

NANOMETRICS INC
Form 424B2
December 17, 2009
Table of Contents

The information in this prospectus supplement and the accompanying prospectus is not complete and may be changed. This prospectus supplement and the accompanying prospectus are not an offer to sell these securities and are not soliciting an offer to buy these securities in any jurisdiction where the offer or sale is not permitted.

SUBJECT TO COMPLETION, DATED DECEMBER 16, 2009

Filed pursuant to Rule 424(b)(2)
Registration Statement No. 333-163168

PRELIMINARY PROSPECTUS SUPPLEMENT

(To Prospectus dated November 23, 2009)

Shares

NANOMETRICS INCORPORATED

Common Stock

\$ per share

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

Trading symbol: NASDAQ Global Market NANO

On December 15, 2009, the last reported sale price of our common stock on the NASDAQ Global Market was \$12.39.

Investing in our common stock involves a high degree of risk. Please read **Risk Factors** beginning on page S-4.

	Per Share	Total
Public Offering Price	\$	\$
Underwriting Discounts and Commissions	\$	\$
Proceeds to Nanometrics (Before Expenses)	\$	\$
Proceeds to the Selling Stockholder (Before Expenses)	\$	\$

We have granted the underwriters an option for a period of 30 days to purchase an additional _____ shares of our common stock to cover overallotments.

Delivery of the shares of common stock is expected to be made on or about December _____, 2009.

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

Sole Book-Running Manager

Piper Jaffray & Co.

Oppenheimer & Co.

RBC Capital Markets

The date of this prospectus supplement is _____, 2009

Table of Contents

TABLE OF CONTENTS

Prospectus Supplement

<u>About This Prospectus Supplement</u>	ii
<u>Prospectus Supplement Summary</u>	S-1
<u>Risk Factors</u>	S-4
<u>Forward-Looking Statements</u>	S-6
<u>Use of Proceeds</u>	S-7
<u>Price Range of Common Stock and Dividend Policy</u>	S-8
<u>Capitalization</u>	S-9
<u>Dilution</u>	S-10
<u>Underwriting</u>	S-11
<u>Legal Matters</u>	S-13
<u>Experts</u>	S-13
<u>Incorporation of Certain Documents by Reference</u>	S-13
<u>Where You Can Find More Information</u>	S-14
<u>Prospectus</u>	
<u>About This Prospectus</u>	1
<u>Summary</u>	1
<u>Risk Factors</u>	3
<u>Special Note Regarding Forward-Looking Statements</u>	4
<u>Use Of Proceeds</u>	4
<u>Dilution</u>	5
<u>Selling Stockholder</u>	5
<u>Description of Capital Stock</u>	6
<u>Plan of Distribution</u>	7
<u>Legal Matters</u>	9
<u>Experts</u>	9
<u>Where You Can Find More Information</u>	9
<u>Incorporation Of Certain Information By Reference</u>	10

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You should rely only on the information contained or incorporated by reference into this prospectus supplement and the accompanying prospectus or in any free writing prospectus that we may provide to you. Neither we nor the underwriters have authorized any other person to provide you with information different from that contained in this prospectus supplement and the accompanying prospectus or in any free writing prospectus that we may provide to you. We and the selling stockholder are offering to sell and are seeking offers to buy shares of common stock only in jurisdictions where offers and sales are permitted. The information contained in or incorporated by reference into this prospectus supplement and the accompanying prospectus is accurate only as of the date such information is presented regardless of the time of delivery of this prospectus supplement and the accompanying prospectus or any sale of common stock. Our business, financial condition, results of operations and prospects may have changed since such date.

-i-

Table of Contents

ABOUT THIS PROSPECTUS SUPPLEMENT

This document is in two parts. The first part is this prospectus supplement, which describes the specific terms of this offering of shares of our common stock. The second part is the accompanying prospectus, which gives more general information. Generally, when we refer to the prospectus, we are referring to both parts of this document combined. If the description of this offering varies between this prospectus supplement and the accompanying prospectus, you should rely on the information in this prospectus supplement.

We incorporate important information into this prospectus by reference. You may obtain the information incorporated by reference into this prospectus without charge by following the instructions under [Where You Can Find More Information](#).

You should read this prospectus supplement along with the accompanying prospectus carefully before you invest. Both documents contain important information you should consider when making your investment decision. This prospectus supplement contains information about the shares of common stock offered in this offering and may add, update or change information in the accompanying prospectus.

Unless otherwise mentioned or unless the context requires otherwise, all references in this prospectus to [Nanometrics](#), [we](#), [us](#), [our](#), or similar references mean [Nanometrics Incorporated](#) together with its subsidiaries.

Table of Contents

PROSPECTUS SUPPLEMENT SUMMARY

The following summary highlights basic information about Nanometrics and this offering. This summary does not contain all of the information you should consider before making a decision to invest in our common stock. You should review this entire prospectus supplement and the accompanying prospectus carefully, including the risks of investing in our common stock discussed in the Risk Factors section, our consolidated financial statements and notes thereto and the documents incorporated by reference.

Our Business

Nanometrics is a leading supplier of advanced process control metrology systems used primarily in the manufacturing and packaging of semiconductors, solar photovoltaics (PVs) and high-brightness LEDs (HB-LEDs), as well as by customers in the silicon wafer and data storage industries. Nanometrics standalone and integrated metrology systems measure various thin film properties, critical dimensions, overlay control, topography and optical, electrical and material properties, including the structural composition of silicon, compound semiconductor and PV devices, during various steps of the manufacturing process, from front end of line substrate manufacturing through die preparation for advanced packaging. These systems enable device manufacturers to improve yields, increase productivity and lower their manufacturing costs.

We have been a pioneer and innovator in the field of optical metrology. Nanometrics has an extensive installed base of over 6,000 systems in over 150 production factories worldwide. Our major customers include Samsung Electronics Co. Ltd., Intel Corporation, Toshiba Semiconductor, Western Digital Corporation, Hynix Semiconductor Inc., and Renesas Technology Corp.

We offer a comprehensive line of metrology products and technologies to address the manufacturing requirements of the high-tech industry. Our metrology systems can be categorized as follows:

Standalone, fully automated systems for high-volume semiconductor manufacturing process control;

Integrated systems incorporated onto semiconductor and solar PV processing systems that provide real-time measurements and feedback to improve process control and increase total system productivity; and

Standalone, manual and semi-automated systems used to monitor material characteristics of various silicon and compound semiconductor devices and substrates.

Demand for our products continues to be driven by the increasing use of multiple thin film technologies by semiconductor manufacturers, and by the increased adoption of both integrated metrology and real-time process control. With feature sizes shrinking below 32 nanometers (nm), there is an increasing need for very tight process tolerances as well as productivity improvements in semiconductor fabrication facilities (fabs). As a result, semiconductor device and wafer manufacturers are investing in process control and metrology systems that improve their manufacturing efficiency by detecting process variations sooner and facilitating rapid diagnosis and corrective action. Our process control and metrology systems measure and characterize the physical dimensions, material composition, optical and electrical characteristics and other critical parameters of semiconductor devices during their fabrication and advanced packaging process steps. For the photolithography process, overlay and critical dimension systems provide enhanced control of layer alignment and device dimensions. For lattice engineering applications, metrology systems monitor the physical, optical, electrical and material characteristics of compound semiconductor, strained silicon and silicon-on-insulator (SOI) devices, including composition, crystal structure, layer thickness, dopant concentration, contamination and electron mobility.

We were incorporated in California in 1975 and reincorporated in Delaware in 2006. We maintain a website at www.nanometrics.com where our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and all amendments to those reports are available without charge, as soon as reasonably practicable following the time they are filed with or furnished to the SEC. Additional information about Nanometrics that is on our website is not, however, part of this prospectus. You may read and copy any materials we file with the SEC at the SEC's public reference room at 100 F Street, NE, Washington, DC 20549. You may obtain information on the operation of the

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public reference room by calling the SEC at 1-800-SEC-0300. The SEC also maintains an electronic

S-1

Table of Contents

Internet site that contains our reports, proxy and information statements, and other information at <http://www.sec.gov>.

S-2

Table of Contents

The Offering

Common stock offered by us	shares
Common stock offering by the selling stockholder	shares
Common stock to be outstanding immediately after this offering	shares
Over-allotment option	We have granted the underwriters an option to purchase up to an additional shares solely to cover over-allotments.
Use of proceeds	We expect to use the net proceeds from this offering to pay off a portion of the amount owed by the Company to Zygo Corporation in connection with the Company's acquisition of certain assets, and for general corporate purposes. You should read the discussion under the heading "Use of Proceeds" on page S-7 for more information.
NASDAQ Global Market symbol	NANO
Risk Factors	Investing in our common stock involves a high degree of risk. See "Risk Factors" beginning on page S-4 of this prospectus supplement and the other information included or incorporated by reference in this prospectus supplement and the accompanying prospectus for a discussion of factors you should consider carefully before deciding to invest in our common stock.

The number of shares to be outstanding after this offering is based on 18,998,564 shares outstanding as of December 15, 2009 and excludes:

an aggregate of 2,949,659 shares of our common stock subject to outstanding options as of December 15, 2009 at a weighted average exercise price of \$5.93 per share; and

an additional 2,838,522 shares of our common stock reserved for issuance upon exercise of options, or as restricted stock grants, restricted stock units or stock awards, that may be granted subsequent to December 15, 2009 under our 2005 Equity Incentive Plan, 2003 Employee Stock Purchase Plan, 2002 Non-Statutory Stock Option Plan, 2000 Employee Stock Option Plan, 2000 Director Stock Option Plan, and 1991 Stock Option Plan.

Unless otherwise stated in this prospectus supplement, we have assumed throughout this prospectus supplement that the over-allotment option granted to the underwriters will not be exercised.

S-3

Table of Contents

RISK FACTORS

Prior to making a decision about investing in our common stock, you should carefully consider the following risks and uncertainties, together with all of the other information contained in or incorporated by reference in this prospectus supplement or the accompanying prospectus. If any of the following risks actually occur, our business could be harmed. In such case, the trading price of our common stock could decline, and you may lose all or part of your investment.

Risk Factors Relating to our Common Stock and the Offering

Our stock price has fluctuated significantly; the trading price of our common stock may fluctuate significantly in the future. The trading price of our common stock has fluctuated significantly. In 2009, our stock price has ranged from a low of \$1.05 on March 3, 2009 to a high of \$14.06 on December 2, 2009. The trading price of our common stock may fluctuate significantly in the future as a result of a number of factors, including:

actual and anticipated variations in our operating results;

general economic and market conditions, including changes in demand for our products;

interest rates;

geopolitical conditions throughout the world;

perceptions of the strengths and weaknesses of our industries;

our ability to pay principal and interest on our debt when due;

developments in our relationships with our lenders, customers and/or suppliers;

announcements of alliances, mergers or other relationships by or between our competitors and/or our suppliers and customers;
and

quarterly variations in our results of operations due to, among other things, seasonality in demand for products and fluctuations in the cost of raw materials

The stock markets in general have experienced broad fluctuations that have often been unrelated to the operating performance of particular companies. These broad market fluctuations may adversely affect the trading price of our common stock. Accordingly, our common stock may trade at prices significantly below the offering price, and you could lose all or part of your investment in the event that you choose to sell your shares.

We have broad discretion to use a portion of the net proceeds from this offering; our investment of these proceeds may not yield a favorable return. We are required to use \$2 million of the net proceeds from this offering to pay a portion of the amount owed by the Company to Zygo Corporation (Zygo) in connection with the Company's acquisition of certain assets of Zygo in June 2009. Our management has broad discretion as to how to spend and invest the remaining net proceeds after the required partial repayment of this liability, and we may spend or invest these net proceeds in ways with which our stockholders may not agree and that do not necessarily improve our operating results or enhance the value

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of our common stock. Accordingly, you will need to rely on our judgment with respect to the use of the remaining net proceeds, and you will not have the opportunity as part of your investment decision to assess whether they are being used or invested appropriately. Until the remaining net proceeds are used, we plan to invest the net proceeds of this offering in short-term, investment-grade, interest-bearing securities. These investments may not yield a favorable return.

S-4

Table of Contents

Our corporate documents and Delaware law make a takeover of our company more difficult, which could prevent certain changes in control and limit the market price of the common stock. Our charter and by-laws and Section 203 of the Delaware General Corporation Law contain provisions that could enable our management to resist a takeover of our company. For example, our board of directors has the authority, without further approval of our stockholders, to fix the rights and preferences, and to cause our company to issue, up to 3,000,000 shares of preferred stock. These provisions could discourage, delay, or prevent a change in the control of our company or a change in our management. They could also discourage proxy contests and make it more difficult for you and other stockholders to elect directors and take other corporate actions. The existence of these provisions could limit the price that investors are willing to pay in the future for shares of the common stock. Some provisions in our charter and by-laws could deter third parties from acquiring us, which could limit the market price of the common stock.

We currently do not intend to pay dividends on our common stock and consequently, your only opportunity to achieve a return on your investment is if the price of our common stock appreciates. We currently do not plan to pay dividends on shares of our common stock in the near future. Consequently, your only opportunity to achieve a return on your investment in us will be if the market price of our common stock appreciates.

Future equity issuances or a sale of a substantial number of shares of our common stock may cause the price of our common stock to decline. Because we may need to raise additional capital in the future to continue to expand our business and our research and development activities, among other things, we may conduct additional equity offerings. If we or our stockholders sell substantial amounts of our common stock (including shares issued upon the exercise of options and warrants) in the public market, the market price of our common stock could fall. A decline in the market price of our common stock could make it more difficult for us to sell equity or equity-related securities in the future at a time and price that we deem appropriate.

If you purchase shares of common stock in this offering, you will suffer immediate and substantial dilution of your investment. The public offering price of the common stock will be substantially higher than the net tangible book value per share of our outstanding common stock. If you purchase shares of our common stock, you will incur immediate and substantial dilution in the amount of \$ per share. See Dilution.

Table of Contents

FORWARD-LOOKING STATEMENTS

Our disclosure and analysis in this prospectus supplement, in the accompanying prospectus, in any related free writing prospectus, in the documents incorporated by reference and in some of our other public statements contain forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995, as amended. This Act provides a safe harbor for forward-looking statements to encourage companies to provide prospective information about themselves so long as they identify these statements as forward-looking and provide meaningful cautionary statements identifying important factors that could cause actual results to differ from the projected results. In some cases, you can identify forward-looking statements by terminology such as anticipate, believe, continue, could, estimate, expect, intend, may, plan, potential, predict, should, or will, or the negative of those terms, or comparable terminology.

Any or all of our forward-looking statements in this prospectus supplement, in the accompanying prospectus, in any related free writing prospectus, in the documents incorporated by reference and in any other public statements we make may turn out to be inaccurate. Forward-looking statements reflect our current expectations or forecasts of future events or results and are inherently uncertain. Inaccurate assumptions we might make and known or unknown risks and uncertainties can affect the accuracy of our forward-looking statements. Accordingly, no forward-looking statement can be guaranteed and future events and actual or suggested results may differ materially. The following factors, among others, could cause actual results and future events to differ materially from those set forth or contemplated in the forward-looking statements:

competition;

the possibility of interruption of business activities due to equipment problems, accidents, strikes, weather or other factors;

product development risk;

changes in raw material prices and availability;

changes in general economic conditions or developments with respect to specific industries or customers affecting demand for our products including unfavorable shifts in product mix;

unanticipated costs, expenses or third-party claims;

interest rate volatility;

foreign currency exchange rate fluctuations;

changes in assumptions used for determining employee benefit expense and obligations;

other unforeseen developments in the industries in which we operate; and

other factors that we describe in the Risk Factors section.

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We undertake no obligation to publicly update any forward-looking statements, whether as a result of new information, future events or otherwise. You are advised, however, to consult any further disclosures we make in our annual reports on Form 10-K, quarterly reports on Form 10-Q and current reports on Form 8-K, as well as in any additional prospectus supplement relating to the accompanying prospectus and other public filings with the SEC.

S-6

Table of Contents

USE OF PROCEEDS

We estimate that the net proceeds from the sale of our common stock in this offering will be approximately \$ million (approximately \$ million if the underwriters' overallotment option is exercised in full), after deducting underwriting discounts and commissions and our estimated offering expenses. We will not receive any proceeds from the sale of shares of our common stock by the selling stockholder.

We are required to use \$2 million of the net proceeds from this offering to pay a portion of the amount owed by the Company to Zygo in connection with the Company's acquisition of certain assets of Zygo in June 2009. As of December 15, 2009 our current liability to Zygo in connection with the asset acquisition was approximately \$3.4 million.

We expect to use any remaining net proceeds from this offering for general corporate purposes, which may include the acquisition of businesses, technologies and products that will complement our existing operations. We assess acquisition opportunities on an ongoing basis and from time to time have discussions with other companies about potential transactions. We currently do not have any agreement with respect to an acquisition, and we cannot assure you that we will make any acquisitions in the future.

These expected uses of net proceeds of this offering represent our current intentions based upon our present plans and business conditions. The amounts and timing of our actual expenditures will depend on numerous factors, including the pursuit of acquisitions or other strategic opportunities and any unforeseen cash needs. As a result, management will retain broad discretion over the allocation of the net proceeds from this offering.

Pending these uses, we plan to invest the net proceeds in short-term interest-bearing obligations, investment-grade instruments, certificates of deposit or direct guaranteed obligations of the United States. The goal with respect to investment of these net proceeds is capital preservation and liquidity so that funds are readily available to fund our operations.

Table of Contents**PRICE RANGE OF COMMON STOCK AND DIVIDEND POLICY**

Our common stock is traded on the NASDAQ Global Market under the symbol NANO. The following table sets forth, for the periods indicated, the high and low reported sale prices of our common stock as reported on the NASDAQ Global Market.

	High	Low
Fiscal Year ended December 29, 2007		
First quarter	\$ 8.51	\$ 6.63
Second quarter	\$ 6.94	\$ 5.74
Third quarter	\$ 9.00	\$ 6.12
Fourth quarter	\$ 11.71	\$ 7.48
Fiscal Year ended December 27, 2008		
First quarter	\$ 9.93	\$ 5.00
Second quarter	\$ 8.50	\$ 5.75
Third quarter	\$ 6.09	\$ 2.20
Fourth quarter	\$ 3.04	\$ 0.80
Fiscal Year ending January 2, 2010		
First quarter	\$ 1.67	\$ 1.05
Second quarter	\$ 2.79	\$ 1.11
Third quarter	\$ 9.00	\$ 2.46
Fourth quarter (through December 15, 2009)	\$ 14.06	\$ 5.35

As of December 15, 2009, there were approximately 273 holders of record of our common stock. On December 15, 2009, the last sale price reported on the NASDAQ Global Market for our common stock was \$12.39 per share.

Dividends

We have never declared or paid any cash dividends on our common stock. We currently do not plan to pay dividends on shares of our common stock in the near future. Consequently, your only opportunity to achieve a return on your investment in us will be if the market price of our common stock appreciates.

Table of Contents**CAPITALIZATION**

The following table shows our cash, cash equivalents and investments and capitalization as of September 26, 2009 on an actual basis and on an as adjusted basis to give effect to the sale of our common stock in this offering and the application of the net proceeds received in this offering as described under "Use of Proceeds". You should read this table together with our financial statements and the related notes thereto, as well as "Management's Discussion and Analysis of Financial Condition and Results of Operations" and the other financial information, included elsewhere or incorporated by reference in this prospectus supplement or the accompanying prospectus.

	September 26, 2009	
	Actual	As Adjusted ⁽¹⁾
	(in thousands)	
Cash, cash equivalents and investments	\$ 17,207	\$
Other Current Liabilities	\$ 6,808	\$
Stockholders' equity		
Preferred stock, \$0.001 par value, 3,000,000 shares authorized; no shares issued or outstanding	\$	\$
Common stock, \$0.001 par value; 47,000,000 shares authorized; 18,629,915 issued and outstanding; issued and outstanding as adjusted	19	
Additional paid-in capital	191,765	
Accumulated deficit	(112,666)	
Accumulated other comprehensive income (loss)	962	
Total shareholders' equity	\$ 80,080	\$
Total capitalization	\$	\$

⁽¹⁾Reflects the use of approximately \$2 million of the net proceeds from this offering to reduce our obligations to Zygo in connection with the acquisition of certain assets of Zygo and for general corporate purposes. As of December 15, 2009 our current liability to Zygo in connection with the asset acquisition was approximately \$3.4 million.

Table of Contents

DILUTION

If you invest in our common stock, your ownership interest will be diluted to the extent of the difference between the public offering price per share of common stock and the adjusted net tangible book value per share of common stock immediately after this offering. The net tangible book value of our common stock as of September 26, 2009 was \$72,603,151, or \$3.90 per share. Net tangible book value per share is determined by dividing (1) our total tangible assets less our total liabilities by (2) the number of shares of common stock outstanding.

After giving effect to our sale of shares of common stock in this offering at a public offering price of \$ per share and after deducting underwriting discounts and estimated offering expenses payable by us, our adjusted net tangible book value as of September 26, 2009 would have been \$ million, or \$ per share. This represents an immediate increase in net tangible book value to existing stockholders of \$ per share and an immediate dilution to new investors of \$ per share. The following table illustrates this per share dilution:

Public offering price per share	\$
Net tangible book value per share as of September 26, 2009	\$ 3.90
Increase per share attributable to sale of shares in this offering	\$
Adjusted net tangible book value per share after this offering	\$
Dilution per share to new investors	\$

If the underwriters exercise their over-allotment option in-full to purchase additional shares of common stock in this offering, the adjusted net tangible book value per share after the offering would be \$ per share, the increase in the net tangible book value per share to existing stockholders would be \$ per share and the dilution to new investors purchasing common stock in this offering would be \$ per share.

The preceding discussion and table is based on the number of shares of common stock outstanding as of December 15, 2009 and excludes:

an aggregate of 2,949,659 shares of our common stock subject to outstanding options as of December 10, 2009 at a weighted average exercise price of \$5.93 per share; and

an additional 2,838,522 shares of our common stock reserved for issuance upon exercise of options, or as restricted stock grants, restricted stock units or stock awards, that may be granted subsequent to December 10, 2009 under our 2005 Equity Incentive Plan, 2003 Employee Stock Purchase Plan, 2002 Non-Statutory Stock Option Plan, 2000 Employee Stock Option Plan, 2000 Director Stock Option Plan, and 1991 Stock Option Plan.

Table of Contents**UNDERWRITING**

We and the selling stockholder are offering the shares of common stock described in this prospectus supplement through a number of underwriters. Piper Jaffray is acting as the sole book-running manager of the offering and as representative of the underwriters. Oppenheimer & Co. Inc. and RBC Capital Markets Corporation are acting as co-managers for this offering. We and the selling stockholder have entered into a firm commitment underwriting agreement with the underwriters. Subject to the terms and conditions of the underwriting agreement, we and the selling stockholder have agreed to sell to the underwriters, and each underwriter has severally agreed to purchase, at the public offering price less the underwriting discount set forth on the cover page of this prospectus supplement, the number of shares of common stock listed next to its name in the following table:

Underwriter	Number of Shares
Piper Jaffray & Co.	
Oppenheimer & Co. Inc.	
RBC Capital Markets Corporation	

Total

The underwriters are committed to purchase all the shares of common stock offered by us and the selling stockholder if they purchase any shares, other than those shares covered by the over-allotment option described below. The underwriting agreement also provides that if an underwriter defaults, the purchase commitments of non-defaulting underwriters may also be increased or the offering may be terminated.

The underwriters propose to offer the common stock directly to the public at the initial public offering price set forth on the cover page of this prospectus supplement and to certain dealers at that price less a concession not in excess of \$ per share. After the offering, these figures may be changed by the underwriters. Sales of shares made outside of the United States may be made by affiliates of the underwriters.

The underwriters have an option to buy up to additional shares of common stock from us to cover sales of shares by the underwriters which exceed the number of shares specified in the table above. The underwriters may exercise this option at any time and from time to time during the 30-day period from the date of this prospectus supplement. If any shares are purchased with this over-allotment option, the underwriters will purchase shares in approximately the same proportion as shown in the table above. If any additional shares of common stock are purchased, the underwriters will offer the additional shares on the same terms as those on which the shares are being offered.

The underwriting fee is equal to the public offering price per share of common stock less the amount paid by the underwriters to us per share of common stock. The following table shows the per share and total underwriting discount to be paid to the underwriters assuming both no exercise and full exercise of the underwriters' option to purchase additional shares.

	Without over-allotment exercise	With full over-allotment exercise
Per Share	\$	\$
Total	\$	\$

We estimate that the total fees and expenses payable by us, excluding underwriting discount, will be approximately \$, which includes \$150,000 that we have agreed to reimburse the underwriters for the fees incurred by them in connection with the offering.

We have agreed to indemnify the underwriters against certain liabilities, including liabilities under the Securities Act, or to contribute to payments that the underwriters may be required to make in respect of those liabilities.

We and certain of our directors and executive officers and the selling stockholder are subject to lock-up agreements that prohibit us and them from offering for sale, pledging, assigning, encumbering, announcing the intention to sell, selling, contracting to

Table of Contents

sell, granting any option, right or warrant to purchase, or otherwise transferring or disposing of, any shares of our common stock or any securities convertible into or exercisable or exchangeable for shares of our common stock for a period of at least 90 days following the date of this prospectus supplement without the prior written consent of Piper Jaffray. The lock-up agreements do not prohibit our directors and executive officers from transferring shares of our common stock for bona fide estate or tax planning purposes, subject to certain requirements, including that the transferee be subject to the same lock-up terms. The lock-up agreements do not prohibit us from issuing shares upon the exercise or conversion of securities outstanding on the date of this prospectus supplement. The lock-up provisions do not prevent us from selling shares to the underwriters pursuant to the underwriting agreement, or us from granting options to acquire securities under our existing stock option plans or issuing shares upon the exercise or conversion of securities outstanding on the date of this prospectus supplement.

The 90-day lock-up period in all of the lock-up agreements is subject to extension if (i) during the last 17 days of the lock-up period we issue an earnings release or material news or a material event relating to us occurs or (ii) prior to the expiration of the lock-up period, we announce that we will release earnings results during the 16-day period beginning on the last day of the lock-up period, in which case the restrictions imposed in these lock-up agreements shall continue to apply until the expiration of the 18-day period beginning on the issuance of the earnings release or the occurrence of the material news or material event, unless Piper Jaffray waives the extension in writing.

Our shares are quoted on the NASDAQ Global Market under the symbol NANO.

To facilitate the offering, the underwriters may engage in transactions that stabilize, maintain or otherwise affect the price of our common stock during and after the offering. Specifically, the underwriters may over-allot or otherwise create a short position in the common stock for their own accounts by selling more shares of common stock than we have sold to them. Short sales involve the sale by the underwriters of a greater number of shares than they are required to purchase in the offering. The underwriters may close out any short position by either exercising their option to purchase additional shares or purchasing shares in the open market.

In addition, the underwriters may stabilize or maintain the price of our common stock by bidding for or purchasing shares of common stock in the open market and may impose penalty bids. If penalty bids are imposed, selling concessions allowed to syndicate members or other broker-dealers participating in the offering are reclaimed if shares of common stock previously distributed in the offering are repurchased, whether in connection with stabilization transactions or otherwise. The effect of these transactions may be to stabilize or maintain the market price of our common stock at a level above that which might otherwise prevail in the open market. The imposition of a penalty bid may also affect the price of our common stock to the extent that it discourages resales of our common stock. The magnitude or effect of any stabilization or other transactions is uncertain. These transactions may be effected on the NASDAQ Global Market or otherwise and, if commenced, may be discontinued at any time. The underwriters may also engage in passive market making transactions in our common stock. Passive market making consists of displaying bids on the NASDAQ Global Market limited by the prices of independent market makers and effecting purchases limited by those prices in response to order flow. Rule 103 of Regulation M promulgated by the SEC limits the amount of net purchases that each passive market maker may make and the displayed size of each bid. Passive market making may stabilize the market price of our common stock at a level above that which might otherwise prevail in the open market and, if commenced, may be discontinued at any time.

This prospectus supplement and the accompanying prospectus in electronic format may be made available on web sites maintained by the underwriters, and the underwriters may distribute prospectuses and prospectus supplements electronically.

From time to time in the ordinary course of their respective businesses, the underwriters and certain of their affiliates may in the future engage in commercial banking or investment banking transactions with us and our affiliates.

Table of Contents

LEGAL MATTERS

The validity of the issuance of the common stock offered by us in this offering will be passed upon for us by Perkins Coie LLP, Denver, Colorado. Certain legal matters in connection with the offering will be passed upon for the underwriters by Goodwin Procter LLP, New York, New York.

EXPERTS

The consolidated financial statements and schedule as of December 27, 2008 and December 29, 2007 and for each of the three years in the period ended December 27, 2008 incorporated by reference in this prospectus supplement have been so incorporated in reliance on the report of BDO Seidman, LLP, an independent registered public accounting firm, incorporated herein by reference, given on the authority of said firm as experts in auditing and accounting.

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC allows us to incorporate by reference information that we file with it into our registration statement on Form S-3 of which this prospectus supplement and the accompanying prospectus are a part, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is an important part of this prospectus supplement and the accompanying prospectus. Information contained in this prospectus supplement modifies, supersedes and replaces information incorporated by reference into this prospectus supplement that we filed with the SEC prior to the date of this prospectus supplement, while information that we file later with the SEC and deemed to be incorporated by reference into this prospectus supplement will automatically update and supersede the information contained in this prospectus supplement. We incorporate by reference into the registration statement and this prospectus supplement the documents listed below, and any future filings we make with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act after the date of this prospectus supplement (other than Current Reports or portions thereof furnished under Item 2.02 or Item 7.01 of Form 8-K):

our Annual Report on Form 10-K for the fiscal year ended December 27, 2008, filed on March 27, 2009;

our Definitive Proxy Statement filed with the Commission on April 21, 2009;

our Quarterly Reports on Form 10-Q for the quarters ended March 28, 2009, June 27, 2009 and September 26, 2009, filed on May 12, 2009, August 11, 2009 and November 9, 2009, respectively;

the description of our Common Stock contained in our Registration Statement on Form 8-A filed with the Commission on April 29, 1985, including any amendment or report filed for the purpose of updating such description;

our Current Reports on Form 8-K, filed with the Commission on April 30, 2009, May 29, 2009, June 23, 2009, July 30, 2009, August 31, 2009, and October 29, 2009, and our Current Report on Form 8-K/A, filed with the Commission on August 3, 2009; and

all other reports filed pursuant to Section 13(a) or 15(d) of the Exchange Act since the end of the fiscal year covered by the annual report referred to above.

We will provide each person, including any beneficial owner, to whom a prospectus supplement and the accompanying prospectus is delivered, a copy of any or all of the information that has been incorporated by reference into this prospectus supplement but not delivered with this prospectus supplement upon written or oral request at no cost to the requester. Requests should be directed to: Nanometrics Incorporated, 1550 Buckeye Drive, Milpitas, CA 95035, Attn: Investor Relations, telephone: (408) 545-6000.

Table of Contents

This prospectus supplement is part of a registration statement on Form S-3 that we filed with the SEC. That registration statement contains more information than this prospectus supplement and the accompanying prospectus regarding us and our common stock, including certain exhibits and schedules. You can obtain a copy of the registration statement from the SEC at the address listed above or from the SEC's website.

You should rely only on the information provided in and incorporated by reference into this prospectus supplement or the accompanying prospectus. We have not authorized anyone else to provide you with different information. You should not assume that the information in this prospectus supplement or the accompanying prospectus is accurate as of any date other than the date on the front cover of these documents.

WHERE YOU CAN FIND MORE INFORMATION

We file annual, quarterly and current reports, proxy statements and other information electronically with the SEC. You may read and copy these reports, proxy statements and other information at the SEC's public reference room at 100 F Street, N.E., Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for more information about the operation of the public reference room. You can request copies of these documents by writing to the SEC and paying a fee for the copying costs. The SEC also maintains an Internet site that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC, including us. The SEC's Internet site can be found at <http://www.sec.gov>. In addition, we make available on or through our website copies of these reports as soon as reasonably practicable after we electronically file or furnish them to the SEC. Our website can be found at <http://www.nanometrics.com>. Additional information about Nanometrics that is on our website is not, however, part of this prospectus.

Table of Contents

PROSPECTUS

6,200,000 Shares

Common Stock

NANOMETRICS INCORPORATED

This prospectus relates to the offer and sale at various times in one or more offerings of up to 6,200,000 shares of our common stock. Of these shares, 1,200,000 are being offered by the selling stockholder named in this prospectus and 5,000,000 are being offered by us. We will not receive any of the proceeds from the sale of shares by the selling stockholder.

We will provide specific terms of any offering in supplements to this prospectus. Any prospectus supplement may also add, update or change information in this prospectus. You should read this prospectus, any applicable prospectus supplement and the additional information incorporated by reference in this prospectus carefully before you purchase any of our securities. We may also authorize one or more free writing prospectuses to be provided to you in connection with these offerings. You should read carefully this prospectus, the applicable prospectus supplement and any related free writing prospectus, as well as any documents incorporated by reference before you invest in any of our securities. **This prospectus may not be used to offer or sell any securities unless accompanied by the applicable prospectus supplement.**

Our common stock is listed on the NASDAQ Global Market under the symbol NANO. On November 16, 2009, the last reported sales price of our common stock was \$12.64 per share. The applicable prospectus supplement will contain information, where applicable, as to any other listing on the NASDAQ Global Market or any securities market or other exchange of the securities, if any, covered by the prospectus supplement.

Investing in our securities involves risk. You should carefully review the risks and uncertainties described under the heading Risk Factors beginning on page 3 and in the documents which are incorporated by reference herein, and contained in the applicable prospectus supplement and any related free writing prospectus.

We will sell these securities directly to investors, through agents designated from time to time or to or through underwriters or dealers. For additional information on the methods of sale, you should refer to the section entitled Plan of Distribution in this prospectus. 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 commissions or discounts 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.

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.

The date of this prospectus is November 23, 2009.

Table of Contents

TABLE OF CONTENTS

<u>ABOUT THIS PROSPECTUS</u>	1
<u>SUMMARY</u>	1
<u>RISK FACTORS</u>	3
<u>SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS</u>	4
<u>USE OF PROCEEDS</u>	4
<u>DILUTION</u>	5
<u>SELLING STOCKHOLDER</u>	5
<u>DESCRIPTION OF CAPITAL STOCK</u>	6
<u>PLAN OF DISTRIBUTION</u>	7
<u>LEGAL MATTERS</u>	9
<u>EXPERTS</u>	9
<u>WHERE YOU CAN FIND MORE INFORMATION</u>	9
<u>INCORPORATION OF CERTAIN INFORMATION BY REFERENCE</u>	10

Table of Contents

ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement that we filed with the Securities and Exchange Commission, or the SEC, using a shelf registration process. Under this shelf registration process, we may from time to time sell up to 5,000,000 shares of our common stock in one or more offerings and the selling stockholder may sell up to 1,200,000 shares of our common stock in one or more offerings. We have provided to you in this prospectus a general description of the securities we may offer. Each time we or the selling stockholder sell securities under this shelf registration, we will, to the extent required by law, provide a prospectus supplement that will contain 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 relating to these offerings. The prospectus supplement and any related free writing prospectus that we may authorize to be provided to you may also add, update or change information contained in this prospectus or in any documents that we have incorporated by reference into this prospectus. To the extent there is a conflict between the information contained in this prospectus and the prospectus supplement or any related free writing prospectus, you should rely on the information in the prospectus supplement or the related free writing prospectus; *provided that* if any statement in one of these documents is inconsistent with a statement in another document having a later date for example, a document incorporated by reference in this prospectus or any prospectus supplement or any related free writing prospectus the statement in the document having the later date modifies or supersedes the earlier statement.

We and the selling stockholder have not authorized any dealer, agent or other person to give any information or to make any representation other than those contained or incorporated by reference in this prospectus and any accompanying prospectus supplement. You must not rely upon any information or representation not contained or incorporated by reference in this prospectus or an accompanying prospectus supplement. This prospectus and the accompanying prospectus supplement, if any, do not constitute an offer to sell or the solicitation of an offer to buy any securities other than the registered securities to which they relate, nor do this prospectus and the accompanying prospectus supplement constitute an offer to sell or the solicitation of an offer to buy securities in any jurisdiction to any person to whom it is unlawful to make such offer or solicitation in such jurisdiction. You should not assume that the information contained in this prospectus, any applicable prospectus supplement or any related free writing prospectus is accurate on any date subsequent to the date set forth on the front of the document or that any information we have incorporated by reference is correct on any date subsequent to the date of the document incorporated by reference (as our business, financial condition, results of operations and prospects may have changed since that date), even though this prospectus, any applicable prospectus supplement or any related free writing prospectus is delivered or securities are sold on a later date.

As permitted by the rules and regulations of the SEC, the registration statement, of which this prospectus forms a part, includes additional information not contained in this prospectus. You may read the registration statement and the other reports we file with the SEC at the SEC's web site or at the SEC's offices described below under the heading *Where You Can Find Additional Information*.

SUMMARY

*This summary highlights selected information from this prospectus 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, including the risks of investing discussed under *Risk Factors* and in the documents which are incorporated by reference herein, and contained in the applicable prospectus supplement and any related free writing prospectus, the information incorporated by reference, including our financial statements, and the exhibits to the registration statement of which this prospectus is a part. When used in this prospectus, the terms *Nanometrics, we, our, us* or the *Company* refer to *Nanometrics Incorporated* and its consolidated subsidiaries, unless otherwise indicated or as the context otherwise requires.*

About Nanometrics Incorporated

Overview

Nanometrics is a leading supplier of advanced process control metrology systems used primarily in the manufacturing and packaging of semiconductors, solar photovoltaics (PVs) and high-brightness LEDs (HB-LEDs),

Table of Contents

as well as by customers in the silicon wafer and data storage industries. Nanometrics standalone and integrated metrology systems measure various thin film properties, critical dimensions, overlay control, topography and optical, electrical and material properties, including the structural composition of silicon, compound semiconductor and PV devices, during various steps of the manufacturing process, from front end of line substrate manufacturing through die preparation for advanced packaging. These systems enable device manufacturers to improve yields, increase productivity and lower their manufacturing costs.

We have been a pioneer and innovator in the field of optical metrology. Nanometrics has an extensive installed base of over 6,000 systems in over 150 production factories worldwide. Our major customers include Samsung Electronics Co. Ltd., Intel Corporation, Toshiba Semiconductor, Western Digital Corporation, Hynix Semiconductor Inc., and Renesas Technology Corp.

Our Business

We offer a comprehensive line of metrology products and technologies to address the manufacturing requirements of the high-tech industry. Our metrology systems can be categorized as follows:

Standalone, fully automated systems for high-volume semiconductor manufacturing process control;

Integrated systems incorporated onto semiconductor and solar PV processing systems that provide real-time measurements and feedback to improve process control and increase total system productivity; and

Standalone, manual and semi-automated systems used to monitor material characteristics of various silicon and compound semiconductor devices and substrates.

We believe that there are numerous characteristics of the semiconductor, solar PV, high-brightness LED and other component manufacturing markets that drive a growing need for process control metrology. As films and film materials become thinner and more exotic, along with more demanding critical dimension control and overlay requirements, advanced process control metrology will continue to grow in importance, especially as wafers become more expensive to manufacture and as advanced wafer-scale packaging is deployed in a growing number of applications. We expect these factors will continue to drive the demand for our advanced standalone and integrated metrology products. Additionally, customers can deploy our products into their R&D lines to accelerate the process development cycle and enable faster production ramp.

Additional demands for better film uniformity, tighter dimensional and overlay control, tool-to-tool matching and within-tool chamber uniformity is driving the need for integrated process control metrology. These new tool requirements will drive the need to place metrology inside the processing tools for real-time, integrated, process control metrology, using both feed-forward and feedback of the collected metrology data to control the process equipment.

We have made several strategic business decisions to enable us to further address these metrology trends, including:

Introducing new leading-edge products in every core product line and primary market served;

Restructuring our business and practices for operational and earnings leverage;

Diversifying our product line and served markets through acquisitions, such as our 2006 acquisition of Accent Optical Technologies, Inc.; our 2008 acquisition of Tevet Process Control Technologies (Tevet), an integrated metrology supplier serving both semiconductor and solar PV industries; and our acquisition of the UnifireTM product line from Zygo Corporation in June 2009;

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The continuing development of new measurement technologies for advanced chemical mechanical planarization, or CMP, and photolithographic processes; and

Table of Contents

Researching innovative applications of existing technology to new market opportunities within the solar PV industry. Demand for our products continues to be driven by the increasing use of multiple thin film technologies by semiconductor manufacturers, and by the increased adoption of both integrated metrology and real-time process control. With feature sizes shrinking below 32 nanometers (nm), there is an increasing need for very tight process tolerances as well as productivity improvements in semiconductor fabrication facilities (fabs). As a result, semiconductor device and wafer manufacturers are investing in process control and metrology systems that improve their manufacturing efficiency by detecting process variations sooner and facilitating rapid diagnosis and corrective action. Our process control and metrology systems measure and characterize the physical dimensions, material composition, optical and electrical characteristics and other critical parameters of semiconductor devices during their fabrication and advanced packaging process steps. For the photolithography process, overlay and critical dimension systems provide enhanced control of layer alignment and device dimensions. For lattice engineering applications, metrology systems monitor the physical, optical, electrical and material characteristics of compound semiconductor, strained silicon and silicon-on-insulator (SOI) devices, including composition, crystal structure, layer thickness, dopant concentration, contamination and electron mobility.

We were incorporated in California in 1975 and reincorporated in Delaware in 2006. Our executive offices are located at 1550 Buckeye Drive, Milpitas, California 95035. We transact business directly and through our subsidiaries unless otherwise indicated.

We maintain a website at www.nanometrics.com where our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and all amendments to those reports are available without charge, as soon as reasonably practicable following the time they are filed with or furnished to the SEC. Additional information about Nanometrics that is on our website is not, however, part of this prospectus. You may read and copy any materials we file with the SEC at the SEC's public reference room at 100 F Street, NE, Washington, DC 20549. You may obtain information on the operation of the public reference room by calling the SEC at 1-800-SEC-0300. The SEC also maintains an electronic Internet site that contains our reports, proxy and information statements, and other information at <http://www.sec.gov>.

RISK FACTORS

Except for the historical information contained in this prospectus or incorporated by reference, this prospectus (and the information incorporated by reference in this prospectus) contains forward-looking statements that involve risks and uncertainties. Our actual results could differ materially from those discussed here or incorporated by reference. Factors that could cause or contribute to such differences include, but are not limited to, (i) the risks and uncertainties described under the heading "Risk Factors" contained in, or incorporated into, the applicable prospectus supplement and any related free writing prospectus, and (ii) those discussed in the section entitled "Risk Factors" contained in our most recent Annual Report on Form 10-K and Quarterly Report on Form 10-Q filed with the SEC, as well as any amendments thereto reflected in subsequent filings with the SEC, which are incorporated herein by reference in their entirety (collectively the "Nanometrics Risk Factors").

Investment in our securities involves risks. Prior to making a decision about investing in our securities, you should consider carefully the Nanometrics Risk Factors, together with all of the other information contained or incorporated by reference in this prospectus and any prospectus supplement or any related free writing prospectus, including any additional specific risks described in any such prospectus supplement or free writing prospectus. Each of these risk factors could adversely affect our business, operating results and financial condition, which may result in the loss of all or part of your investment.

Keep these risk factors in mind when you read forward-looking statements contained elsewhere or incorporated by reference in this prospectus, any accompanying prospectus supplement, or any related free writing prospectus. These statements relate to our expectations about future events. Discussions containing forward-looking statements may be found, among other places, in "Business and Management's Discussion and Analysis of Financial Condition and Results of Operations" incorporated by reference from our most recent Annual Report on Form 10-K and our Quarterly Reports on Form 10-Q, as well as any amendments thereto reflected in subsequent

Table of Contents

filings with the SEC. These forward-looking statements are based largely on our expectations and projections about future events and future trends affecting our business, and so are subject to risks and uncertainties, including the risks and uncertainties described below under Forward-Looking Information, that could cause actual results to differ materially from those anticipated in the forward-looking statements.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

Our disclosure and analysis in this prospectus, in any prospectus supplement or related free writing prospectus, in the documents incorporated by reference and in some of our other public statements contain forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995, as amended. This Act provides a safe harbor for forward-looking statements to encourage companies to provide prospective information about themselves so long as they identify these statements as forward-looking and provide meaningful cautionary statements identifying important factors that could cause actual results to differ from the projected results. In some cases, you can identify forward-looking statements by terminology such as anticipate, believe, continue, could, estimate, expect, intend, may, might, predict, should, or will, or the negative of those terms, or comparable terminology.

Any or all of our forward-looking statements in this prospectus, in any prospectus supplement or related free writing prospectus, in the documents incorporated by reference and in any other public statements we make may turn out to be inaccurate. Forward-looking statements reflect our current expectations or forecasts of future events or results and are inherently uncertain. Inaccurate assumptions we might make and known or unknown risks and uncertainties can affect the accuracy of our forward-looking statements. Accordingly, no forward-looking statement can be guaranteed and future events and actual or suggested results may differ materially.

We undertake no obligation to publicly update any forward-looking statements, whether as a result of new information, future events or otherwise. You are advised, however, to consult any further disclosures we make in our annual reports on Form 10-K, quarterly reports on Form 10-Q and current reports on Form 8-K, as well as in any prospectus supplement relating to this prospectus and other public filings with the SEC.

USE OF PROCEEDS

Except as described in any prospectus supplement and any free writing prospectus in connection with a specific offering, we currently intend to use the net proceeds from the sale of the securities offered under this prospectus for general corporate purposes, including working capital. We may also use the net proceeds to repay any debts and/or invest in or acquire complementary businesses, products or technologies, although we have no current commitments or agreements with respect to any such investments or acquisitions as of the date of this prospectus. We have not determined the amount of net proceeds to be used specifically for the foregoing purposes. As a result, our management will have broad discretion in the allocation of the net proceeds and investors will be relying on the judgment of our management regarding the application of the proceeds of any sale of the securities. Pending use of the net proceeds, we intend to invest the proceeds in short-term, investment-grade, interest-bearing instruments. We will not receive any proceeds from the sale of shares of our common stock by the selling stockholder.

When we offer securities, we will describe the intended use of the net proceeds from that offering in a prospectus supplement. The actual amount of net proceeds we spend on a particular use will depend on many factors, including, our future capital expenditures, the amount of cash required by our operations, and our future revenue growth, if any. Therefore, we will retain broad discretion in the use of the net proceeds.

Table of Contents

DILUTION

If you invest in an offering of common stock by us, your interest will be diluted to the extent of the difference between the public offering price per share in an offering under this prospectus and the net tangible book value per share after the offering, except to the extent proceeds are applied to the repayment of debt. We will set forth in the applicable prospectus supplement or free writing prospectus the following information regarding any material dilution of the equity interests of investors purchasing shares in an offering by us under this prospectus:

the net tangible book value per share of our equity securities before and after the offering;

the amount of the increase in such net tangible book value per share attributable to the cash payments made by investors purchasing shares in the offering; and

the amount of the immediate dilution from the public offering price to such investors.

SELLING STOCKHOLDER

The following table presents information regarding the selling stockholder and the shares that such selling stockholder may offer and sell from time to time under this prospectus and any prospectus supplement. Such information was obtained from the selling stockholder and has not been independently verified by us. The term "selling stockholder" includes his transferees, pledgees, donees, or other successors. Any material relationship the selling stockholder has had with us during the past three years is described in the footnotes to the table. To our knowledge, there currently are no agreements, arrangements, or understandings with respect to the sale of any shares of our common stock.

The selling stockholder may from time to time offer and sell pursuant to this prospectus up to 1,200,000 shares of common stock owned by him. The selling stockholder, however, makes no representations that the shares covered by this prospectus will be offered for sale. The selling stockholder will pay any underwriting discounts and commissions and expenses incurred by the selling stockholder for brokerage, accounting, tax or legal services or any other expenses incurred by the selling stockholder in connection with sales by him. We will bear all other costs, fees and expenses incurred in effecting the registration of the shares covered by this prospectus, including, but not limited to, all registration and filing fees and fees and expenses of our counsel and our accountants.

Name of Beneficial Owner	Shares Beneficially Owned		Shares Being Registered for Resale ⁽³⁾	Shares Beneficially Owned	
	Prior to Offering ⁽¹⁾			After Offering ⁽¹⁾⁽³⁾⁽⁴⁾	
	Number	Percent ⁽²⁾		Number	Percent ⁽⁵⁾
Vincent J. Coates ⁽⁶⁾	3,501,511	18.63%	1,200,000	2,301,511	9.67%

⁽¹⁾The selling stockholder named in the table has sole voting and investment power with respect to all shares of common stock beneficially owned by him. The numbers and percentages shown include (a) the shares of common stock actually owned as of November 17, 2009, and (b) the shares of common stock which the selling stockholder had the right to acquire within sixty (60) days upon the exercise of options, warrants, or the conversion of convertible securities held by the selling stockholder on November 17, 2009. In calculating the percentage of ownership, all shares of common stock that the selling stockholder had the right to acquire within sixty (60) days upon the exercise of options, warrants, or the conversion of convertible securities held by the selling stockholder are deemed to be outstanding for the purpose of computing the percentage of the shares of common stock owned by such person, but are not deemed to be outstanding for the purpose of computing the percentage of the shares of common stock owned by any other person or group.

⁽²⁾Calculated on the basis of 18,799,386 shares of common stock, which is the number of shares of our common stock outstanding as of November 17, 2009.

⁽³⁾We do not know the extent to which the selling stockholder will sell any of the common stock being registered hereby.

Table of Contents

- (4) Assumes all the shares of common stock covered hereby are sold in the offering.
- (5) Calculated on the basis of 23,799,386 shares of common stock outstanding upon completion of this offering.
- (6) Vincent J. Coates founded Nanometrics and served as Vice-Chairman of the Board of Directors and Chairman of our Scientific Advisory Board from July 2007 through August 2009, as Chairman of the Board from January 1975 through July 2007 and as Secretary from February 1989 until July 2007. On August 25, 2009, Vincent J. Coates resigned from the Board and the Board appointed Norman Coates, the son of Vincent J. Coates, as a director of the Company to fill the vacancy created by the resignation of Vincent J. Coates. Norman Coates currently serves as a director on the Board.

DESCRIPTION OF CAPITAL STOCK

General

The following description of our capital stock includes a summary of certain provisions of our certificate of incorporation and our bylaws. This description is subject to the detailed provisions of, and is qualified by reference to, our certificate of incorporation and our bylaws.

We are authorized to issue up to 50,000,000 shares, consisting of 47,000,000 shares of common stock, par value \$0.001 per share, and 3,000,000 shares of preferred stock, per value \$0.001 per share.

Common Stock

Holders of our common stock are entitled to one vote for each share held of record on all matters submitted to a vote of stockholders. Subject to preferences that may be applicable to any outstanding shares of preferred stock, the holders of common stock are entitled to receive ratably such dividends, if any, as may be declared by the board of directors out of funds legally available for the payment of dividends. If we liquidate, dissolve or wind up, the holders of common stock are entitled to share ratably in all assets remaining after payment of liabilities and liquidation preferences of any outstanding shares of preferred stock. The rights, preferences and privileges of holders of common stock are subject to, and may be adversely affected by, the rights of any series of preferred stock which we may designate and issue in the future. Holders of common stock have no preemptive rights or rights to convert their common stock into any other securities. There are no redemption or sinking fund provisions applicable to the common stock.

Preferred Stock

Pursuant to our restated certificate of incorporation, the board of directors has the authority, without further action by the stockholders, to issue up to 3,000,000 shares of preferred stock in one or more series and to fix the designations, powers, preferences, privileges, and relative, participating, optional or special rights and the qualifications, limitations or restrictions thereof, including dividend rights, conversion rights, voting rights, terms of redemption and liquidation preferences, any or all of which may be greater than the rights of the common stock. The board of directors, without stockholder approval, can issue preferred stock with voting, conversion or other rights that could adversely affect the voting power and other rights of the holders of common stock. Currently, no shares of preferred stock have been designated as a series.

Delaware Anti-Takeover Law and Anti-Takeover Effects of Provisions of Our Charter and Bylaws

Delaware Anti-Takeover Statute

We are subject to Section 203 of the Delaware General Corporation Law. In general, these provisions prohibit a Delaware corporation from engaging in any business combination with any interested stockholder for a period of three (3) years following the date that the stockholder became an interested stockholder, unless the transaction in which the person became an interested stockholder is approved in a manner presented in Section 203 of the Delaware General Corporation Law. Generally, a business combination is defined to include mergers, asset sales and other transactions resulting in financial benefit to a stockholder. In general, an interested stockholder is a person who, together with affiliates and employees, owns, or within three (3) years, did own, 15% or more of a corporation's voting stock.

Table of Contents

Charter and Bylaws

Our bylaws provide for our board of directors to be divided into three classes, with staggered three-year terms. As a result, only one class of directors will be elected at each annual meeting of stockholders, with the other classes continuing for the remainder of their respective three-year terms. Stockholders have no cumulative voting rights, and the stockholders representing a majority of the shares of common stock outstanding are able to elect all of the directors.

Our bylaws require a stockholder who intends to nominate a candidate for election to the board of directors, or to raise new business at a stockholder meeting, to give advance written notice to us. In order to be timely, the stockholder's notice must be delivered to or mailed and received at our principal executive offices not less than one hundred twenty (120) calendar days before the one year anniversary of the date on which we first mailed our proxy statement to stockholders in connection with the previous year's annual meeting of stockholders; *provided, however*, that in the event that no annual meeting was held in the previous year or the date of the annual meeting has been changed by more than thirty (30) days from the date of the prior year's meeting, notice by the stockholder to be timely must be so received not later than the close of business on the later of one hundred twenty (120) calendar days in advance of such annual meeting and ten (10) calendar days following the date on which public announcement of the date of the meeting is first made. The notice provision requires a stockholder who desires to raise new business to provide us certain information concerning the nature of the new business, the stockholder and the stockholder's interest in the new business. Similarly, a stockholder wishing to nominate any person for election as a director will need to provide us with certain information concerning the nominee and the stockholder. A special meeting of the stockholders may be called by the Chairman of the Board or by the affirmative vote of a majority of our board of directors. These provisions all may have the effect of delaying, deferring or preventing a change in control.

The classification of our board of directors and lack of cumulative voting will make it more difficult for our existing stockholders to replace our board of directors as well as for another party to obtain control of us by replacing our board of directors. Since our board of directors has the power to retain and discharge our officers, these provisions could also make it more difficult for existing stockholders or another party to effect a change in management.

These and other provisions may have the effect of deterring hostile takeovers or delaying changes in control or management. These provisions are intended to enhance the likelihood of continued stability in the composition of our board of directors and in the policies of our board of directors and to discourage certain types of transactions that may involve an actual or threatened change in control. These provisions are designed to reduce our vulnerability to an unsolicited acquisition proposal. The provisions also are intended to discourage certain tactics that may be used in proxy fights. However, such provisions could have the effect of discouraging others from making tender offers for our shares and, as a consequence, they also may inhibit fluctuations in the market price of the our shares that could result from actual or rumored takeover attempts. Such provisions also may have the effect of preventing changes in our management.

Transfer Agent and Registrar

Registrar and Transfer Company is the transfer agent and registrar for our common stock.

Listing

Our common stock is listed for trading on the NASDAQ Global Market under the symbol NANO.

PLAN OF DISTRIBUTION

We and the selling stockholder may sell the securities to or through underwriters or dealers, through agents, or directly to one or more purchasers. A prospectus supplement or supplements (and any related free writing prospectus that we may authorize to be provided to you) will describe the terms of the offering of the securities, including, to the extent applicable:

the name or names of any agents or underwriters;

Table of Contents

the name of, and number of shares of our common stock being sold by, the selling stockholder;

the purchase price of the securities being offered and the proceeds we will receive from the sale;

any over-allotment options under which underwriters may purchase additional securities from us or the selling stockholder;

any agency fees or underwriting discounts and other items constituting agents or underwriters' compensation;

any public offering price;

any discounts or concessions allowed or reallocated or paid to dealers; and

any securities exchanges or markets on which such securities may be listed.

We may distribute the securities from time to time in one or more transactions at:

fixed price or prices, which may be changed from time to time;

market prices prevailing at the time of sale;

prices related to such prevailing market prices; or

negotiated prices.

Agents

We or the selling stockholder may designate agents who agree to use their reasonable efforts to solicit purchases of our securities for the period of their appointment or to sell our securities on a continuing basis. We will name any agent involved in the offering and sale of securities and we will describe any commissions we will pay the agent in the applicable prospectus supplement.

Underwriters

The term "selling stockholder" includes donees, pledgees, transferees or other successors-in-interest selling shares received after the date of this prospectus from the selling stockholder as a gift, pledge, partnership distribution or other non-sale related transfer. If we or the selling stockholder use underwriters for a sale of securities, the underwriters will acquire the securities for their own account. The underwriters may resell the securities in one or more transactions, including negotiated transactions, at a fixed public offering price or at varying prices determined at the time of sale. The obligations of the underwriters to purchase the securities will be subject to the conditions set forth in the applicable underwriting agreement. Subject to certain conditions, the underwriters will be obligated to purchase all the securities of the series offered if they purchase any of the securities of that series. We may change from time to time any public offering price and any discounts or concessions the underwriters allow or reallocate or pay to dealers. We may use underwriters with whom we or the selling stockholder have a material relationship. We will describe the nature of any such relationship in any applicable prospectus supplement naming any such underwriter. Only underwriters we name in the prospectus supplement are underwriters of the securities offered by the prospectus supplement.

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We and the selling stockholder may provide agents and underwriters with indemnification against civil liabilities related to offerings under this prospectus, including liabilities under the Securities Act, or contribution with respect to payments that the agents or underwriters may make with respect to these liabilities.

Table of Contents

Direct Sales

We and the selling stockholder may also sell securities directly to one or more purchasers without using underwriters or agents. Underwriters, dealers and agents that participate in the distribution of the securities may be underwriters as defined in the Securities Act, and any discounts or commissions they receive from us and any profit on their resale of the securities may be treated as underwriting discounts and commissions under the Securities Act. We will identify in the applicable prospectus supplement any underwriters, dealers or agents and will describe their compensation. We and the selling stockholder may have agreements with the underwriters, dealers and agents to indemnify them against specified civil liabilities, including liabilities under the Securities Act. Underwriters, dealers and agents may engage in transactions with or perform services for us in the ordinary course of their businesses. In addition, any shares that qualify for sale by the selling stockholder pursuant to Rule 144 under the Securities Act of 1933 may be sold under Rule 144 rather than pursuant to this prospectus.

Stabilization Activities

Any underwriter may engage in overallotment, stabilizing transactions, short covering transactions and penalty bids in accordance with Regulation M under the Exchange Act. Overallotment involves sales in excess of the offering size, which create a short position. Stabilizing transactions permit bids to purchase the underlying security so long as the stabilizing bids do not exceed a specified maximum. Short covering transactions involve purchases of the securities in the open market after the distribution is completed to cover short positions. 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. Those activities may cause the price of the securities to be higher than it would otherwise be. If commenced, the underwriters may discontinue any of these activities at any time.

Passive Market Making

Any underwriters who are qualified market makers on the NASDAQ Global Market may engage in passive market making transactions in the securities 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.

LEGAL MATTERS

The validity of the securities being offered by this prospectus will be passed upon for us by Perkins Coie LLP. If the validity of any securities is also passed upon by counsel any underwriters, dealers or agents, that counsel will be named in the prospectus supplement relating to that specific offering.

EXPERTS

The consolidated financial statements and schedule as of December 27, 2008 and December 29, 2007 and for each of the three years in the period ended December 27, 2008 incorporated by reference in this prospectus have been so incorporated in reliance on the report of BDO Seidman, LLP, an independent registered public accounting firm, incorporated herein by reference, given on the authority of said firm as experts in auditing and accounting.

WHERE YOU CAN FIND MORE INFORMATION

We file annual, quarterly and current reports, proxy statements and other information electronically with the SEC. You may read and copy these reports, proxy statements and other information at the SEC's public reference room at 100 F Street, N.E., Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for more information about the operation of the public reference room. You can request copies of these documents by writing to the SEC and paying a fee for the copying costs. The SEC also maintains an Internet site that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC, including us.

Table of Contents

The SEC's Internet site can be found at <http://www.sec.gov>. In addition, we make available on or through our website copies of these reports as soon as reasonably practicable after we electronically file or furnish them to the SEC. Our website can be found at <http://www.nanometrics.com>.

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

We are allowed to incorporate by reference information contained in documents that we file with the SEC. This means that we can disclose important information to you by referring you to those documents and that the information in this prospectus is not complete. You should read the information incorporated by reference for more detail. We incorporate by reference in two ways. First, we list below certain documents that we have already filed with the SEC. The information in these documents is considered part of this prospectus. Second, the information in documents that we file in the future will update and supersede the current information in, and be incorporated by reference in, this prospectus.

We incorporate by reference into this prospectus the documents listed below, any filings we make with the SEC pursuant to Section 13(a), 13(c), 14 or 15(d) of the Exchange Act after the date of the initial registration statement of which this prospectus is a part and prior to the effectiveness of the registration statement, and any filings we make with the SEC pursuant to Section 13(a), 13(c), 14 or 15(d) of the Exchange Act from the date of this prospectus until the termination of this offering (in each case, except for the information furnished under Item 2.02 or Item 7.01 in any current report on Form 8-K and Form 8-K/A):

our Annual Report on Form 10-K for the fiscal year ended December 27, 2008, filed on March 27, 2009;

our Quarterly Reports on Form 10-Q for the quarters ended March 28, 2009, June 27, 2009 and September 26, 2009, filed on May 12, 2009, August 11, 2009 and November 9, 2009, respectively;

the description of our Common Stock contained in our Registration Statement on Form 8-A filed with the Commission on April 29, 1985, including any amendment or report filed for the purpose of updating such description;

our Current Reports on Form 8-K, filed with the Commission on April 30, 2009, May 29, 2009, June 23, 2009, July 30, 2009, August 31, 2009, and October 29, 2009, and our Current Report on Form 8-K/A, filed with the Commission on August 3, 2009; and

all other reports filed pursuant to Section 13(a) or 15(d) of the Exchange Act since the end of the fiscal year covered by the annual report referred to above.

We will provide each person, including any beneficial owner, to whom a prospectus is delivered, a copy of any or all of the information that has been incorporated by reference into this prospectus but not delivered with this prospectus upon written or oral request at no cost to the requester. Requests should be directed to: Nanometrics Incorporated, 1550 Buckeye Drive, Milpitas, CA 95035, Attn: Investor Relations, telephone: (408) 545-6000.

This prospectus is part of a registration statement on Form S-3 that we filed with the SEC. That registration statement contains more information than this prospectus regarding us and our common stock, including certain exhibits and schedules. You can obtain a copy of the registration statement from the SEC at the address listed above or from the SEC's website.

You should rely only on the information provided in and incorporated by reference into this prospectus or any prospectus supplement. We have not authorized anyone else to provide you with different information. You should not assume that the information in this prospectus or any prospectus supplement is accurate as of any date other than the date on the front cover of these documents.

Table of Contents

6,200,000 Shares

NANOMETRICS INCORPORATED

Common Stock

PROSPECTUS

November 23, 2009

Table of Contents

Shares

NANOMETRICS INCORPORATED

Common Stock

PROSPECTUS SUPPLEMENT

Sole Book-Running Manager

Piper Jaffray & Co.

Oppenheimer & Co.

RBC Capital Markets

, 2009