased.

(b) If at any time or from time to time the holders of [title of Preferred Stock purchasable through exercise of Warrants] (or any shares of stock or other securities at the time receivable upon the exercise of the Warrants) shall have received or become entitled to receive, without payment therefore,

(i) [title of Preferred Stock purchasable through exercise of Warrants] or any shares of stock or other securities which are at any time directly or indirectly convertible into or exchangeable for [title of Preferred Stock purchasable through exercise of Warrants], or any rights or options to subscribe for, purchase or otherwise acquire any of the foregoing by way of dividend or other distribution;

(ii) any cash paid or payable otherwise than in accordance with the terms of [title of Preferred Stock purchasable through exercise of Warrants] or as a cash dividend paid or payable out of the Company's current or retained earnings;

(iii) any evidence of the Company's indebtedness or rights to subscribe for or purchase the Company's indebtedness; or

(iv) [title of Preferred Stock purchasable through exercise of Warrants] or additional stock or other securities or property (including cash) by way of spinoff, split-up, reclassification, combination of shares or similar corporate rearrangement (other than shares of [title of Preferred Stock purchasable through exercise of Warrants] issued as a stock split or adjustments in respect of which shall be covered by the terms of Section 3.4(a) above), then and in each such case, the holder of each Warrant shall, upon the exercise of the Warrant, be entitled to receive, in addition to the number of Warrant Securities receivable thereupon, and without payment of any additional consideration therefore, the amount of stock and other securities and property (including cash and indebtedness or rights to subscribe for or purchase indebtedness) which such holder would hold on the date of such exercise had such holder been the holder of record of such Warrant Securities as of the date on which holders of [title of Preferred Stock purchasable through exercise of Warrants] received or became entitled to receive such shares or all other additional stock and other securities and property.

(c) In case of (i) any reclassification, capital reorganization, or change in the [title of Preferred Stock purchasable through exercise of Warrants] of the Company (other than as a result of a subdivision, combination, or stock dividend provided for in Section 3.4(a) or Section 3.4(b) above), (ii) share exchange, merger or similar transaction of the Company with or into another person or entity (other than a share exchange, merger or similar transaction in which the Company is the acquiring or surviving corporation and which does not result in any change in the [title of Preferred Stock purchasable through exercise of Warrants] other than the issuance of additional shares of [title of Preferred Stock purchasable through exercise of Warrants]) or (iii) the sale, exchange, lease, transfer or other disposition of all or substantially all of the properties and assets of the Company as an entirety (in any such case, a "**Reorganization Event**"), then, as a condition of such Reorganization Event, lawful provisions shall be made, and duly executed documents evidencing the same from the Company or its successor shall be delivered to the holders of the Warrants, so that the holders of the Warrants shall have the right at any time prior to the expiration of the Warrants to purchase, at a total price equal to that payable upon the exercise of the Warrants, the kind and amount of shares of stock and other securities and property receivable in connection with such Reorganization Event by a holder of the same number of shares of [title of Preferred Stock purchasable through exercise of Warrants] as were purchasable by the holders of the Warrants immediately prior to such Reorganization Event. In any such case appropriate provisions shall be made

with respect to the rights and interests of the holders of the Warrants so that the provisions hereof shall thereafter be applicable with respect to any shares of stock or other securities and property deliverable upon exercise the Warrants, and appropriate adjustments shall be made to the Warrant Price payable hereunder provided the aggregate purchase price shall remain the same. In the case of any transaction described in clauses (ii) and (iii) above, the Company shall thereupon be relieved of any further obligation hereunder or under the Warrants, and the Company as the predecessor corporation may thereupon or at any time thereafter be dissolved, wound up or liquidated. Such successor or assuming entity thereupon may cause to be signed, and may issue either in its own name or in the name of the Company, any or all of the Warrants issuable hereunder which heretofore shall not have been signed by the Company, and may execute and deliver securities in its own name, in fulfillment of its obligations to deliver Warrant Securities upon exercise of the Warrants. All the Warrants so issued shall in all respects have the same legal rank and benefit under this Agreement as the Warrants theretofore or thereafter issued in accordance with the terms of this Agreement as though all of such Warrants had been issued at the date of the execution hereof. In any case of any such Reorganization Event, such changes in phraseology and form (but not in substance) may be made in the Warrants thereafter to be issued as may be appropriate. The Warrant Agent may receive a written opinion of legal counsel as conclusive evidence that any such Reorganization Event complies with the provisions of this Section 3.4.

(d) The Company may, at its option, at any time until the Expiration Date, reduce the then current Warrant Price to any amount deemed appropriate by the Board of Directors of the Company for any period not exceeding twenty consecutive days (as evidenced in a resolution adopted by such Board of Directors), but only upon giving the notices required by Section 3.5 at least ten days prior to taking such action.

(e) Except as herein otherwise expressly provided, no adjustment in the Warrant Price shall be made by reason of the issuance of any securities of the Company or for any other reason whatsoever.

(f) No fractional Warrant Securities shall be issued upon the exercise of Warrants. If more than one Warrant shall be exercised at one time by the same holder, the number of full Warrant Securities which shall be issuable upon such exercise shall be computed on the basis of the aggregate number of Warrant Securities purchased pursuant to the Warrants so exercised. Instead of any fractional Warrant Security which would otherwise be issuable upon exercise of any Warrant, the Company shall pay a cash adjustment in respect of such fraction in an amount equal to the same fraction of the last reported sale price (or bid price if there were no sales) per Warrant Security, in either case as reported on the principal registered national securities exchange on which the Warrant Securities are listed or admitted to trading on the business day that next precedes the day of exercise or, if the Warrant Securities are not then listed or admitted to trading on any registered national securities exchange, the average of the closing high bid and low asked prices as reported on the OTC Bulletin Board Service (the "**OTC Bulletin Board**") operated by the Financial Industry Regulatory Authority, Inc. ("**FINRA**") or, if not available on the OTC Bulletin Board, then the average of the closing high bid and low asked prices as reported on any other U.S. quotation medium or inter-dealer quotation system on such date, or if on any such date the Warrant Securities are not listed or admitted to trading on a registered national securities exchange, are not included in the OTC Bulletin Board, and are not quoted on any other U.S. quotation medium or inter-dealer quotation system, an amount equal to the same fraction of the average of the closing bid and asked prices as furnished by any FINRA member firm selected from time to time by the Company for that purpose at the close of business on the business day that next precedes the day of exercise.

(g) Whenever the Warrant Price then in effect is adjusted as herein provided, the Company shall mail to each holder of the Warrants at such holder's address as it shall appear on the books of the Company a statement setting forth the adjusted Warrant Price then and thereafter effective under the provisions hereof, together with the facts, in reasonable detail, upon which such adjustment is based.

(h) Notwithstanding anything to the contrary herein, in no event shall the Warrant Price, as adjusted in accordance with the terms hereof, be less than the par value per share of [title of Preferred Stock purchasable through exercise of Warrants].

3.5 Notice to Warrant Holders. In case the Company shall (a) effect any dividend or distribution described in Section 3.4(b), (b) effect any Reorganization Event, (c) make any distribution on or in respect of the [title of Preferred Stock purchasable through exercise of Warrants] in connection with the dissolution, liquidation or winding up of the Company, or (d) reduce the then current Warrant Price pursuant to Section 3.4(d), then the Company shall mail to each holder of Warrants at such holder's address as it shall appear on the books of the Warrant Agent, at least ten days prior to the applicable date hereinafter specified, a notice stating (x) the record date for such dividend or distribution, or, if a record is not to be taken, the date as of which the holders of record of [title of Preferred Stock purchasable through exercise of Warrants] that will be entitled to such dividend or distribution are to be determined, (y) the date on which such Reorganization Event, dissolution, liquidation or winding up is expected to become effective, and the date as of which it is expected that holders of [title of Preferred Stock purchasable through exercise of Warrants] of record shall be entitled to exchange their shares of [title of Preferred Stock purchasable through exercise of Warrants] for securities or other property deliverable upon such Reorganization Event, dissolution, liquidation or winding up, or (z) the first date on which the then current Warrant Price shall be reduced pursuant to Section 3.4(d). No failure to mail such notice nor any defect therein or in the mailing thereof shall affect any such transaction or any adjustment in the Warrant Price required by Section 3.4.

3.6 [If the Warrants are subject to acceleration by the Company — Acceleration of Warrants by the Company.]

(a) At any time on or after [●], the Company shall have the right to accelerate any or all Warrants at any time by causing them to expire at the close of business on the day next preceding a specified date (the "**Acceleration Date**"), if the Market Price (as hereinafter defined) of the [title of Preferred Stock purchasable through exercise of Warrants] equals or exceeds [●] percent ([●]%) of the then effective Warrant Price on any twenty Trading Days (as hereinafter defined) within a period of thirty consecutive Trading Days ending no more than five Trading Days prior to the date on which the Company gives notice to the Warrant Agent of its election to accelerate the Warrants.

(b) (b) "**Market Price**" for each Trading Day shall be, if the [title of Preferred Stock purchasable through exercise of Warrants] is listed or admitted to trading on any registered national securities exchange, the last reported sale price, regular way (or, if no such price is reported, the average of the reported closing bid and asked prices, regular way) of [title of Preferred Stock purchasable through exercise of Warrants], in either case as reported on the principal registered national securities exchange on which the [title of Preferred Stock purchasable through exercise of Warrants] is listed or admitted to trading or, if not listed or admitted to trading on any registered national securities exchange, the average of the closing high bid and low asked prices as reported on the OTC Bulletin Board operated by FINRA, or if not available on the OTC Bulletin Board, then the average of the closing high bid and low asked prices as reported on any other U.S. quotation medium or inter-dealer quotation system, or if on any such date the shares of [title of Preferred Stock purchasable through exercise of Warrants] are not listed or admitted to trading on a registered national securities exchange, are not included in the OTC Bulletin Board, and are not quoted on any other U.S. quotation medium or inter-dealer quotation system, the average of the closing bid and asked prices as furnished by any FINRA member firm selected from time to time by the Company for that purpose. "Trading Day" shall be each Monday through Friday, other than any day on which securities are not traded in the system or on the exchange that is the principal market for the [title of Preferred Stock purchasable through exercise of Warrants].

Preferred Stock purchasable through exercise of Warrants], as determined by the Board of Directors of the Company. In the event of an acceleration of less than all of the Warrants, the Warrant Agent shall select the Warrants to be accelerated by lot, pro rata or in such other manner as it deems, in its discretion, to be fair and appropriate.

(c) Notice of an acceleration specifying the Acceleration Date shall be sent by mail first class, postage prepaid, to each registered holder of a Warrant Certificate representing a Warrant accelerated at such holder's address appearing on the books of the Warrant Agent not more than sixty days nor less than thirty days before the Acceleration Date. Such notice of an acceleration also shall be given no more than twenty days, and no less than ten days, prior to the mailing of notice to registered holders of Warrants pursuant to this Section 3.6, by publication at least once in a newspaper of general circulation in the City of New York.

(d) Any Warrant accelerated may be exercised until [●] p.m., [City] time, on the business day next preceding the Acceleration Date. The Warrant Price shall be payable as provided in Section 2.]

ARTICLE 4

EXCHANGE AND TRANSFER OF WARRANT CERTIFICATES

4.1 Exchange and Transfer of Warrant Certificates. Upon surrender at the corporate trust office of the Warrant Agent, Warrant Certificates evidencing Warrants may be exchanged for Warrant Certificates in other denominations evidencing such Warrants or the transfer thereof may be registered in whole or in part; provided that such other Warrant Certificates evidence Warrants for the same aggregate number of Warrant Securities as the Warrant Certificates so surrendered. The Warrant Agent shall keep, at its corporate trust office, books in which, subject to such reasonable regulations as it may prescribe, it shall register Warrant Certificates and exchanges and transfers of outstanding Warrant Certificates, upon surrender of the Warrant Certificates to the Warrant Agent at its corporate trust office for exchange or registration of transfer, properly endorsed or accompanied by appropriate instruments of registration of transfer and written instructions for transfer, all in form satisfactory to the Company and the Warrant Agent. No service charge shall be made for any exchange or registration of transfer of Warrant Certificates, but the Company may require payment of a sum sufficient to cover any stamp or other tax or other governmental charge that may be imposed in connection with any such exchange or registration of transfer. Whenever any Warrant Certificates are so surrendered for exchange or registration of transfer, an authorized officer of the Warrant Agent shall manually countersign and deliver to the person or persons entitled thereto a Warrant Certificate or Warrant Certificates duly authorized and executed by the Company, as so requested. The Warrant Agent shall not be required to effect any exchange or registration of transfer which will result in the issuance of a Warrant Certificate evidencing a Warrant for a fraction of a Warrant Security or a number of Warrants for a whole number of Warrant Securities and a fraction of a Warrant Security. All Warrant Certificates issued upon any exchange or registration of transfer of Warrant Certificates shall be the valid obligations of the Company, evidencing the same obligations and entitled to the same benefits under this Agreement as the Warrant Certificate surrendered for such exchange or registration of transfer.

4.2 Treatment of Holders of Warrant Certificates. The Company, the Warrant Agent and all other persons may treat the registered holder of a Warrant Certificate as the absolute owner thereof for any purpose and as the person entitled to exercise the rights represented by the Warrants evidenced thereby, any notice to the contrary notwithstanding.

4.3 Cancellation of Warrant Certificates. Any Warrant Certificate surrendered for exchange, registration of transfer or exercise of the Warrants evidenced thereby shall, if surrendered to the

Company, be delivered to the Warrant Agent and all Warrant Certificates surrendered or so delivered to the Warrant Agent shall be promptly canceled by the Warrant Agent and shall not be reissued and, except as expressly permitted by this Agreement, no Warrant Certificate shall be issued hereunder in exchange therefor or in lieu thereof. The Warrant Agent shall deliver to the Company from time to time or otherwise dispose of canceled Warrant Certificates in a manner satisfactory to the Company.

ARTICLE 5

CONCERNING THE WARRANT AGENT

5.1 Warrant Agent. The Company hereby appoints [●] as Warrant Agent of the Company in respect of the Warrants and the Warrant Certificates upon the terms and subject to the conditions herein set forth, and [●] hereby accepts such appointment. The Warrant Agent shall have the powers and authority granted to and conferred upon it in the Warrant Certificates and hereby and such further powers and authority to act on behalf of the Company as the Company may hereafter grant to or confer upon it. All of the terms and provisions with respect to such powers and authority contained in the Warrant Certificates are subject to and governed by the terms and provisions hereof.

5.2 Conditions of Warrant Agent's Obligations. The Warrant Agent accepts its obligations herein set forth upon the terms and conditions hereof, including the following to all of which the Company agrees and to all of which the rights hereunder of the holders from time to time of the Warrant Certificates shall be subject:

(a) Compensation and Indemnification. The Company agrees promptly to pay the Warrant Agent the compensation to be agreed upon with the Company for all services rendered by the Warrant Agent and to reimburse the Warrant Agent for reasonable out-of-pocket expenses (including reasonable counsel fees) incurred without negligence, bad faith or willful misconduct by the Warrant Agent in connection with the services rendered hereunder by the Warrant Agent. The Company also agrees to indemnify the Warrant Agent for, and to hold it harmless against, any loss, liability or expense incurred without negligence, bad faith or willful misconduct on the part of the Warrant Agent, arising out of or in connection with its acting as Warrant Agent hereunder, including the reasonable costs and expenses of defending against any claim of such liability.

(b) Agent for the Company. In acting under this Agreement and in connection with the Warrant Certificates, the Warrant Agent is acting solely as agent of the Company and does not assume any obligations or relationship of agency or trust for or with any of the holders of Warrant Certificates or beneficial owners of Warrants.

(c) Counsel. The Warrant Agent may consult with counsel satisfactory to it, which may include counsel for the Company, and the written advice of such counsel shall be full and complete authorization and protection in respect of any action taken, suffered or omitted by it hereunder in good faith and in accordance with the advice of such counsel.

(d) Documents. The Warrant Agent shall be protected and shall incur no liability for or in respect of any action taken or omitted by it in reliance upon any Warrant Certificate, notice, direction, consent, certificate, affidavit, statement or other paper or document reasonably believed by it to be genuine and to have been presented or signed by the proper parties.

(e) Certain Transactions. The Warrant Agent, and its officers, directors and employees, may become the owner of, or acquire any interest in, Warrants, with the same rights that it or they would have if it were not the Warrant Agent hereunder, and, to the extent permitted by applicable law,

it or they may engage or be interested in any financial or other transaction with the Company and may act on, or as depository, trustee or agent for, any committee or body of holders of Warrant Securities or other obligations of the Company as freely as if it were not the Warrant Agent hereunder. Nothing in this Agreement shall be deemed to prevent the Warrant Agent from acting as trustee under any indenture to which the Company is a party.

(f) No Liability for Interest. Unless otherwise agreed with the Company, the Warrant Agent shall have no liability for interest on any monies at any time received by it pursuant to any of the provisions of this Agreement or of the Warrant Certificates.

(g) No Liability for Invalidity. The Warrant Agent shall have no liability with respect to any invalidity of this Agreement or any of the Warrant Certificates (except as to the Warrant Agent's countersignature thereon).

(h) No Responsibility for Representations. The Warrant Agent shall not be responsible for any of the recitals or representations herein or in the Warrant Certificates (except as to the Warrant Agent's countersignature thereon), all of which are made solely by the Company.

(i) No Implied Obligations. The Warrant Agent shall be obligated to perform only such duties as are herein and in the Warrant Certificates specifically set forth and no implied duties or obligations shall be read into this Agreement or the Warrant Certificates against the Warrant Agent. The Warrant Agent shall not be under any obligation to take any action hereunder which may tend to involve it in any expense or liability, the payment of which within a reasonable time is not, in its reasonable opinion, assured to it. The Warrant Agent shall not be accountable or under any duty or responsibility for the use by the Company of any of the Warrant Certificates authenticated by the Warrant Agent and delivered by it to the Company pursuant to this Agreement or for the application by the Company of the proceeds of the Warrant Certificates. The Warrant Agent shall have no duty or responsibility in case of any default by the Company in the performance of its covenants or agreements contained herein or in the Warrant Certificates or in the case of the receipt of any written demand from a holder of a Warrant Certificate with respect to such default, including, without limiting the generality of the foregoing, any duty or responsibility to initiate or attempt to initiate any proceedings at law or otherwise or, except as provided in Section 6.2 hereof, to make any demand upon the Company.

5.3 Resignation, Removal and Appointment of Successors.

(a) The Company agrees, for the benefit of the holders from time to time of the Warrant Certificates, that there shall at all times be a Warrant Agent hereunder until all the Warrants have been exercised or are no longer exercisable.

(b) The Warrant Agent may at any time resign as agent by giving written notice to the Company of such intention on its part, specifying the date on which its desired resignation shall become effective; provided that such date shall not be less than three months after the date on which such notice is given unless the Company otherwise agrees. The Warrant Agent hereunder may be removed at any time by the filing with it of an instrument in writing signed by or on behalf of the Company and specifying such removal and the intended date when it shall become effective. Such resignation or removal shall take effect upon the appointment by the Company, as hereinafter provided, of a successor Warrant Agent (which shall be a bank or trust company authorized under the laws of the jurisdiction of its organization to exercise corporate trust powers) and the acceptance of such appointment by such successor Warrant Agent. The obligation of the Company under Section 5.2(a) shall continue to the extent set forth therein notwithstanding the resignation or removal of the Warrant Agent.

(c) In case at any time the Warrant Agent shall resign, or shall be removed, or shall become incapable of acting, or shall be adjudged a bankrupt or insolvent, or shall commence a voluntary case under the Federal bankruptcy laws, as now or hereafter constituted, or under any other applicable Federal or state bankruptcy, insolvency or similar law or shall consent to the appointment of or taking possession by a receiver, custodian, liquidator, assignee, trustee, sequestrator (or other similar official) of the Warrant Agent or its property or affairs, or shall make an assignment for the benefit of creditors, or shall admit in writing its inability to pay its debts generally as they become due, or shall take corporate action in furtherance of any such action, or a decree or order for relief by a court having jurisdiction in the premises shall have been entered in respect of the Warrant Agent in an involuntary case under the Federal bankruptcy laws, as now or hereafter constituted, or any other applicable Federal or state bankruptcy, insolvency or similar law, or a decree or order by a court having jurisdiction in the premises shall have been entered for the appointment of a receiver, custodian, liquidator, assignee, trustee, sequestrator (or similar official) of the Warrant Agent or of its property or affairs, or any public officer shall take charge or control of the Warrant Agent or of its property or affairs for the purpose of rehabilitation, conservation, winding up or liquidation, a successor Warrant Agent, qualified as aforesaid, shall be appointed by the Company by an instrument in writing, filed with the successor Warrant Agent. Upon the appointment as aforesaid of a successor Warrant Agent and acceptance by the successor Warrant Agent of such appointment, the Warrant Agent shall cease to be Warrant Agent hereunder.

(d) Any successor Warrant Agent appointed hereunder shall execute, acknowledge and deliver to its predecessor and to the Company an instrument accepting such appointment hereunder, and thereupon such successor Warrant Agent, without any further act, deed or conveyance, shall become vested with all the authority, rights, powers, trusts, immunities, duties and obligations of such predecessor with like effect as if originally named as Warrant Agent hereunder, and such predecessor, upon payment of its charges and disbursements then unpaid, shall thereupon become obligated to transfer, deliver and pay over, and such successor Warrant Agent shall be entitled to receive, all monies, securities and other property on deposit with or held by such predecessor, as Warrant Agent hereunder.

(e) Any corporation into which the Warrant Agent hereunder may be merged or converted or any corporation with which the Warrant Agent may be consolidated, or any corporation resulting from any merger, conversion or consolidation to which the Warrant Agent shall be a party, or any corporation to which the Warrant Agent shall sell or otherwise transfer all or substantially all the assets and business of the Warrant Agent, provided that it shall be qualified as aforesaid, shall be the successor Warrant Agent under this Agreement without the execution or filing of any paper or any further act on the part of any of the parties hereto.

ARTICLE 6

MISCELLANEOUS

6.1 Amendment. This Agreement may be amended by the parties hereto, without the consent of the holder of any Warrant Certificate, for the purpose of curing any ambiguity, or of curing, correcting or supplementing any defective provision contained herein, or making any other provisions with respect to matters or questions arising under this Agreement as the Company and the Warrant Agent may deem necessary or desirable; provided that such action shall not materially adversely affect the interests of the holders of the Warrant Certificates.

6.2 Notices and Demands to the Company and Warrant Agent. If the Warrant Agent shall receive any notice or demand addressed to the Company by the holder of a Warrant Certificate pursuant to the provisions of the Warrant Certificates, the Warrant Agent shall promptly forward such notice or demand to the Company.

6.3 Addresses. Any communication from the Company to the Warrant Agent with respect to this Agreement shall be addressed to [●], Attention: [●] and any communication from the Warrant Agent to the Company with respect to this Agreement shall be addressed to Personalis, Inc., 1330 O'Brien Drive, Menlo Park, CA 94025, Attention: [●] (or such other address as shall be specified in writing by the Warrant Agent or by the Company).

6.4 Governing Law. This Agreement and each Warrant Certificate issued hereunder shall be governed by and construed in accordance with the laws of the State of New York.

6.5 Delivery of Prospectus. The Company shall furnish to the Warrant Agent sufficient copies of a prospectus meeting the requirements of the Securities Act of 1933, as amended, relating to the Warrant Securities deliverable upon exercise of the Warrants (the "*Prospectus*"), and the Warrant Agent agrees that upon the exercise of any Warrant, the Warrant Agent will deliver to the holder of the Warrant Certificate evidencing such Warrant, prior to or concurrently with the delivery of the Warrant Securities issued upon such exercise, a Prospectus. The Warrant Agent shall not, by reason of any such delivery, assume any responsibility for the accuracy or adequacy of such Prospectus.

6.6 Obtaining of Governmental Approvals. The Company will from time to time take all action which may be necessary to obtain and keep effective any and all permits, consents and approvals of governmental agencies and authorities and securities act filings under United States Federal and state laws (including without limitation a registration statement in respect of the Warrants and Warrant Securities under the Securities Act of 1933, as amended), which may be or become requisite in connection with the issuance, sale, transfer, and delivery of the Warrant Securities issued upon exercise of the Warrants, the issuance, sale, transfer and delivery of the Warrants or upon the expiration of the period during which the Warrants are exercisable.

6.7 Persons Having Rights under the Agreement. Nothing in this Agreement shall give to any person other than the Company, the Warrant Agent and the holders of the Warrant Certificates any right, remedy or claim under or by reason of this Agreement.

6.8 Headings. The descriptive headings of the several Articles and Sections of this Agreement are inserted for convenience only and shall not control or affect the meaning or construction of any of the provisions hereof.

6.9 Counterparts. This Agreement may be executed in any number of counterparts, each of which as so executed shall be deemed to be an original, but such counterparts shall together constitute but one and the same instrument.

6.10 Inspection of Agreement. A copy of this Agreement shall be available at all reasonable times at the principal corporate trust office of the Warrant Agent for inspection by the holder of any Warrant Certificate. The Warrant Agent may require such holder to submit such holder's Warrant Certificate for inspection by it.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be duly executed as of the day and year first above written.

PERSONALIS, INC., as Company

By: _____
Name: _____
Title: _____

ATTEST: _____

COUNTERSIGNED

[●], as Warrant Agent

By: _____
Name: _____
Title: _____

ATTEST: _____

[SIGNATURE PAGE TO PERSONALIS, INC. PREFERRED STOCK WARRANT AGREEMENT]

EXHIBIT A

**FORM OF WARRANT CERTIFICATE
[FACE OF WARRANT CERTIFICATE]**

[Form of Legend if Warrants are not immediately exercisable.]

[Prior to [●], Warrants evidenced by this Warrant Certificate cannot be exercised.]

EXERCISABLE ONLY IF COUNTERSIGNED BY THE WARRANT AGENT AS PROVIDED HEREIN

VOID AFTER [●] P.M., [City] time, ON [●].

PERSONALIS, INC.
WARRANT CERTIFICATE REPRESENTING
WARRANTS TO PURCHASE
[TITLE OF WARRANT SECURITIES]

No. [●]

[●] Warrants

This certifies that [●] or registered assigns is the registered owner of the above indicated number of Warrants, each Warrant entitling such owner to purchase, at any time [after [●] p.m., [City] time, [on [●] and] on or before [●] p.m., [City] time, on [●], [●] shares of [TITLE OF WARRANT SECURITIES], par value \$0.0001 per share (the “*Warrant Securities*”), of Personalis, Inc. (the “*Company*”) on the following basis: during the period from [●], through and including [●], the exercise price per Warrant Security will be \$[●], subject to adjustment as provided in the Warrant Agreement (as hereinafter defined) (the “*Warrant Price*”). The Holder may exercise the Warrants evidenced hereby by providing certain information set forth on the back hereof and by paying in full, in lawful money of the United States of America, [in cash or by certified check or official bank check in New York Clearing House funds] [by bank wire transfer in immediately available funds], the Warrant Price for each Warrant Security with respect to which this Warrant is exercised to the Warrant Agent (as hereinafter defined) and by surrendering this Warrant Certificate, with the purchase form on the back hereof duly executed, at the corporate trust office of [name of Warrant Agent], or its successor as warrant agent (the “*Warrant Agent*”), which is, on the date hereof, at the address specified on the reverse hereof, and upon compliance with and subject to the conditions set forth herein and in the Warrant Agreement (as hereinafter defined).

The term “*Holder*” as used herein shall mean the person in whose name at the time this Warrant Certificate shall be registered upon the books to be maintained by the Warrant Agent for that purpose pursuant to Section 4 of the Warrant Agreement.

The Warrants evidenced by this Warrant Certificate may be exercised to purchase a whole number of Warrant Securities in registered form. Upon any exercise of fewer than all of the Warrants evidenced by this Warrant Certificate, there shall be issued to the Holder hereof a new Warrant Certificate evidencing Warrants for the number of Warrant Securities remaining unexercised.

This Warrant Certificate is issued under and in accordance with the Warrant Agreement dated as of [●] (the “*Warrant Agreement*”), between the Company and the Warrant Agent and is subject to the terms and provisions contained in the Warrant Agreement, to all of which terms and provisions the Holder of this Warrant Certificate consents by acceptance hereof. Copies of the Warrant Agreement are on file at the above-mentioned office of the Warrant Agent.

Transfer of this Warrant Certificate may be registered when this Warrant Certificate is surrendered at the corporate trust office of the Warrant Agent by the registered owner or such owner’s assigns, in the manner and subject to the limitations provided in the Warrant Agreement.

After countersignature by the Warrant Agent and prior to the expiration of this Warrant Certificate, this Warrant Certificate may be exchanged at the corporate trust office of the Warrant Agent for Warrant Certificates representing Warrants for the same aggregate number of Warrant Securities.

This Warrant Certificate shall not entitle the Holder hereof to any of the rights of a holder of the Warrant Securities, including, without limitation, the right to receive payments of dividends or distributions, if any, on the Warrant Securities (except to the extent set forth in the Warrant Agreement) or to exercise any voting rights.

Reference is hereby made to the further provisions of this Warrant Certificate set forth on the reverse hereof, which further provisions shall for all purposes have the same effect as if set forth at this place.

This Warrant Certificate shall not be valid or obligatory for any purpose until countersigned by the Warrant Agent.

IN WITNESS WHEREOF, the Company has caused this Warrant to be executed in its name and on its behalf by the facsimile signatures of its duly authorized officers.

Dated:

PERSONALIS, INC., as Company

By: _____
Name: _____
Title: _____

ATTEST: _____

COUNTERSIGNED

[•], as Warrant Agent

By: _____
Name: _____
Title: _____

ATTEST: _____

[REVERSE OF WARRANT CERTIFICATE]

(Instructions for Exercise of Warrant)

To exercise any Warrants evidenced hereby for Warrant Securities (as hereinafter defined), the Holder must pay, in lawful money of the United States of America, [in cash or by certified check or official bank check in New York Clearing House funds] [by bank wire transfer in immediately available funds], the Warrant Price in full for Warrants exercised, to [•] [address of Warrant Agent], Attention: [•], which payment must specify the name of the Holder and the number of Warrants exercised by such Holder. In addition, the Holder must complete the information required below and present this Warrant Certificate in person or by mail (certified or registered mail is recommended) to the Warrant Agent at the appropriate address set forth above. This Warrant Certificate, completed and duly executed, must be received by the Warrant Agent within five business days of the payment.

(To be executed upon exercise of Warrants)

The undersigned hereby irrevocably elects to exercise _____ Warrants, evidenced by this Warrant Certificate, to purchase _____ shares of the [TITLE OF WARRANT SECURITIES], par value \$0.0001 per share (the "*Warrant Securities*"), of Personalis, Inc. and represents that the undersigned has tendered payment for such Warrant Securities, in lawful money of the United States of America, [in cash or by certified check or official bank check in New York Clearing House funds] [by bank wire transfer in immediately available funds], to the order of Personalis, Inc., c/o [insert name and address of Warrant Agent], in the amount of \$ _____ in accordance with the terms hereof. The undersigned requests that said Warrant Securities be in fully registered form in the authorized denominations, registered in such names and delivered all as specified in accordance with the instructions set forth below.

If the number of Warrants exercised is less than all of the Warrants evidenced hereby, the undersigned requests that a new Warrant Certificate evidencing the Warrants for the number of Warrant Securities remaining unexercised be issued and delivered to the undersigned unless otherwise specified in the instructions below.

Dated: _____ Name: _____
Please Print

Address: _____

(Insert Social Security or Other Identifying Number of Holder)

Signature Guaranteed: _____
Signature

(Signature must conform in all respects to name of holder as specified on the face of this Warrant Certificate and must bear a signature guarantee by a FINRA member firm).

This Warrant may be exercised at the following addresses: By hand at:

[•]

By mail at:

[Instructions as to form and delivery of Warrant Securities and, if applicable, Warrant Certificates evidencing Warrants for the number of Warrant Securities remaining unexercised — complete as appropriate.]

ASSIGNMENT

[Form of assignment to be executed if Warrant Holder desires to transfer Warrant]

FOR VALUE RECEIVED, hereby sells, assigns and transfers unto:

(Please print name and address including zip code)

Please print Social Security or other identifying number

the right represented by the within Warrant to purchase shares of [Title of Warrant Securities] of Personalis, Inc. to which the within Warrant relates and appoints attorney to transfer such right on the books of the Warrant Agent with full power of substitution in the premises.

Dated: _____

Name: _____

Signature

(Signature must conform in all respects to name of holder as specified on the face of the Warrant)

Signature Guaranteed

PERSONALIS, INC.

AND

, AS WARRANT AGENT

FORM OF DEBT SECURITIES
WARRANT AGREEMENT

DATED AS OF

PERSONALIS, INC. FORM OF DEBT SECURITIES WARRANT AGREEMENT

THIS DEBT SECURITIES WARRANT AGREEMENT (this “*Agreement*”), dated as of [●], between **PERSONALIS, INC.**, a Delaware corporation (the “*Company*”), and [●], a [corporation] [national banking association] organized and existing under the laws of [●] and having a corporate trust office in [●], as warrant agent (the “*Warrant Agent*”).

WHEREAS, the Company has entered into an indenture dated as of [●] (the “*Indenture*”), with [●], as trustee (such trustee, and any successors to such trustee, herein called the “*Trustee*”), providing for the issuance from time to time of its debt securities, to be issued in one or more series as provided in the Indenture (the “*Debt Securities*”);

WHEREAS, the Company proposes to sell [*If Warrants are sold with other securities* — [title of such other securities being offered] (the “*Other Securities*”) with] warrant certificates evidencing one or more warrants (the “*Warrants*” or, individually, a “*Warrant*”) representing the right to purchase [title of Debt Securities purchasable through exercise of Warrants] (the “*Warrant Debt Securities*”), such warrant certificates and other warrant certificates issued pursuant to this Agreement being herein called the “*Warrant Certificates*”; and

WHEREAS, the Company desires the Warrant Agent to act on behalf of the Company, and the Warrant Agent is willing so to act, in connection with the issuance, registration, transfer, exchange, exercise and replacement of the Warrant Certificates, and in this Agreement wishes to set forth, among other things, the form and provisions of the Warrant Certificates and the terms and conditions on which they may be issued, registered, transferred, exchanged, exercised and replaced.

NOW THEREFORE, in consideration of the premises and of the mutual agreements herein contained, the parties hereto agree as follows:

ARTICLE 1

**ISSUANCE OF WARRANTS AND EXECUTION AND
DELIVERY OF WARRANT CERTIFICATES**

1.1 Issuance of Warrants. [*If Warrants alone* — Upon issuance, each Warrant Certificate shall evidence one or more Warrants.] [*If Other Securities and Warrants* — Warrant Certificates will be issued in connection with the issuance of the Other Securities but shall be separately transferable and each Warrant Certificate shall evidence one or more Warrants.] Each Warrant evidenced thereby shall represent the right, subject to the provisions contained herein and therein, to purchase one Warrant Debt Security. [*If Other Securities and Warrants* — Warrant Certificates will be issued with the Other Securities and each Warrant Certificate will evidence [●] Warrants for each [\$[●] principal amount] [[●] shares] of Other Securities issued.]

1.2 Execution and Delivery of Warrant Certificates. Each Warrant Certificate, whenever issued, shall be in registered form substantially in the form set forth in **Exhibit A** hereto, shall be dated the date of its countersignature by the Warrant Agent and may have such letters, numbers, or other marks of identification or designation and such legends or endorsements printed, lithographed or engraved thereon as the officers of the Company executing the same may approve (execution thereof to be conclusive evidence of such approval) and as are not inconsistent with the provisions of this Agreement, or as may be required to comply with any law or with any rule or regulation made pursuant thereto or with any rule or regulation of any securities exchange on which the Warrants may be listed, or to conform to usage. The Warrant Certificates shall be signed on behalf of the Company by any of its present or future chief executive

officers, presidents, senior vice presidents, vice presidents, chief financial officers, chief legal officers, treasurers, assistant treasurers, controllers, assistant controllers, secretaries or assistant secretaries under its corporate seal reproduced thereon. Such signatures may be manual or facsimile signatures of such authorized officers and may be imprinted or otherwise reproduced on the Warrant Certificates. The seal of the Company may be in the form of a facsimile thereof and may be impressed, affixed, imprinted or otherwise reproduced on the Warrant Certificates.

No Warrant Certificate shall be valid for any purpose, and no Warrant evidenced thereby shall be exercisable, until such Warrant Certificate has been countersigned by the manual signature of the Warrant Agent. Such signature by the Warrant Agent upon any Warrant Certificate executed by the Company shall be conclusive evidence that the Warrant Certificate so countersigned has been duly issued hereunder.

In case any officer of the Company who shall have signed any of the Warrant Certificates either manually or by facsimile signature shall cease to be such officer before the Warrant Certificates so signed shall have been countersigned and delivered by the Warrant Agent, such Warrant Certificates may be countersigned and delivered notwithstanding that the person who signed such Warrant Certificates ceased to be such officer of the Company; and any Warrant Certificate may be signed on behalf of the Company by such persons as, at the actual date of the execution of such Warrant Certificate, shall be the proper officers of the Company, although at the date of the execution of this Agreement any such person was not such officer.

The term “*holder*” or “*holder of a Warrant Certificate*” as used herein shall mean any person in whose name at the time any Warrant Certificate shall be registered upon the books to be maintained by the Warrant Agent for that purpose.

1.3 Issuance of Warrant Certificates. Warrant Certificates evidencing the right to purchase Warrant Debt Securities may be executed by the Company and delivered to the Warrant Agent upon the execution of this Agreement or from time to time thereafter. The Warrant Agent shall, upon receipt of Warrant Certificates duly executed on behalf of the Company, countersign such Warrant Certificates and shall deliver such Warrant Certificates to or upon the order of the Company.

ARTICLE 2

WARRANT PRICE, DURATION AND EXERCISE OF WARRANTS

2.1 Warrant Price. During the period specified in Section 2.2, each Warrant shall, subject to the terms of this Agreement and the applicable Warrant Certificate, entitle the holder thereof to purchase the principal amount of Warrant Debt Securities specified in the applicable Warrant Certificate at an exercise price of [●]% of the principal amount thereof [plus accrued amortization, if any, of the original issue discount of the Warrant Debt Securities] [plus accrued interest, if any, from the most recent date from which interest shall have been paid on the Warrant Debt Securities or, if no interest shall have been paid on the Warrant Debt Securities, from the date of their initial issuance.] [The original issue discount (\$[●] for each \$1,000 principal amount of Warrant Debt Securities) will be amortized at a [●]% annual rate, computed on a[n] [semi-] annual basis [using a 360-day year consisting of twelve 30-day months].] Such purchase price for the Warrant Debt Securities is referred to in this Agreement as the “*Warrant Price*.”

2.2 Duration of Warrants. Each Warrant may be exercised in whole or in part at any time, as specified herein, on or after [the date thereof] [●] and at or before [●] p.m., [City] time, on [●] or such later date as the Company may designate by notice to the Warrant Agent and the holders of Warrant Certificates mailed to their addresses as set forth in the record books of the Warrant Agent (the “*Expiration Date*”). Each Warrant not exercised at or before [●] p.m., [City] time, on the Expiration Date shall become void, and all rights of the holder of the Warrant Certificate evidencing such Warrant under this Agreement shall cease.

2.3 Exercise of Warrants.

(a) During the period specified in Section 2.2, the Warrants may be exercised to purchase a whole number of Warrant Debt Securities in registered form by providing certain information as set forth on the reverse side of the Warrant Certificate and by paying in full, in lawful money of the United States of America, [in cash or by certified check or official bank check in New York Clearing House funds] [by bank wire transfer in immediately available funds] the Warrant Price for each Warrant Debt Security with respect to which a Warrant is being exercised to the Warrant Agent at its corporate trust office, provided that such exercise is subject to receipt within five business days of such payment by the Warrant Agent of the Warrant Certificate with the form of election to purchase Warrant Debt Securities set forth on the reverse side of the Warrant Certificate properly completed and duly executed. The date on which payment in full of the Warrant Price is received by the Warrant Agent shall, subject to receipt of the Warrant Certificate as aforesaid, be deemed to be the date on which the Warrant is exercised; provided, however, that if, at the date of receipt of such Warrant Certificates and payment in full of the Warrant Price, the transfer books for the Warrant Debt Securities purchasable upon the exercise of such Warrants shall be closed, no such receipt of such Warrant Certificates and no such payment of such Warrant Price shall be effective to constitute the person so designated to be named as the holder of record of such Warrant Debt Securities on such date, but shall be effective to constitute such person as the holder of record of such Warrant Debt Securities for all purposes at the opening of business on the next succeeding day on which the transfer books for the Warrant Debt Securities purchasable upon the exercise of such Warrants shall be opened, and the certificates for the Warrant Debt Securities in respect of which such Warrants are then exercised shall be issuable as of the date on such next succeeding day on which the transfer books shall next be opened, and until such date the Company shall be under no duty to deliver any certificate for such Warrant Debt Securities. The Warrant Agent shall deposit all funds received by it in payment of the Warrant Price in an account of the Company maintained with it and shall advise the Company by telephone at the end of each day on which a payment for the exercise of Warrants is received of the amount so deposited to its account. The Warrant Agent shall promptly confirm such telephone advice to the Company in writing.

(b) The Warrant Agent shall, from time to time, as promptly as practicable, advise the Company of (i) the number of Warrant Debt Securities with respect to which Warrants were exercised, (ii) the instructions of each holder of the Warrant Certificates evidencing such Warrants with respect to delivery of the Warrant Debt Securities to which such holder is entitled upon such exercise, (iii) delivery of Warrant Certificates evidencing the balance, if any, of the Warrants for the remaining Warrant Debt Securities after such exercise, and (iv) such other information as the Company or the Trustee shall reasonably require.

(c) As soon as practicable after the exercise of any Warrant, the Company shall issue pursuant to the Indenture, in authorized denominations, to or upon the order of the holder of the Warrant Certificate evidencing such Warrant the Warrant Debt Securities to which such holder is entitled, in fully registered form, registered in such name or names as may be directed by such holder. If fewer than all of the Warrants evidenced by such Warrant Certificate are exercised, the Company shall execute, and an authorized officer of the Warrant Agent shall manually countersign and deliver, a new Warrant Certificate evidencing Warrants for the number of Warrant Debt Securities remaining unexercised.

(d) The Company shall not be required to pay any stamp or other tax or other governmental charge required to be paid in connection with any transfer involved in the issue of the Warrant Debt Securities, and in the event that any such transfer is involved, the Company shall not be required to issue or deliver any Warrant Debt Securities until such tax or other charge shall have been paid or it has been established to the Company's satisfaction that no such tax or other charge is due.

(e) Prior to the issuance of any Warrants there shall have been reserved, and the Company shall at all times through the Expiration Date keep reserved, out of its authorized but unissued Warrant Debt Securities, a number of shares sufficient to provide for the exercise of the Warrants.

ARTICLE 3

OTHER PROVISIONS RELATING TO RIGHTS OF HOLDERS OF WARRANT CERTIFICATES

3.1 No Rights as Holder of Warrant Debt Securities Conferred by Warrants or Warrant Certificates. No Warrant Certificate or Warrant evidenced thereby shall entitle the holder thereof to any of the rights of a holder of Warrant Debt Securities, including, without limitation, the right to receive the payment of principal of (or premium, if any) or interest, if any, on the Warrant Debt Securities or to enforce any of the covenants in the Indenture.

3.2 Lost, Stolen, Mutilated or Destroyed Warrant Certificates. Upon receipt by the Warrant Agent of evidence reasonably satisfactory to it and the Company of the ownership of and the loss, theft, destruction or mutilation of any Warrant Certificate and/or indemnity reasonably satisfactory to the Warrant Agent and the Company and, in the case of mutilation, upon surrender of the mutilated Warrant Certificate to the Warrant Agent for cancellation, then, in the absence of notice to the Company or the Warrant Agent that such Warrant Certificate has been acquired by a bona fide purchaser, the Company shall execute, and an authorized officer of the Warrant Agent shall manually countersign and deliver, in exchange for or in lieu of the lost, stolen, destroyed or mutilated Warrant Certificate, a new Warrant Certificate of the same tenor and evidencing Warrants for a like principal amount of Warrant Debt Securities. Upon the issuance of any new Warrant Certificate under this Section 3.2, the Company may require the payment of a sum sufficient to cover any tax or other governmental charge that may be imposed in relation thereto and any other expenses (including the fees and expenses of the Warrant Agent) in connection therewith. Every substitute Warrant Certificate executed and delivered pursuant to this Section 3.2 in lieu of any lost, stolen or destroyed Warrant Certificate shall represent an additional contractual obligation of the Company, whether or not the lost, stolen or destroyed Warrant Certificate shall be at any time enforceable by anyone, and shall be entitled to the benefits of this Agreement equally and proportionately with any and all other Warrant Certificates duly executed and delivered hereunder. The provisions of this Section 3.2 are exclusive and shall preclude (to the extent lawful) all other rights and remedies with respect to the replacement of mutilated, lost, stolen or destroyed Warrant Certificates.

3.3 Holder of Warrant Certificate May Enforce Rights. Notwithstanding any of the provisions of this Agreement, any holder of a Warrant Certificate, without the consent of the Warrant Agent, the Trustee, the holder of any Warrant Debt Securities or the holder of any other Warrant Certificate, may, in such holder's own behalf and for such holder's own benefit, enforce, and may institute and maintain any suit, action or proceeding against the Company suitable to enforce, or otherwise in respect of, such holder's right to exercise the Warrants evidenced by such holder's Warrant Certificate in the manner provided in such holder's Warrant Certificates and in this Agreement.

3.4 Merger, Sale, Conveyance or Lease. In case of (a) any share exchange, merger or similar transaction of the Company with or into another person or entity (other than a share exchange, merger or similar transaction in which the Company is the acquiring or surviving corporation) or (b) the sale, exchange, lease, transfer or other disposition of all or substantially all of the properties and assets of the Company as an entirety (in any such case, a "*Reorganization Event*"), then, as a condition of such

Reorganization Event, lawful provisions shall be made, and duly executed documents evidencing the same from the Company's successor shall be delivered to the holders of the Warrants, so that such successor shall succeed to and be substituted for the Company, and assume all the Company's obligations under, this Agreement and the Warrants. The Company shall thereupon be relieved of any further obligation hereunder or under the Warrants, and the Company as the predecessor corporation may thereupon or at any time thereafter be dissolved, wound up or liquidated. Such successor or assuming entity thereupon may cause to be signed, and may issue either in its own name or in the name of the Company, any or all of the Warrants issuable hereunder which heretofore shall not have been signed by the Company, and may execute and deliver securities in its own name, in fulfillment of its obligations to deliver Warrant Debt Securities upon exercise of the Warrants. All the Warrants so issued shall in all respects have the same legal rank and benefit under this Agreement as the Warrants theretofore or thereafter issued in accordance with the terms of this Agreement as though all of such Warrants had been issued at the date of the execution hereof. In any case of any such Reorganization Event, such changes in phraseology and form (but not in substance) may be made in the Warrants thereafter to be issued as may be appropriate. The Warrant Agent may receive a written opinion of legal counsel as conclusive evidence that any such Reorganization Event complies with the provisions of this Section 3.4.

3.5 Notice to Warrant Holders. In case the Company shall (a) effect any Reorganization Event or (b) make any distribution on or in respect of the [title of Warrant Debt Securities] in connection with the dissolution, liquidation or winding up of the Company, then the Company shall mail to each holder of Warrants at such holder's address as it shall appear on the books of the Warrant Agent, at least ten days prior to the applicable date hereinafter specified, a notice stating the date on which such Reorganization Event, dissolution, liquidation or winding up is expected to become effective, and the date as of which it is expected that holders of [title of Warrant Debt Securities] of record shall be entitled to exchange their shares of [title of Warrant Debt Securities] for securities or other property deliverable upon such Reorganization Event, dissolution, liquidation or winding up. No failure to mail such notice nor any defect therein or in the mailing thereof shall affect any such transaction.

ARTICLE 4

EXCHANGE AND TRANSFER OF WARRANT CERTIFICATES

4.1 Exchange and Transfer of Warrant Certificates. Upon surrender at the corporate trust office of the Warrant Agent, Warrant Certificates evidencing Warrants may be exchanged for Warrant Certificates in other denominations evidencing such Warrants or the transfer thereof may be registered in whole or in part; provided that such other Warrant Certificates evidence Warrants for the same aggregate principal amount of Warrant Debt Securities as the Warrant Certificates so surrendered. The Warrant Agent shall keep, at its corporate trust office, books in which, subject to such reasonable regulations as it may prescribe, it shall register Warrant Certificates and exchanges and transfers of outstanding Warrant Certificates, upon surrender of the Warrant Certificates to the Warrant Agent at its corporate trust office for exchange or registration of transfer, properly endorsed or accompanied by appropriate instruments of registration of transfer and written instructions for transfer, all in form satisfactory to the Company and the Warrant Agent. No service charge shall be made for any exchange or registration of transfer of Warrant Certificates, but the Company may require payment of a sum sufficient to cover any stamp or other tax or other governmental charge that may be imposed in connection with any such exchange or registration of transfer. Whenever any Warrant Certificates are so surrendered for exchange or registration of transfer, an authorized officer of the Warrant Agent shall manually countersign and deliver to the person or persons entitled thereto a Warrant Certificate or Warrant Certificates duly authorized and executed by the Company, as so requested. The Warrant Agent shall not be required to effect any exchange or registration of transfer which will result in the issuance of a Warrant Certificate evidencing a Warrant for a fraction of a Warrant Debt Security or a number of Warrants for a whole number of Warrant Debt Securities and a fraction of a

Warrant Debt Security. All Warrant Certificates issued upon any exchange or registration of transfer of Warrant Certificates shall be the valid obligations of the Company, evidencing the same obligations and entitled to the same benefits under this Agreement as the Warrant Certificate surrendered for such exchange or registration of transfer.

4.2 Treatment of Holders of Warrant Certificates. The Company, the Warrant Agent and all other persons may treat the registered holder of a Warrant Certificate as the absolute owner thereof for any purpose and as the person entitled to exercise the rights represented by the Warrants evidenced thereby, any notice to the contrary notwithstanding.

4.3 Cancellation of Warrant Certificates. Any Warrant Certificate surrendered for exchange, registration of transfer or exercise of the Warrants evidenced thereby shall, if surrendered to the Company, be delivered to the Warrant Agent and all Warrant Certificates surrendered or so delivered to the Warrant Agent shall be promptly canceled by the Warrant Agent and shall not be reissued and, except as expressly permitted by this Agreement, no Warrant Certificate shall be issued hereunder in exchange therefor or in lieu thereof. The Warrant Agent shall deliver to the Company from time to time or otherwise dispose of canceled Warrant Certificates in a manner satisfactory to the Company.

ARTICLE 5

CONCERNING THE WARRANT AGENT

5.1 Warrant Agent. The Company hereby appoints [●] as Warrant Agent of the Company in respect of the Warrants and the Warrant Certificates upon the terms and subject to the conditions herein set forth, and [●] hereby accepts such appointment. The Warrant Agent shall have the powers and authority granted to and conferred upon it in the Warrant Certificates and hereby and such further powers and authority to act on behalf of the Company as the Company may hereafter grant to or confer upon it. All of the terms and provisions with respect to such powers and authority contained in the Warrant Certificates are subject to and governed by the terms and provisions hereof.

5.2 Conditions of Warrant Agent's Obligations. The Warrant Agent accepts its obligations herein set forth upon the terms and conditions hereof, including the following to all of which the Company agrees and to all of which the rights hereunder of the holders from time to time of the Warrant Certificates shall be subject:

(a) **Compensation and Indemnification.** The Company agrees promptly to pay the Warrant Agent the compensation to be agreed upon with the Company for all services rendered by the Warrant Agent and to reimburse the Warrant Agent for reasonable out-of-pocket expenses (including reasonable counsel fees) incurred without negligence, bad faith or willful misconduct by the Warrant Agent in connection with the services rendered hereunder by the Warrant Agent. The Company also agrees to indemnify the Warrant Agent for, and to hold it harmless against, any loss, liability or expense incurred without negligence, bad faith or willful misconduct on the part of the Warrant Agent, arising out of or in connection with its acting as Warrant Agent hereunder, including the reasonable costs and expenses of defending against any claim of such liability.

(b) **Agent for the Company.** In acting under this Agreement and in connection with the Warrant Certificates, the Warrant Agent is acting solely as agent of the Company and does not assume any obligations or relationship of agency or trust for or with any of the holders of Warrant Certificates or beneficial owners of Warrants.

(c) **Counsel.** The Warrant Agent may consult with counsel satisfactory to it, which may include counsel for the Company, and the written advice of such counsel shall be full and complete authorization and protection in respect of any action taken, suffered or omitted by it hereunder in good faith and in accordance with the advice of such counsel.

(d) **Documents.** The Warrant Agent shall be protected and shall incur no liability for or in respect of any action taken or omitted by it in reliance upon any Warrant Certificate, notice, direction, consent, certificate, affidavit, statement or other paper or document reasonably believed by it to be genuine and to have been presented or signed by the proper parties.

(e) **Certain Transactions.** The Warrant Agent, and its officers, directors and employees, may become the owner of, or acquire any interest in, Warrants, with the same rights that it or they would have if it were not the Warrant Agent hereunder, and, to the extent permitted by applicable law, it or they may engage or be interested in any financial or other transaction with the Company and may act on, or as depository, trustee or agent for, any committee or body of holders of Warrant Debt Securities or other obligations of the Company as freely as if it were not the Warrant Agent hereunder. Nothing in this Agreement shall be deemed to prevent the Warrant Agent from acting as trustee under any indenture to which the Company is a party, including, without limitation, as Trustee under the Indenture.

(f) **No Liability for Interest.** Unless otherwise agreed with the Company, the Warrant Agent shall have no liability for interest on any monies at any time received by it pursuant to any of the provisions of this Agreement or of the Warrant Certificates.

(g) **No Liability for Invalidity.** The Warrant Agent shall have no liability with respect to any invalidity of this Agreement or any of the Warrant Certificates (except as to the Warrant Agent's countersignature thereon).

(h) **No Responsibility for Representations.** The Warrant Agent shall not be responsible for any of the recitals or representations herein or in the Warrant Certificates (except as to the Warrant Agent's countersignature thereon), all of which are made solely by the Company.

(i) **No Implied Obligations.** The Warrant Agent shall be obligated to perform only such duties as are herein and in the Warrant Certificates specifically set forth and no implied duties or obligations shall be read into this Agreement or the Warrant Certificates against the Warrant Agent. The Warrant Agent shall not be under any obligation to take any action hereunder which may tend to involve it in any expense or liability, the payment of which within a reasonable time is not, in its reasonable opinion, assured to it. The Warrant Agent shall not be accountable or under any duty or responsibility for the use by the Company of any of the Warrant Certificates authenticated by the Warrant Agent and delivered by it to the Company pursuant to this Agreement or for the application by the Company of the proceeds of the Warrant Certificates. The Warrant Agent shall have no duty or responsibility in case of any default by the Company in the performance of its covenants or agreements contained herein or in the Warrant Certificates or in the case of the receipt of any written demand from a holder of a Warrant Certificate with respect to such default, including, without limiting the generality of the foregoing, any duty or responsibility to initiate or attempt to initiate any proceedings at law or otherwise or, except as provided in Section 6.2 hereof, to make any demand upon the Company.

5.3 Resignation, Removal and Appointment of Successors.

(a) The Company agrees, for the benefit of the holders from time to time of the Warrant Certificates, that there shall at all times be a Warrant Agent hereunder until all the Warrants have been exercised or are no longer exercisable.

(b) The Warrant Agent may at any time resign as agent by giving written notice to the Company of such intention on its part, specifying the date on which its desired resignation shall become effective; provided that such date shall not be less than three months after the date on which such notice is given unless the Company otherwise agrees. The Warrant Agent hereunder may be removed at any time by the filing with it of an instrument in writing signed by or on behalf of the Company and specifying such removal and the intended date when it shall become effective. Such resignation or removal shall take effect upon the appointment by the Company, as hereinafter provided, of a successor Warrant Agent (which shall be a bank or trust company authorized under the laws of the jurisdiction of its organization to exercise corporate trust powers) and the acceptance of such appointment by such successor Warrant Agent. The obligation of the Company under Section 5.2(a) shall continue to the extent set forth therein notwithstanding the resignation or removal of the Warrant Agent.

(c) In case at any time the Warrant Agent shall resign, or shall be removed, or shall become incapable of acting, or shall be adjudged a bankrupt or insolvent, or shall commence a voluntary case under the Federal bankruptcy laws, as now or hereafter constituted, or under any other applicable Federal or state bankruptcy, insolvency or similar law or shall consent to the appointment of or taking possession by a receiver, custodian, liquidator, assignee, trustee, sequestrator (or other similar official) of the Warrant Agent or its property or affairs, or shall make an assignment for the benefit of creditors, or shall admit in writing its inability to pay its debts generally as they become due, or shall take corporate action in furtherance of any such action, or a decree or order for relief by a court having jurisdiction in the premises shall have been entered in respect of the Warrant Agent in an involuntary case under the Federal bankruptcy laws, as now or hereafter constituted, or any other applicable Federal or state bankruptcy, insolvency or similar law, or a decree or order by a court having jurisdiction in the premises shall have been entered for the appointment of a receiver, custodian, liquidator, assignee, trustee, sequestrator (or similar official) of the Warrant Agent or of its property or affairs, or any public officer shall take charge or control of the Warrant Agent or of its property or affairs for the purpose of rehabilitation, conservation, winding up or liquidation, a successor Warrant Agent, qualified as aforesaid, shall be appointed by the Company by an instrument in writing, filed with the successor Warrant Agent. Upon the appointment as aforesaid of a successor Warrant Agent and acceptance by the successor Warrant Agent of such appointment, the Warrant Agent shall cease to be Warrant Agent hereunder.

(d) Any successor Warrant Agent appointed hereunder shall execute, acknowledge and deliver to its predecessor and to the Company an instrument accepting such appointment hereunder, and thereupon such successor Warrant Agent, without any further act, deed or conveyance, shall become vested with all the authority, rights, powers, trusts, immunities, duties and obligations of such predecessor with like effect as if originally named as Warrant Agent hereunder, and such predecessor, upon payment of its charges and disbursements then unpaid, shall thereupon become obligated to transfer, deliver and pay over, and such successor Warrant Agent shall be entitled to receive, all monies, securities and other property on deposit with or held by such predecessor, as Warrant Agent hereunder.

(e) Any corporation into which the Warrant Agent hereunder may be merged or converted or any corporation with which the Warrant Agent may be consolidated, or any corporation resulting from any merger, conversion or consolidation to which the Warrant Agent shall be a party, or any corporation to which the Warrant Agent shall sell or otherwise transfer all or substantially all the assets and business of the Warrant Agent, provided that it shall be qualified as aforesaid, shall be the successor Warrant Agent under this Agreement without the execution or filing of any paper or any further act on the part of any of the parties hereto.

ARTICLE 6

MISCELLANEOUS

6.1 Amendment. This Agreement may be amended by the parties hereto, without the consent of the holder of any Warrant Certificate, for the purpose of curing any ambiguity, or of curing, correcting or supplementing any defective provision contained herein, or making any other provisions with respect to matters or questions arising under this Agreement as the Company and the Warrant Agent may deem necessary or desirable; provided that such action shall not materially adversely affect the interests of the holders of the Warrant Certificates.

6.2 Notices and Demands to the Company and Warrant Agent. If the Warrant Agent shall receive any notice or demand addressed to the Company by the holder of a Warrant Certificate pursuant to the provisions of the Warrant Certificates, the Warrant Agent shall promptly forward such notice or demand to the Company.

6.3 Addresses. Any communication from the Company to the Warrant Agent with respect to this Agreement shall be addressed to [●], Attention: [●] and any communication from the Warrant Agent to the Company with respect to this Agreement shall be addressed to Personalis, Inc., 1330 O'Brien Drive, Menlo Park, CA 94025, Attention: [●] (or such other address as shall be specified in writing by the Warrant Agent or by the Company).

6.4 Governing Law. This Agreement and each Warrant Certificate issued hereunder shall be governed by and construed in accordance with the laws of the State of New York.

6.5 Delivery of Prospectus. The Company shall furnish to the Warrant Agent sufficient copies of a prospectus meeting the requirements of the Securities Act of 1933, as amended, relating to the Warrant Debt Securities deliverable upon exercise of the Warrants (the "*Prospectus*"), and the Warrant Agent agrees that upon the exercise of any Warrant, the Warrant Agent will deliver to the holder of the Warrant Certificate evidencing such Warrant, prior to or concurrently with the delivery of the Warrant Debt Securities issued upon such exercise, a Prospectus. The Warrant Agent shall not, by reason of any such delivery, assume any responsibility for the accuracy or adequacy of such Prospectus.

6.6 Obtaining of Governmental Approvals. The Company will from time to time take all action which may be necessary to obtain and keep effective any and all permits, consents and approvals of governmental agencies and authorities and securities act filings under United States Federal and state laws (including without limitation a registration statement in respect of the Warrants and Warrant Debt Securities under the Securities Act of 1933, as amended), which may be or become requisite in connection with the issuance, sale, transfer, and delivery of the Warrant Debt Securities issued upon exercise of the Warrants, the issuance, sale, transfer and delivery of the Warrants or upon the expiration of the period during which the Warrants are exercisable.

6.7 Persons Having Rights under the Agreement. Nothing in this Agreement shall give to any person other than the Company, the Warrant Agent and the holders of the Warrant Certificates any right, remedy or claim under or by reason of this Agreement.

6.8 Headings. The descriptive headings of the several Articles and Sections of this Agreement are inserted for convenience only and shall not control or affect the meaning or construction of any of the provisions hereof.

6.9 Counterparts. This Agreement may be executed in any number of counterparts, each of which as so executed shall be deemed to be an original, but such counterparts shall together constitute but one and the same instrument.

6.10 Inspection of Agreement. A copy of this Agreement shall be available at all reasonable times at the principal corporate trust office of the Warrant Agent for inspection by the holder of any Warrant Certificate. The Warrant Agent may require such holder to submit such holder's Warrant Certificate for inspection by it.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be duly executed as of the day and year first above written.

PERSONALIS, INC., as Company

By: _____
Name: _____
Title: _____

ATTEST: _____

COUNTERSIGNED

[●], as Warrant Agent

By: _____
Name: _____
Title: _____

ATTEST: _____

[SIGNATURE PAGE TO PERSONALIS, INC. DEBT SECURITIES WARRANT AGREEMENT]

EXHIBIT A

**FORM OF WARRANT CERTIFICATE
[FACE OF WARRANT CERTIFICATE]**

[Form of Legend if Warrants are not immediately exercisable.]

[Prior to [●], Warrants evidenced by this Warrant Certificate cannot be exercised.]

EXERCISABLE ONLY IF COUNTERSIGNED BY THE WARRANT AGENT AS PROVIDED HEREIN

VOID AFTER [●] P.M., [City] time, ON [●].

PERSONALIS, INC.
WARRANT CERTIFICATE REPRESENTING
WARRANTS TO PURCHASE
[TITLE OF WARRANT DEBT SECURITIES]

No. [●]

[●] Warrants

This certifies that [●] or registered assigns is the registered owner of the above indicated number of Warrants, each Warrant entitling such owner to purchase, at any time [after [●] p.m., [City] time, [on [●] and] on or before [●] p.m., [City] time, on [●], \$[●] principal amount of [TITLE OF WARRANT DEBT SECURITIES] (the "*Warrant Debt Securities*"), of Personalis, Inc. (the "*Company*") issued or to be issued under the Indenture (as hereinafter defined), on the following basis: during the period from [●], through and including [●], each Warrant shall entitle the Holder thereof, subject to the provisions of this Agreement, to purchase the principal amount of Warrant Debt Securities stated in the Warrant Certificate at the warrant price (the "*Warrant Price*") of [●]% of the principal amount thereof [plus accrued amortization, if any, of the original issue discount of the Warrant Debt Securities] [plus accrued interest, if any, from the most recent date from which interest shall have been paid on the Warrant Debt Securities or, if no interest shall have been paid on the Warrant Debt Securities, from the date of their original issuance]. [The original issue discount (\$[●] for each \$1,000 principal amount of Warrant Debt Securities) will be amortized at a [●]% annual rate, computed on a[n] [semi-]annual basis [using a 360-day year consisting of twelve 30-day months]. The Holder may exercise the Warrants evidenced hereby by providing certain information set forth on the back hereof and by paying in full, in lawful money of the United States of America, [in cash or by certified check or official bank check in New York Clearing House funds] [by bank wire transfer in immediately available funds], the Warrant Price for each Warrant Debt Security with respect to which this Warrant is exercised to the Warrant Agent (as hereinafter defined) and by surrendering this Warrant Certificate, with the purchase form on the back hereof duly executed, at the corporate trust office of [name of Warrant Agent], or its successor as warrant agent (the "*Warrant Agent*"), which is, on the date hereof, at the address specified on the reverse hereof, and upon compliance with and subject to the conditions set forth herein and in the Warrant Agreement (as hereinafter defined).

The term "*Holder*" as used herein shall mean the person in whose name at the time this Warrant Certificate shall be registered upon the books to be maintained by the Warrant Agent for that purpose pursuant to Section 4 of the Warrant Agreement.

The Warrants evidenced by this Warrant Certificate may be exercised to purchase Warrant Debt Securities in the principal amount of \$1,000 or any integral multiple thereof in registered form. Upon any exercise of fewer than all of the Warrants evidenced by this Warrant Certificate, there shall be issued to the Holder hereof a new Warrant Certificate evidencing Warrants for the aggregate principal amount of Warrant Debt Securities remaining unexercised.

This Warrant Certificate is issued under and in accordance with the Warrant Agreement dated as of [●] (the "*Warrant Agreement*"), between the Company and the Warrant Agent and is subject to the terms and provisions contained in the Warrant Agreement, to all of which terms and provisions the Holder of this Warrant Certificate consents by acceptance hereof. Copies of the Warrant Agreement are on file at the above-mentioned office of the Warrant Agent.

The Warrant Debt Securities to be issued and delivered upon the exercise of Warrants evidenced by this Warrant Certificate will be issued under and in accordance with an Indenture, dated as of [●] (the “*Indenture*”), between the Company and [●], as trustee (such trustee, and any successors to such trustee, the “*Trustee*”) and will be subject to the terms and provisions contained in the Warrant Debt Securities and in the Indenture. Copies of the Indenture, including the form of the Warrant Debt Securities, are on file at the corporate trust office of the Trustee.

Transfer of this Warrant Certificate may be registered when this Warrant Certificate is surrendered at the corporate trust office of the Warrant Agent by the registered owner or such owner’s assigns, in the manner and subject to the limitations provided in the Warrant Agreement.

After countersignature by the Warrant Agent and prior to the expiration of this Warrant Certificate, this Warrant Certificate may be exchanged at the corporate trust office of the Warrant Agent for Warrant Certificates representing Warrants for the same aggregate principal amount of Warrant Debt Securities.

This Warrant Certificate shall not entitle the Holder hereof to any of the rights of a holder of the Warrant Debt Securities, including, without limitation, the right to receive payments of principal of (and premium, if any) or interest, if any, on the Warrant Debt Securities or to enforce any of the covenants of the Indenture.

Reference is hereby made to the further provisions of this Warrant Certificate set forth on the reverse hereof, which further provisions shall for all purposes have the same effect as if set forth at this place.

This Warrant Certificate shall not be valid or obligatory for any purpose until countersigned by the Warrant Agent.

IN WITNESS WHEREOF, the Company has caused this Warrant to be executed in its name and on its behalf by the facsimile signatures of its duly authorized officers.

Dated:

PERSONALIS, INC., as Company

By: _____
Name: _____
Title: _____

ATTEST: _____

COUNTERSIGNED

[●], as Warrant Agent

By: _____
Name: _____
Title: _____

ATTEST: _____

[REVERSE OF WARRANT CERTIFICATE]

(Instructions for Exercise of Warrant)

To exercise any Warrants evidenced hereby for Warrant Debt Securities (as hereinafter defined), the Holder must pay, in lawful money of the United States of America, [in cash or by certified check or official bank check in New York Clearing House funds] [by bank wire transfer in immediately available funds], the Warrant Price in full for Warrants exercised, to [●] [address of Warrant Agent], Attention: [●], which payment must specify the name of the Holder and the number of Warrants exercised by such Holder. In addition, the Holder must complete the information required below and present this Warrant Certificate in person or by mail (certified or registered mail is recommended) to the Warrant Agent at the appropriate address set forth above. This Warrant Certificate, completed and duly executed, must be received by the Warrant Agent within five business days of the payment.

(To be executed upon exercise of Warrants)

The undersigned hereby irrevocably elects to exercise _____ Warrants, evidenced by this Warrant Certificate, to purchase \$[●] principal amount of the [TITLE OF WARRANT DEBT SECURITIES] (the "*Warrant Debt Securities*"), of Personalis, Inc. and represents that the undersigned has tendered payment for such Warrant Debt Securities, in lawful money of the United States of America, [in cash or by certified check or official bank check in New York Clearing House funds] [by bank wire transfer in immediately available funds], to the order of Personalis, Inc., c/o [insert name and address of Warrant Agent], in the amount of \$ _____ in accordance with the terms hereof. The undersigned requests that said principal amount of Warrant Debt Securities be in fully registered form in the authorized denominations, registered in such names and delivered all as specified in accordance with the instructions set forth below.

If the number of Warrants exercised is less than all of the Warrants evidenced hereby, the undersigned requests that a new Warrant Certificate evidencing the Warrants for the aggregate principal amount of Warrant Debt Securities remaining unexercised be issued and delivered to the undersigned unless otherwise specified in the instructions below.

Dated: _____ Name: _____
Please Print

Address: _____

(Insert Social Security or Other Identifying Number of Holder)

Signature Guaranteed: _____
Signature

(Signature must conform in all respects to name of holder as specified on the face of this Warrant Certificate and must bear a signature guarantee by a FINRA member firm).

This Warrant may be exercised at the following addresses: By hand at:

[●]

By mail at:

[Instructions as to form and delivery of Warrant Debt Securities and, if applicable, Warrant Certificates evidencing Warrants for the number of Warrant Debt Securities remaining unexercised — complete as appropriate.]

ASSIGNMENT

[Form of assignment to be executed if Warrant Holder desires to transfer Warrant]

FOR VALUE RECEIVED, _____ hereby sells, assigns and transfers unto:

(Please print name and address including zip code)

Please print Social Security or other identifying number

the right represented by the within Warrant to purchase _____ aggregate principal amount of [Title of Warrant Debt Securities] of Personalis, Inc., to which the within Warrant relates and appoints _____ attorney to transfer such right on the books of the Warrant Agent with full power of substitution in the premises.

Dated: _____

Name: _____

Signature

(Signature must conform in all respects to name of holder as specified on the face of the Warrant)

Signature Guaranteed



Michael E. Tenta
T: +1 650 843 5636
mtenta@cooley.com

December 30, 2020

Personalis, Inc.
1330 O'Brien Drive
Menlo Park, CA 94025

Ladies and Gentlemen:

We have acted as counsel to Personalis, Inc., a Delaware corporation (the "**Company**"), in connection with the filing of a Registration Statement on Form S-3 (the "**Registration Statement**") by the Company under the Securities Act of 1933, as amended (the "**Securities Act**"). The Registration Statement includes a prospectus (the "**Base Prospectus**") that provides it will be supplemented in the future by one or more prospectus supplements (each, a "**Prospectus Supplement**"). The Registration Statement, including the Base Prospectus (as supplemented from time to time by one or more Prospectus Supplements), will provide for the registration of:

- shares of common stock, par value \$0.0001 per share, of the Company (the "**Common Stock**") to be sold by the Company;
- shares of preferred stock, par value \$0.0001 per share, of the Company (the "**Preferred Stock**") to be sold by the Company;
- debt securities, in one or more series (the "**Debt Securities**"), which may be issued pursuant to an indenture to be dated on or about the date of the first issuance of Debt Securities thereunder, by and between a trustee to be selected by the Company (the "**Trustee**") and the Company, in the form filed as Exhibit 4.4 to the Registration Statement and one or more indentures supplemental thereto with respect to any particular series of Debt Securities (the "**Indenture**") to be sold by the Company;
- warrants to purchase Common Stock, Preferred Stock, or Debt Securities (the "**Warrants**"), which may be issued under one or more warrant agreements, to be dated on or about the date of the first issuance of the Warrants thereunder, by and between a warrant agent to be selected by the Company (the "**Warrant Agent**") and the Company, in the forms filed as Exhibits 4.6, 4.7 and 4.8 to the Registration Statement, respectively (each, a "**Warrant Agreement**"), to be sold by the Company; and
- the resale of up to 1,774,240 shares (the "**Resale Shares**") of Common Stock currently held by certain selling stockholders to be identified in one or more Prospectus Supplements.

The Common Stock, the Preferred Stock, the Debt Securities and the Warrants, plus any additional Common Stock, Preferred Stock, Debt Securities and Warrants that may be registered pursuant to any registration statement that the Company may hereafter file with the Securities and Exchange Commission pursuant to Rule 462(b) under the Securities Act in connection with an offering by the Company pursuant to the Registration Statement, are collectively referred to herein as the "**Securities**." The Securities and the Resale Shares are being registered for offer and sale from time to time pursuant to Rule 415 under the Securities Act.

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In connection with this opinion, we have examined and relied upon originals, or copies certified to our satisfaction, of such records, documents, certificates, opinions, memoranda and other instruments as in our judgment are necessary or appropriate to enable us to render the opinion expressed below. As to certain factual matters, we have relied upon a certificate of an officer of the Company and have not independently verified such matters.

In rendering this opinion, we have assumed the genuineness and authenticity of all signatures on original documents; the authenticity of all documents submitted to us as originals; the conformity to originals of all documents submitted to us as copies; the accuracy, completeness and authenticity of certificates of public officials; and the due authorization, execution and delivery of all documents where authorization, execution and delivery are prerequisites to the effectiveness of such documents.

With respect to our opinion as to the Common Stock, we have assumed that, at the time of issuance and sale, a sufficient number of shares of Common Stock is authorized and available for issuance and that the consideration for the issuance and sale of the Common Stock (or Preferred Stock or Debt Securities convertible into, or Warrants exercisable for, Common Stock) is in an amount that is not less than the par value of the Common Stock. With respect to our opinion as to the Preferred Stock, we have assumed that, at the time of issuance and sale, a sufficient number of shares of Preferred Stock is authorized, designated and available for issuance and that the consideration for the issuance and sale of the Preferred Stock (or Debt Securities convertible into, or Warrants exercisable for, Preferred Stock) is in an amount that is not less than the par value of the Preferred Stock. We have also assumed that any Debt Securities or Warrants offered under the Registration Statement, and the related Indenture and Warrant Agreement are executed in the forms filed as exhibits to the Registration Statement or incorporated by reference therein. We have also assumed that (i) with respect to Securities issuable upon conversion of any convertible Preferred Stock, such convertible Preferred Stock is duly authorized, validly issued, fully paid and non-assessable; and (ii) with respect to any Securities issuable upon conversion of any convertible Debt Securities or upon exercise of any Warrants, such convertible Debt Securities or Warrants constitute valid and legally binding obligations of the Company, enforceable against the Company in accordance with their terms, except as enforcement may be limited by applicable bankruptcy, insolvency, reorganization, arrangement, moratorium or other similar laws affecting creditors' rights, and subject to general equity principles and to limitations on availability of equitable relief, including specific performance.

Our opinion herein is expressed solely with respect to the General Corporation Law of the State of Delaware and, as to the Debt Securities and the Warrants constituting valid and legally binding obligations of the Company, the laws of the State of New York. Our opinion is based on these laws as in effect on the date hereof. We express no opinion to the extent that any other laws are applicable to the subject matter hereof and express no opinion and provide no assurance as to compliance with any federal or state securities law, rule or regulation.

On the basis of the foregoing and in reliance thereon, and subject to the qualifications herein stated, we are of the opinion that:

1. With respect to the Common Stock offered under the Registration Statement, provided that (i) the Registration Statement and any required post-effective amendment thereto have become effective under the Securities Act and the Base Prospectus and any and all Prospectus Supplement(s) required by applicable laws have been delivered and filed as required by such laws; (ii) the issuance of the Common Stock has been duly authorized by all necessary corporate action on the part of the Company; (iii) the issuance and sale of the Common Stock do not violate any applicable law, are in conformity with the Company's then operative certificate of incorporation (the "*Certificate of Incorporation*") and bylaws (the "*Bylaws*"), do not result in a default under or breach of any agreement or instrument binding upon the

Company and comply with any applicable requirement or restriction imposed by any court or governmental body having jurisdiction over the Company; and (iv) the certificates, if any, for the Common Stock have been duly executed by the Company, countersigned by the transfer agent therefor and duly delivered to the purchasers thereof against payment therefor, then the Common Stock, when issued and sold as contemplated in the Registration Statement, the Base Prospectus and the related Prospectus Supplement(s), and in accordance with a duly authorized, executed and delivered purchase, underwriting or similar agreement, or upon conversion of any convertible Preferred Stock or convertible Debt Securities in accordance with their terms, or upon exercise of any Warrants in accordance with their terms, will be validly issued, fully paid and non-assessable.

2. With respect to the Preferred Stock offered under the Registration Statement, provided that (i) the Registration Statement and any required post-effective amendment thereto have become effective under the Securities Act and the Base Prospectus and any and all Prospectus Supplement(s) required by applicable laws have been delivered and filed as required by such laws; (ii) the terms and issuance of the Preferred Stock have been duly authorized by all necessary corporate action on the part of the Company; (iii) the terms of the shares of Preferred Stock and their issuance and sale do not violate any applicable law, are in conformity with the Certificate of Incorporation and the Bylaws, do not result in a default under or breach of any agreement or instrument binding upon the Company and comply with any applicable requirement or restriction imposed by any court or governmental body having jurisdiction over the Company; and (iv) the certificates, if any, for the Preferred Stock have been duly executed by the Company, countersigned by the transfer agent therefor and duly delivered to the purchasers thereof against payment therefor, then the Preferred Stock, when issued and sold as contemplated in the Registration Statement, the Base Prospectus and the related Prospectus Supplement(s) and in accordance with a duly authorized, executed and delivered purchase, underwriting or similar agreement, or upon conversion of any convertible Debt Securities in accordance with their terms, or upon exercise of any Warrants in accordance with their terms, will be validly issued, fully paid and non-assessable.

3. With respect to any series of the Debt Securities issued under the Indenture and offered under the Registration Statement, provided that (i) the Registration Statement and any required post-effective amendment thereto have become effective under the Securities Act and the Base Prospectus and any and all Prospectus Supplement(s) required by applicable laws have been delivered and filed as required by such laws; (ii) the Indenture has been duly authorized by the Company and the Trustee by all necessary corporate action; (iii) the Indenture in substantially the form filed as an exhibit to the Registration Statement, has been duly executed and delivered by the Company and the Trustee and has been qualified under the Trust Indenture Act of 1939, as amended; (iv) the issuance and terms of the Debt Securities have been duly authorized by the Company by all necessary corporate action; (v) the terms of the Debt Securities and of their issuance and sale have been duly established in conformity with the Indenture so as not to violate any applicable law or result in a default under or breach of any agreement or instrument binding upon the Company, so as to be in conformity with the Certificate of Incorporation and the Bylaws, and so as to comply with any requirement or restriction imposed by any court or governmental body having jurisdiction over the Company; and (vi) the notes representing the Debt Securities have been duly executed and delivered by the Company and authenticated by the Trustee pursuant to the Indenture and delivered against payment therefor, then the Debt Securities, when issued and sold in accordance with the Indenture and a duly authorized, executed and delivered purchase, underwriting or similar agreement, or upon exercise of any Warrants in accordance with their terms, will be valid and legally binding obligations of the Company, except as may be limited by bankruptcy, insolvency, reorganization, moratorium or other similar laws relating to or affecting creditors' rights generally, and by general equitable principles (regardless of whether considered in a proceeding at law or in equity).

4. With respect to the Warrants issued under the Warrant Agreements and offered under the Registration Statement, provided that (i) the Registration Statement and any required post-effective amendment thereto have become effective under the Securities Act and the Base Prospectus and any and all Prospectus Supplement(s) required by applicable laws have been delivered and filed as required by such laws; (ii) the applicable Warrant Agreement has been duly authorized by the Company and the Warrant Agent by all necessary corporate action; (iii) the applicable Warrant Agreement has been duly executed and delivered by the Company and the Warrant Agent; (iv) the issuance and terms of the Warrants have been duly authorized by the Company by all necessary corporate action; (v) the terms of the Warrants and of their issuance and sale have been duly established in conformity with the applicable Warrant Agreement and as described in the Registration Statement, the Base Prospectus and the related Prospectus Supplement(s), so as not to violate any applicable law or result in a default under or breach of any agreement or instrument binding upon the Company, so as to be in conformity with the Certificate of Incorporation and the Bylaws, and so as to comply with any requirement or restriction imposed by any court or governmental body having jurisdiction over the Company; and (vi) the Warrants have been duly executed and delivered by the Company and authenticated by the Warrant Agent pursuant to the applicable Warrant Agreement and delivered against payment therefor, then the Warrants, when issued and sold as contemplated in the Registration Statement, the Base Prospectus and the Prospectus Supplement(s) and in accordance with the applicable Warrant Agreement and a duly authorized, executed and delivered purchase, underwriting or similar agreement, will be valid and legally binding obligations of the Company, except as may be limited by bankruptcy, insolvency, reorganization, moratorium or other similar laws relating to or affecting creditors' rights generally, and by general equitable principles (regardless of whether considered in a proceeding at law or in equity).

5. The Resale Shares have been validly issued and are fully paid and non-assessable.

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December 30, 2020

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We hereby consent to the filing of this opinion as an exhibit to the Registration Statement and to the reference to our firm under the caption “Legal Matters” in the Base Prospectus. We further consent to the incorporation by reference of this opinion into any registration statement filed pursuant to Rule 462(b) under the Securities Act with respect to additional Securities.

Our opinion set forth above is limited to the matters expressly set forth in this letter, and no opinion is implied or may be inferred beyond the matters expressly stated. This opinion speaks only as to law and facts in effect or existing as of the date hereof, and we undertake no obligation or responsibility to update or supplement this opinion to reflect any facts or circumstances that may hereafter come to our attention or any changes in law that may hereafter occur.

Very truly yours,

COOLEY LLP

By: /s/ Michael E. Tenta

Michael E. Tenta

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CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in this Registration Statement on Form S-3 of our report dated March 25, 2020, relating to the consolidated financial statements of Personalis, Inc. and subsidiary (the “Company”), appearing in the Annual Report on Form 10-K of the Company for the year ended December 31, 2019. We also consent to the reference to us under the heading “Experts” in such Registration Statement.

/s/ DELOITTE & TOUCHE LLP

San Jose, California
December 30, 2020