

**nano**metrics

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**2018 ANNUAL REPORT | 2019 PROXY STATEMENT**



**LETTER TO STOCKHOLDERS**

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NANOMETRICS INCORPORATED

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## 2018 IN REVIEW

A record year in many respects, 2018 was an outstanding year for Nanometrics. Revenues of \$325 million were up 25% over 2017, compared to approximately 7% growth for the overall wafer fab equipment (WFE) industry, and an estimated 12% growth for our served market of process control metrology and inspection. Our relative outperformance in terms of revenue growth was primarily driven by significant incremental market share gains won early in 2018, as well as very robust first-half spending in support of capacity expansions and technology investments in both 3D-NAND and DRAM – markets in which we have established leading market share positions.

***Our objective is to continuously grow faster than the WFE market.*** 2018 marked our fifth straight year of double-digit revenue growth, with a compound annual growth rate of 18% since 2013, compared to 12% growth for overall WFE spending over the same period. We also well-outpaced our peers and competitors in 2018, delivering the strongest revenue growth performance reported in the process control segment.

We achieved new annual revenue records for our Automated, Integrated, and Optical Critical Dimension (OCD) metrology products, as well as new records for software and service. Our product revenues to the memory sector increased over 60% from the prior year, driving over 80% of our total product revenues for the full year. Service also grew to a new record of \$49 million, up 13% from 2017 – exceeding our long-term growth rate of 10% for this business, due to our continued focus on leveraging and optimizing our global service and support infrastructure.

***Our goal is to grow earnings consistently faster than revenues.*** In fiscal 2018, we increased both gross and operating margins by approximately four percentage points year-over-year, which along with the strong growth in revenues, drove new annual records in both operating and net income. We grew earnings significantly faster than revenues, with earnings per share approximately doubling year-over-year, compared to 25% revenue growth. Along with five straight years of double-digit revenue growth, we also have delivered five straight years of increasing gross margin, operating margin, and earnings per share.

***We are focused on cash flow generation and balance sheet efficiency.*** Given our strong operating performance and the improved efficiency of our balance sheet, we generated record cash flow from operations of \$103 million for the year. Our net increase in cash and investments was approximately \$35 million, reflecting an increased level of capital expenditures and the funds deployed to repurchase stock and acquire 4D Technology during the year.

***Prudent and strategic deployment of the company's capital is a key aspect of the strategies we've put in place to increase stockholder value.*** Our primary capital allocation priority in 2018 was increased investments in R&D and our global service and sales infrastructure, in support of continued expansion of our business above the new record revenue levels set in 2018. Secondly, we stepped up our capital expenditures in support of future revenue growth, with capex increasing 44% year-over-year, as we upgraded our manufacturing environment and other critical facilities, while investing in incremental technology to enable us to scale to a much higher revenue level.

We completed a \$50 million stock repurchase plan earlier this year, reducing our share count by about 2 million shares. This was our third stock repurchase program since we commenced stock buy-back plans in 2010. The fourth component of our capital deployment strategy is making accretive and complementary acquisitions and, late in the year, we completed the \$40 million acquisition of 4D Technology. Located in Tucson, Arizona, 4D brings to the Nanometrics team 57 employees and multiple opportunities for growth.

To sum up our performance in 2018, we accomplished our key goals of outgrowing the market, growing earnings faster than revenue, increasing free cash flow generation and balance sheet efficiency, and strategically deploying capital to increase stockholder value. As of the date of this printing, we have returned \$80 million to our stockholders through stock repurchase programs, and announced a new \$80 million plan in early March 2019.

## CURRENT SHIFTS IN INDUSTRY SPENDING

As we enter 2019, we are experiencing a meaningful short-term shift in the drivers and magnitude of industry spending. The WFE industry has historically been highly cyclical, with the very recent past breaking all previous patterns by experiencing an unprecedented *five straight years* of growth. This unrelenting expansion of semiconductor capital spending, to new record levels of WFE in 2018 at least 50% greater than the previous cyclical “peaks” of 2000, 2007, and 2011, has primarily come as a result of the industry’s transition from planar to three-dimensional NAND Flash devices, also known as 3D-NAND.

For most of this decade, and in fact for most of the industry’s history, capital spending for foundry/logic devices has been the largest driver of WFE. This dynamic began to shift in 2016, when multiple memory companies were making their first major 3D-NAND capital investments, and then accelerated through 2018, the first year in which total memory (both DRAM and NAND, as well as emerging memory technologies) drove the majority of WFE spending. NAND spending grew from a range of 15% to 18% of total semiconductor capital spending in any given year, to approximately *one-third* of all spending in 2018.

Over the same time period, our OCD metrology technology, in conjunction with our proprietary and powerful suite of servers, software and analytics that drive and support our Automated and Integrated systems, became the leading solution for 3D-NAND process control worldwide. We believe our leading market share position today is due to Nanometrics’ unique ability to provide our customers with the industry’s most robust data modeling and analytics for the most challenging 3D device structures. This includes not only 3D-NAND but also 10 nanometer and below FinFET logic device structures as well as 1X and 1Y DRAM technology nodes.

Given that our strongest market share positions are in the memory segment, and in particular 3D-NAND, Nanometrics has benefited from the recent strength in memory spending. Our five-year growth record is the highest in process control, and half of our product revenues in 2018 were to the NAND segment. As we enter 2019, it is abundantly clear that the pendulum is swinging back toward foundry/logic spending, at least in the short-term.

## LOOKING FORWARD

***At this point early in the year, we expect memory WFE spending will be meaningfully lower in 2019 vs. 2018.*** Several planned customer projects in the memory segment have been delayed and pushed out further into the future. A very weak environment for memory pricing, smartphone demand, and data center spending have dampened our customers’ confidence in maintaining their prior capital expansion plans, along with a backdrop of escalating trade, tariff and export concerns.

The good news is, we are seeing significant growth in our sales to our foundry, IDM and other logic customers. Product sales to this segment nearly doubled, from the first half of 2018, to the second half of 2018, albeit from a small base. Our non-memory businesses are growing significantly entering this year, and we expect them to compose close to half of our product revenues for the first part of 2019. For the full year, we expect our sales to our foundry, IDM and other device manufacturers to increase significantly from 2018 levels in support of 10 nanometer and below investments, and broader demand from all other non-memory markets.

While we are clearly experiencing headwinds in our core memory market, there is optimism for a rebound in spending, starting modestly in the second half of this year, and more meaningfully as we look to 2020. Memory spending today is at depressed levels and it’s a matter of when, not if, memory spending recovers.

In the meantime, we expect that growing sales to logic, foundry and other devices, as well as the contribution of 4D Technology and a growing business in services and Materials Characterization products, will help offset the expected declines in memory spending this year.

***We intend to continue to deliver solid performance in margins, profitability, and cash flows.*** We intend to continue to execute toward our objective to outperform WFE, which is currently expected to decline by 15% to 20% in 2019 compared to 2018. Should expectations prove accurate, this will be the first double-digit year-over-year decline in WFE to occur since 2012.

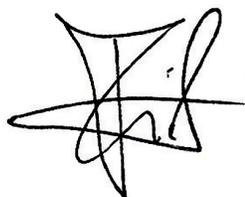
We intend to continue our R&D investments in support of new products and technologies that we believe will drive future growth. We intend to continue to execute on our other capital deployment priorities, including capital investments to enable us to scale to much higher revenue levels, as well as returning capital to our stockholders through opportunistic stock repurchases against our recently-announced \$80 million plan.

***We have handily outperformed the process control and wafer fab equipment markets over the last five years, and our objective is to do the same again over the next five years.*** We expect to complement these future revenue growth drivers with continued strong operational execution, and we are firmly committed to creating stockholder value as we drive toward our revenue growth and profitability targets in 2020 and beyond.

Our focus as industry conditions recover will be on operational and executional excellence, predictable financial results aligned with our target model, continued technological leadership and success in launching new product platforms, continued balance sheet efficiency and generation of strong free cash flows, increasing recurring revenue contributions from our installed base through growing business from services, software and upgrades, and, most importantly, delivering economies of scale for our business that are essential to achieving industry-leading profitability levels.

2018 was an outstanding year for Nanometrics. Our management team and board of directors are confident in our strategy and ability to continue to grow stockholder value through focus and execution. And we say with deep gratitude and appreciation that our accomplishments are tied directly to our terrific team of employees and business partners who help make it all happen.

Sincerely,

A handwritten signature in black ink, appearing to read 'Dr. Lesaicherre', with a stylized, overlapping structure.

Dr. Pierre-Yves Lesaicherre  
President and Chief Executive Officer

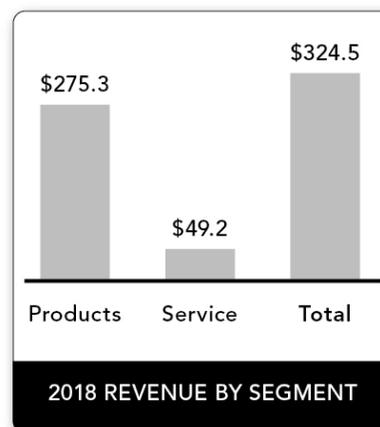
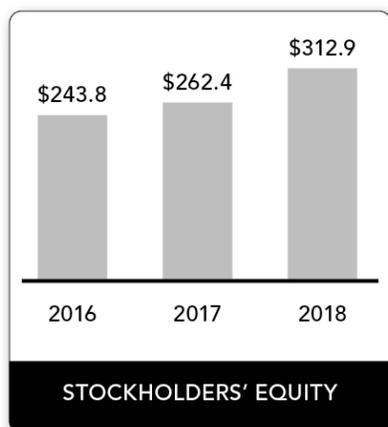
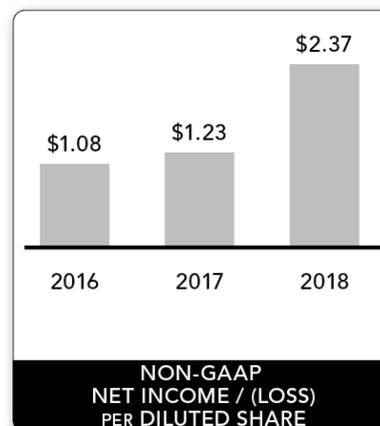
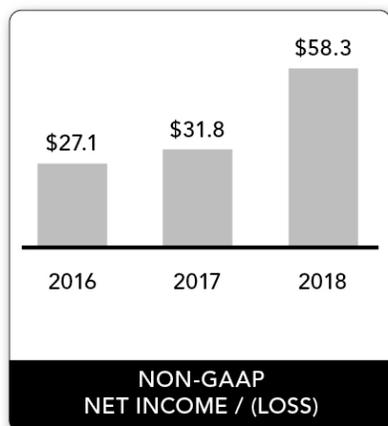
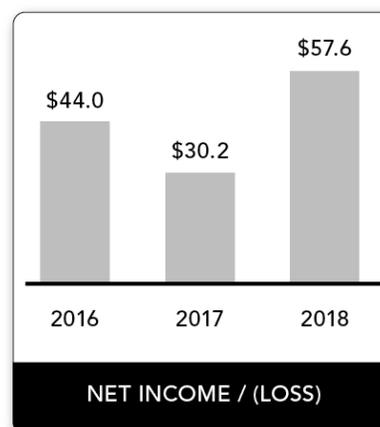
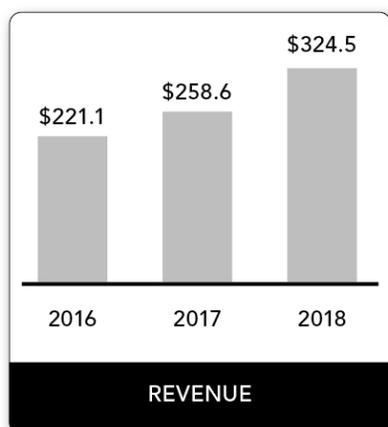
This Letter to Stockholders, which is accompanied by the proxy statement and Annual Report on Form 10-K, contains forward-looking statements. For information on how to identify forward-looking statements and cautionary language with respect to forward-looking statements, please see “Cautionary Information Regarding Forward-Looking Statements” in the Annual Report on Form 10-K.

## Financial Notes

The company ended fiscal 2018 with cash, cash equivalents and marketable securities of \$152 million, working capital of \$211 million, and tangible book value (stockholders' equity excluding goodwill and other intangible assets) of \$259 million.

A reconciliation between GAAP operating results and non-GAAP operating results follows the financial notes below. Non-GAAP results exclude acquisition-related expenses such as amortization of acquired intangibles and transaction costs, asset impairments, restructuring charges, and certain discrete tax items.

(Dollars in millions, except per share amounts)



(Amounts in millions, except per share amounts)	<u>2016</u>	<u>2017</u>	<u>2018</u>
GAAP net income	\$44.0	\$30.2	\$57.6
Non-GAAP adjustments:			
Amortization of intangible assets	1.5	0.2	0.4
Acquisition-related charges	-	-	1.6
Severance and executive search costs	-	1.6	1.5
Discrete tax items	(18.4)	(2.8)	(2.0)
Gain on disposal of property	-	-	(0.9)
Tax reform	-	2.6	-
Non-GAAP net income	<u>\$27.1</u>	<u>\$31.8</u>	<u>\$58.3</u>
GAAP net income per diluted share	<u>\$1.75</u>	<u>\$1.17</u>	<u>\$2.34</u>
Non-GAAP net income per diluted share	<u>\$1.08</u>	<u>\$1.23</u>	<u>\$2.37</u>
Shares used in diluted income per share calculation	<u>25.2</u>	<u>25.9</u>	<u>24.6</u>

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**NOTICE OF 2018 ANNUAL STOCKHOLDERS MEETING AND PROXY STATEMENT**

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NANOMETRICS INCORPORATED

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**NANOMETRICS INCORPORATED**  
**1550 Buckeye Drive**  
**Milpitas, California 95035**

**NOTICE OF ANNUAL MEETING OF STOCKHOLDERS**

**To Be Held On May 22, 2019**

Dear Stockholder:

You are cordially invited to attend the Annual Meeting of Stockholders of NANOMETRICS INCORPORATED, a Delaware corporation. The meeting will be held on Wednesday, May 22, 2019, at 9:00 a.m. local time, at our Corporate Headquarters located at 1550 Buckeye Drive, Milpitas, California 95035 for the following purposes:

1. To elect the Board's seven nominees for director to serve until the next annual meeting and until their successors are duly elected and qualified.
2. To approve, on an advisory basis, the compensation of Nanometrics' named executive officers, as disclosed in this proxy statement.
3. To ratify the appointment by the Audit Committee of the Board of Directors of PricewaterhouseCoopers LLP as the independent registered public accounting firm of Nanometrics for its fiscal year ending December 28, 2019.
4. To conduct any other business properly brought before the meeting.

These items of business are more fully described in the Proxy Statement accompanying this Notice.

The record date for the Annual Meeting is March 25, 2019. Only stockholders of record at the close of business on that date may vote at the meeting or any adjournment thereof.

**Important Notice Regarding the Availability of Proxy Materials for the Stockholders' Meeting  
To Be Held on May 22, 2019, at 1550 Buckeye Drive, Milpitas, California 95035.**

The proxy statement and annual report to stockholders are available at [www.proxyvote.com](http://www.proxyvote.com)

By Order of the Board of Directors

/s/ Bruce C. Rhine

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Bruce C. Rhine

Chairman of the Board of Directors

Milpitas, California

April 3, 2019

**You are cordially invited to attend the meeting in person. Whether or not you expect to attend the meeting, please complete, date, sign and return the proxy card that may be mailed to you, or vote over the telephone or the Internet as instructed in these materials, as promptly as possible to ensure your representation at the meeting. Even if you have voted by proxy, you may still vote in person if you attend the meeting. Please note, however, that if your shares are held of record by a broker, bank or other nominee and you wish to vote at the meeting, you must obtain a proxy issued in your name from that record holder.**

**NANOMETRICS INCORPORATED**  
**2019 ANNUAL MEETING OF STOCKHOLDERS**  
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**NANOMETRICS INCORPORATED**  
**1550 Buckeye Drive**  
**Milpitas, California 95035**

**PROXY STATEMENT FOR THE 2019 ANNUAL MEETING OF STOCKHOLDERS**

**May 22, 2019**

**QUESTIONS AND ANSWERS ABOUT THESE PROXY MATERIALS AND VOTING**

**Why did I receive a notice regarding the availability of proxy materials on the Internet?**

Pursuant to rules adopted by the Securities and Exchange Commission (the "SEC"), we have elected to provide access to our proxy materials over the Internet. Accordingly, we have sent you a Notice of Internet Availability of Proxy Materials (the "Notice") because the Board of Directors of Nanometrics Incorporated is soliciting your proxy to vote at the 2019 Annual Meeting of Stockholders, including at any adjournments or postponements of the meeting. All stockholders will have the ability to access the proxy materials on the website referred to in the Notice or request to receive a printed set of the proxy materials. Instructions on how to access the proxy materials over the Internet or to request a printed copy may be found in the Notice.

We intend to mail the Notice on or about April 9, 2019, to all stockholders of record entitled to vote at the annual meeting.

**Will I receive any other proxy materials by mail?**

We may send you a proxy card, along with a second Notice, on or after April 19, 2019.

**How do I attend the annual meeting?**

The meeting will be held on Wednesday, May 22, 2019, at 9:00 a.m., local time, at our Corporate Headquarters located at 1550 Buckeye Drive, Milpitas, California 95035. Directions to the annual meeting may be found on our website [www.nanometrics.com](http://www.nanometrics.com) by clicking on "Contact" then "Map & Local Driving Directions." Information on how to vote in person at the annual meeting is discussed below.

**Who can vote at the annual meeting?**

Only stockholders of record at the close of business on March 25, 2019, will be entitled to vote at the annual meeting. On this record date, there were 24,534,582 shares of common stock outstanding and entitled to vote.

*Stockholder of Record: Shares Registered in Your Name*

If on March 25, 2019, your shares were registered directly in your name with Nanometrics' transfer agent, Computershare Trust Company, N.A., then you are a stockholder of record. As a stockholder of record, you may vote in person at the meeting or vote by proxy. Whether or not you plan to attend the meeting, we urge you to fill out and return a proxy card (if you have received one), or vote by proxy over the telephone or on the Internet as instructed below, to ensure your vote is counted.

*Beneficial Owner Shares Registered in the Name of a Broker or Bank*

If on March 25, 2019, your shares were held, not in your name, but rather in an account at a brokerage firm, bank, dealer or other similar organization, then you are the beneficial owner of shares held in "street name" and the Notice is being forwarded to you by that organization. The organization holding your account is considered to be the stockholder of record for purposes of voting at the annual meeting. As a beneficial owner, you have the right to direct your broker or other agent regarding how to vote the shares in your account. You are also invited to attend the annual meeting. However, since you are not the stockholder of record, you may not vote your shares in person at the meeting unless you request and obtain a valid proxy from your broker or other agent.

## What am I voting on?

### There are three matters scheduled for a vote:

- Election of seven directors;
- Advisory approval of the compensation of Nanometrics' named executive officers, as disclosed in this proxy statement in accordance with SEC rules; and
- Ratification of appointment by the Audit Committee of the Board of Directors of PricewaterhouseCoopers LLP as the independent registered public accounting firm of Nanometrics for its fiscal year ending December 28, 2019.

### What if another matter is properly brought before the meeting?

The Board of Directors knows of no other matters that will be presented for consideration at the Annual Meeting. If any other matters are properly brought before the meeting, it is the intention of the persons named in the accompanying proxy to vote on those matters in accordance with their best judgment.

### How do I vote?

You may either vote "For" all the nominees to the Board of Directors or you may "Withhold" your vote for any nominee you specify. For each of the other matters to be voted on, you may vote "For" or "Against" or "Abstain" from voting.

The procedures for voting are as follows:

#### *Stockholder of Record: Shares Registered in Your Name*

If you are a stockholder of record, you may vote in person at the annual meeting or vote by proxy over the telephone, or vote by proxy through the Internet, or vote by proxy using a proxy card that you may request or that we may elect to deliver at a later time. Whether or not you plan to attend the meeting, we urge you to vote by proxy to ensure your vote is counted. You may still attend the meeting and vote in person even if you have already voted by proxy.

- To vote in person, come to the annual meeting and you will receive a ballot when you arrive.
- To vote using a proxy card, you may request a proxy card and simply complete, sign and date the proxy card that may be delivered and return it promptly in the envelope that will be provided with the proxy card. If you return your signed proxy card to us before the annual meeting, we will vote your shares as you direct.
- To vote over the telephone, dial toll-free 1-800-690-6903 using a touch-tone phone and follow the recorded instructions. You will be asked to provide the company number and control number from the **Notice**. Your telephone vote must be received by 11:59 p.m., Eastern Time on May 21, 2019, to be counted.
- To vote through the Internet, go to [www.proxyvote.com](http://www.proxyvote.com) to complete an electronic proxy card. You will be asked to provide the company number and control number from the **Notice**. Your Internet vote must be received by 11:59 p.m., Eastern Time on May 21, 2019, to be counted.

#### *Beneficial Owner: Shares Registered in the Name of Broker or Bank*

If you are a beneficial owner of shares registered in the name of your broker, bank, or other agent, you should have received a Notice containing voting instructions from that organization rather than from Nanometrics. Simply follow the voting instructions in the Notice to ensure that your vote is counted. To vote in person at the annual meeting, you must obtain a valid proxy from your broker, bank or another agent. Follow the instructions from your broker or bank included with these proxy materials, or contact your broker or bank to request a proxy form.

**Internet proxy voting may be provided to allow you to vote your shares online, with procedures designed to ensure the authenticity and correctness of your proxy vote instructions. However, please be aware that you must bear any costs associated with your Internet access, such as usage charges from Internet access providers and telephone companies.**

### **How many votes do I have?**

On each matter to be voted upon, you have one vote for each share of common stock you own as of March 25, 2019.

### **What happens if I do not vote?**

#### *Stockholder of Record: Shares Registered in Your Name*

If you are a stockholder of record and do not vote by completing your proxy card, by telephone, through the Internet or in person at the annual meeting, your shares will not be voted.

#### *Beneficial Owner: Shares Registered in the Name of Broker or Bank*

If you are a beneficial owner and do not instruct your broker, bank, or other agent how to vote your shares, the question of whether your broker or nominee will still be able to vote your shares depends on whether the New York Stock Exchange (“NYSE”) deems the particular proposal to be a “routine” matter. Brokers and nominees can use their discretion to vote “uninstructed” shares with respect to matters that are considered to be “routine,” but not with respect to “non-routine” matters. Under the rules and interpretations of the NYSE, “non-routine” matters are matters that may substantially affect the rights or privileges of stockholders, such as mergers, stockholder proposals, elections of directors (even if not contested), executive compensation (including any advisory stockholder votes on executive compensation and on the frequency of stockholder advisory votes on executive compensation), and certain corporate governance proposals, even if management-supported. Accordingly, your broker or nominee may not vote your shares on Proposals 1 or 2 without your instructions but may vote your shares on Proposal 3 even in the absence of your instruction.

### **What if I return a proxy card or otherwise vote but do not make specific choices?**

If you return a signed and dated proxy card or otherwise vote without marking voting selections, your shares will be voted, as applicable, “For” the election of all seven nominees for director, “For” the advisory approval of executive compensation, and “For” the ratification of the appointment by the Audit Committee of the Board of Directors of PricewaterhouseCoopers LLP as the independent registered public accounting firm of Nanometrics for its fiscal year ending December 28, 2019. If any other matter is properly presented at the meeting, your proxyholder (one of the individuals named on your proxy card) will vote your shares using his or her best judgment.

### **Who is paying for this proxy solicitation?**

We will pay for the entire cost of soliciting proxies. In addition to these proxy materials, our directors and employees may also solicit proxies in person, by telephone, or by other means of communication. Directors and employees will not be paid any additional compensation for soliciting proxies. We may also reimburse brokerage firms, banks and other agents for the cost of forwarding proxy materials to beneficial owners.

### **What does it mean if I receive more than one Notice?**

If you receive more than one Notice, your shares may be registered in more than one name or in different accounts. Please follow the voting instructions on the Notices to ensure that all of your shares are voted.

### **Can I change my vote after submitting my proxy?**

#### *Stockholder of Record: Shares Registered in Your Name*

Yes. You can revoke your proxy at any time before the final vote at the meeting. If you are the record holder of your shares, you may revoke your proxy in any one of the following ways:

- You may submit another properly completed proxy card with a later date.
- You may grant a subsequent proxy by telephone or through the Internet.
- You may send a timely written notice that you are revoking your proxy to Nanometrics’ Secretary at Nanometrics Incorporated, 1550 Buckeye Drive, Milpitas, California 95035.
- You may attend the annual meeting and vote in person. Simply attending the meeting will not, by itself, revoke your proxy.

Your most current proxy card or telephone or Internet proxy is the one that is counted.

### *Beneficial Owner: Shares Registered in the Name of Broker or Bank*

If your shares are held by your broker or bank as a nominee or agent, you should follow the instructions provided by your broker or bank.

### **When are stockholder proposals and director nominations due for next year's annual meeting?**

To be considered for inclusion in next year's proxy materials, your proposal must be submitted in writing by December 11, 2019, to Nanometrics' Secretary at Nanometrics Incorporated, 1550 Buckeye Drive, Milpitas, California 95035. If the date of our 2020 annual meeting is changed by more than 30 days from the one-year anniversary of the date of the 2019 annual meeting, the proposal must be received a reasonable time before we begin to print and mail our proxy materials. The submission of a stockholder proposal does not guarantee that it will be included in our proxy statement.

If you wish to submit a proposal (including a director nomination) at the meeting that is not to be included in next year's proxy materials, you must do so by December 11, 2019, to Nanometrics' Secretary at Nanometrics Incorporated, 1550 Buckeye Drive, Milpitas, California 95035. If we set the date of our 2020 annual meeting to a date more than 30 days from the one year anniversary of the date of our 2019 annual meeting, then the deadline for receipt of stockholder proposals will be no later than the close of business on the later of 120 calendar days in advance of the 2020 annual meeting or ten days following the date on which we first publicly announce the date of the 2020 annual meeting. You are also advised to review Nanometrics' Bylaws, which contain additional requirements about advance notice of stockholder proposals and director nominations.

### **How are votes counted?**

Votes will be counted by the inspector of election appointed for the meeting, who will separately count the votes for the proposals as follows:

- Proposal 1, to elect directors, votes "For," "Withhold" and broker non-votes;
- Proposal 2, the advisory vote on executive compensation, votes "For" and "Against," abstentions and broker non-votes; and
- Proposal 3, the ratification of the appointment by the Audit Committee of the Board of Directors of PricewaterhouseCoopers LLP as the independent registered public accounting firm of Nanometrics for its fiscal year ending December 28, 2019, votes "For" and "Against," abstentions and broker non-votes.

### **What are "broker non-votes"?**

As discussed above, when a beneficial owner of shares held in "street name" does not give instructions to the broker or nominee holding the shares as to how to vote on matters deemed by the NYSE to be "non-routine," the broker or nominee cannot vote the shares. These unvoted shares are counted as "broker non-votes."

### **How many votes are needed to approve each proposal?**

For Proposal 1, the election of directors, the seven nominees receiving the most "For" votes from the holders of shares present in person or represented by proxy and entitled to vote on the election of directors will be elected. Only "For" votes will affect the outcome. However, the Board of Directors has adopted a Majority Vote Policy, pursuant to which any director-nominee that is elected but fails to receive more "For" votes than "Withheld" votes must submit his/her resignation for consideration by the Board. The Board will then decide whether to accept the director's resignation. Details of the Majority Vote Policy are set out below under "Corporate Governance - Voting for Directors - Majority Vote Policy."

For Proposal 2, the advisory approval of the compensation of Nanometrics' named executive officers, the proposal will be approved if it receives "For" votes from the holders of a majority of shares present in person or represented by proxy and entitled to vote on the matter. If you "Abstain" from voting, it will have the same effect as an "Against" vote. Broker non-votes will have no effect.

For Proposal 3, ratification of the appointment by the Audit Committee of the Board of Directors of PricewaterhouseCoopers LLP as the independent registered public accounting firm of Nanometrics for its fiscal year ending December 28, 2019, the proposal will be approved if it receives "For" votes from the holders of a majority of shares present in person or represented by proxy and entitled to vote on the matter. If you "Abstain" from voting, it will have the same effect as an "Against" vote. We do not expect to have any broker non-votes on this matter, but if we do, they will have no effect.

**What is the quorum requirement?**

A quorum of stockholders is necessary to hold a valid meeting. A quorum will be present if stockholders holding at least a majority of the outstanding shares entitled to vote are present at the meeting in person or represented by proxy. On the record date, there were 24,534,582 shares outstanding and entitled to vote. Thus, the holders of 12,267,292 shares must be present in person or represented by proxy at the meeting to have a quorum.

Your shares will be counted towards the quorum only if you submit a valid proxy (or one is submitted on your behalf by your broker, bank or other nominee) or if you vote in person at the meeting. Abstentions and broker non-votes will be counted towards the quorum requirement. If there is no quorum, the holders of a majority of shares present at the meeting in person or represented by proxy may adjourn the meeting to another date.

**How can I find out the results of the voting at the annual meeting?**

Preliminary voting results will be announced at the annual meeting. In addition, final voting results will be published in a current report on Form 8-K that we expect to file within four business days after the annual meeting. If final voting results are not available to us in time to file a Form 8-K within four business days after the meeting, we intend to file a Form 8-K to publish preliminary results and, within four business days after the final results are known to us, file an additional Form 8-K to publish the final results.

## PROPOSAL 1: ELECTION OF DIRECTORS

At the 2019 annual meeting of stockholders, unless otherwise instructed, the proxy holders will vote the proxies received by them for the nominees named below, each of whom has been nominated by the Board of Directors.

The Board of Directors currently has eight members. Effective at the 2019 annual meeting, the size of the Board of Directors will be reduced to seven members. All current directors are standing for election at the 2019 annual meeting, except for J. Thomas Bentley. The nominees were recommended by the Nominating and Governance Committee of the Board of Directors. All the nominees named below were previously elected as directors by our stockholders.

If the nominees are unable or decline to serve as a director at the time of the annual meeting, the proxies will be voted for any nominee who shall be designated by the present Board to fill the vacancy. We do not have any reason to believe that any of the nominees will be unable or will decline to serve as a director. Directors are elected by a plurality of the votes of the holders of shares present in person or by proxy and entitled to vote on the election of directors. The seven nominees receiving the highest number of affirmative votes will be elected. Pursuant to our Majority Vote Policy, if a nominee for director receives a greater number of "Withhold" votes than "For" votes, that director shall promptly tender to the Nominating and Governance Committee his/her offer of resignation. Within 90 days following certification of the stockholder vote, the Committee shall recommend to the Board the action to be taken with respect to such offer of resignation, and the Board shall consider and act upon the Committee's recommendation. Unless marked otherwise, the proxy holders will vote proxies returned to us for the nominees named below.

### Director Nominees

Set forth below is information regarding each of our director nominees, including their ages, as of April 3, 2019, the periods during which they have served as a director, certain information as to principal occupations and directorships held by them in corporations whose shares are publicly registered, and a discussion of the specific experience, qualifications, attributes or skills of each nominee that led the Board to nominate that person as a nominee for director, as of the date of this proxy statement.

**Edward J. Brown, Jr.**, age 61, has served as a director since February 2013. From May 2013 until September 2015, Mr. Brown was the Chief Executive Officer of Cymer Light Source, following the merger of Cymer, Inc. with ASML Holding Ltd., prior to which Mr. Brown served as President and Chief Operating Officer of Cymer, Inc. from September 2005 until May 2013. From 1984 to 2005, Mr. Brown was employed at Applied Materials, Inc., where he held numerous high-level management positions including group vice president and senior advisor to the president, vice president and general manager of the Intel business unit, as well as managing director heading up their largest product division, Global Operations. Prior to Applied Materials Inc., Mr. Brown held key engineering positions at TRW Corporation and Burroughs Corporation. Mr. Brown currently serves as a director of Astrodyne TDI and is a member of SEMI North American Advisory Board.

Mr. Brown received a master's degree in business administration from National University and a bachelor's degree in industrial studies from San Diego State University. Mr. Brown's qualifications to serve as a director include his 40 years of experience in the semiconductor equipment industry and his extensive senior executive management experience.

**Robert Deuster**, age 68, has served as a director since March 2017. Mr. Deuster served as Chief Executive Officer of Collectors Universe, Inc., a public company that provides authentication and grading services to the global collectibles market from 2012 to 2017, and as a Director from 2012 to 2018. Mr. Deuster served as Chairman and Chief Executive Officer of Newport Corporation, a public company that is a global supplier of laser, optical and motion control products, from May 1996 until his retirement in October 2007. Mr. Deuster served in various senior management positions at Applied Power, Inc. (now Actuant Corporation, a New York Stock Exchange listed company) and General Electric Company's Medical Systems Division. Mr. Deuster served as Director of Ondax Incorporated from 2010 to 2018, as a Director of Symmetry Medical Incorporated from 2014 to 2017, and as a Director of Pico Holdings from 2011 to 2016.

Mr. Deuster received a B.S. in Electrical Engineering from Marquette University in 1973. Mr. Deuster holds a Masters Professional Director Certification from the American College of Corporate Directors, a public company director education and credentialing organization. Mr. Deuster's extensive management experience, including as a CEO of and a senior executive at other public companies, combined with his experience as an independent director of both public and private companies, qualifies him to serve as a member of our Board of Directors.

**Pierre-Yves Lesaichere, Ph.D.**, age 55, joined Nanometrics as President, Chief Executive Officer and Director in November 2017. From January 2012 to February 2017, Dr. Lesaichere was the CEO of Lumileds, an integrated manufacturer of LED components and Automotive Lighting Lamps. Prior to that, Dr. Lesaichere held senior executive positions at NXP from 2006 to 2012. Before NXP, Dr. Lesaichere was with Philips Semiconductors.

Dr. Lesaicherre holds an MBA with a focus on international business and strategy from INSEAD and has MS and Ph.D. degrees in Material Science from the National Polytechnic Institute of Grenoble. The Board determined that due to Dr. Lesaicherre's extensive experience in the semiconductor, lighting and LED market space, as well as his role as our President and Chief Executive Officer, Dr. Lesaicherre should serve as a member of the Board.

**Bruce C. Rhine**, age 61, has served as our Chairman of the Board of Directors since July 2007 and as a director since July 2006. From July 2006 to February 2008, Mr. Rhine served as our Chief Strategy Officer. From March 2007 to August 2007, Mr. Rhine served as our Chief Executive Officer. From 2000 to 2006, Mr. Rhine served as Chairman and Chief Executive Officer of Accent Optical Technologies, Inc. (acquired by Nanometrics in July 2006) and as its President from January 2003 to April 2005 and from August 2000 to September 2001. Prior to 2000 Mr. Rhine was an executive at Applied Materials, Lam Research Corporation, Asyst Technologies and Air Products and Chemicals.

Mr. Rhine holds a B.S. degree in Chemical Engineering and an M.B.A. in Finance from The Pennsylvania State University. Mr. Rhine is a member of the National Association of Corporate Directors ("NACD") and the American College of Corporate Directors ("ACCD"). In addition to his experience from his prior senior management service to Nanometrics, Mr. Rhine brings extensive industry knowledge and executive management experience to the Board.

**Christopher A. Seams**, age 56, has served as a director since August 2015. Mr. Seams served as Chief Executive Officer of Deca Technologies from June 2013 to August 2016, where he was responsible for the overall management of the business. Prior to Deca Technologies, Mr. Seams served as Executive Vice President of sales and marketing at Cypress Semiconductor and held various technical and operational management positions in its manufacturing, development and operations. Prior to joining Cypress in 1990, Mr. Seams worked in process development for Advanced Micro Devices and Philips Research Laboratories. Mr. Seams also serves on the board of directors of Xperi Corporation, and previously served on the board of directors of Tesser Technologies, Inc. until December 2016.

Mr. Seams earned his bachelor's degree in electrical engineering from Texas A&M University and his master's degree in electrical and computer engineering from the University of Texas at Austin. Mr. Seams has a Professional Certificate in Advanced Computer Security from Stanford University. Mr. Seams is a member of NACD and ACCD and is also a senior member of the Institute of Electrical and Electronics Engineers. The Board believes that Mr. Seams brings extensive management, sales and marketing, and engineering experience in the semiconductor industry to his role as a member of the Board.

**Timothy J. Stultz, Ph.D.**, age 71, joined Nanometrics in August 2007 and currently serves as a director. He held the position of President and CEO from August 2007 to November 2017. From June 2003 to August 2007, Dr. Stultz served as the President and Chief Executive Officer and a Director of Imago Scientific Instruments Corporation, a supplier of proprietary 3-D atom probe microscopes to the research materials and microelectronics industries. Prior to Imago, Dr. Stultz served as President and Chief Executive Officer for ThauMDx, a developer of diagnostic systems for the healthcare industry; and Vice President and General Manager of Veeco Instruments' Metrology and Instrumentation Business. Dr. Stultz previously served as a member of the board of directors of Tesser Technologies, Inc. until May 2015.

Dr. Stultz received his B.S., M.S. and Ph.D. in Materials Science and Engineering from Stanford University. In addition to his institutional knowledge as the executive leader of Nanometrics, Dr. Stultz's scientific background and significant senior executive management experience in high tech industries is important to the Board.

**Christine A. Tsingos**, age 60, has served as a director since May 2014. Ms. Tsingos is currently the Executive Vice President and Chief Financial Officer of Bio-Rad Laboratories although she announced her intentions to retire as of April 30, 2019. In 2002, Ms. Tsingos was named Bio-Rad's Chief Financial Officer; in 2003 she became Vice President, and in 2012 she was named Executive Vice President. Bio-Rad designs, manufactures and distributes a broad range of innovative products and solutions for the global life science and clinical diagnostic markets. Prior to Bio-Rad, Ms. Tsingos held executive positions at Autodesk, The Cooper Companies, and Attest Systems. Ms. Tsingos also serves on the board of directors of Varex Imaging Corporation.

Ms. Tsingos earned her Bachelor of Arts in International Studies from the American University in Washington D.C. and an M.B.A in International Business from the George Washington University. In 2010, Ms. Tsingos was awarded the prestigious Bay Area CFO of the Year. Ms. Tsingos' qualifications to serve as a director include over 25 years of financial and operational experience.

**THE BOARD OF DIRECTORS RECOMMENDS A VOTE IN FAVOR OF EACH NAMED NOMINEE.**

## CORPORATE GOVERNANCE

### Board Structure

Bruce C. Rhine serves as the Chairman of the Board and Pierre-Yves Lesaichere, Ph.D. serves as the President, Chief Executive Officer and a director of Nanometrics. We believe that having a separate Chairman and Chief Executive Officer is appropriate and is consistent with corporate governance best practices. From July 2006 to February 2008, Mr. Rhine served as our Chief Strategy Officer, and from March 2007 to August 2007, Mr. Rhine served as our Chief Executive Officer. Because of his previous roles with Nanometrics, Mr. Rhine is intimately familiar with Nanometrics' business and industry, and very capable of effectively identifying strategic priorities, leading discussions of the Board of Directors and defining Nanometrics' strategic objectives. The Board of Directors determined that Mr. Rhine became an independent member of the Board effective February 2011 under the Nasdaq Listing Rules due to the passage of time subsequent to his previous management role with Nanometrics. Dr. Lesaichere, as the Chief Executive Officer, is the individual selected by the Board of Directors to manage Nanometrics on a day-to-day basis, and his prior experience and direct involvement in Nanometrics' operations allow him to provide valuable insights with respect to strategic planning and the operational requirements to meet Nanometrics' short- and long-term objectives. Nanometrics' independent directors bring experience, oversight and expertise from outside the company and industry.

### The Board's Role in Risk Oversight

One of the Board's primary responsibilities is reviewing Nanometrics' strategic plans and objectives, including oversight of the principal risk exposures of the company. The Board does not have a standing risk management committee, but rather administers this oversight function directly through the Board as a whole, as well as through various Board standing committees that address risks inherent in their respective areas of oversight. In particular, the Board is responsible for monitoring and assessing strategic risk exposure, including a determination of the nature and level of risk appropriate for the company. The Audit Committee assists the Board in oversight and monitoring of the legal and financial risks facing Nanometrics, and management's approach to addressing these risks and strategies for risk mitigation. The Audit Committee is also responsible for discussing guidelines and policies governing the process by which management and other persons responsible for risk management, assess and manage Nanometrics' exposure to risk, as well as Nanometrics' major financial risk exposures and the steps management has taken to monitor and control such exposures, based on consultation with Nanometrics' management and independent auditors. Our Compensation Committee assesses and monitors whether any of our compensation policies and programs has the potential to encourage excessive risk-taking. The Board addresses, at least annually, the principal current and future risk exposures of Nanometrics. The Board receives regular reports from members of senior management on areas of material risk to Nanometrics, including operational, financial, legal and regulatory, strategic and reputation risks.

### Board of Directors Meetings and Committees

The full Board of Directors met nine times during the fiscal year ended December 29, 2018. During the fiscal year ended December 29, 2018, all directors attended at least 75% of the aggregate number of meetings of the Board of Directors and meetings of committees on which they served. The standing committees of the Board of Directors include an Audit Committee, a Compensation Committee and a Nominating and Governance Committee.

Directors are encouraged to attend the annual meeting of stockholders. All members of the Board of Directors, then in office, attended the 2018 annual meeting of stockholders.

The Board of Directors has determined that all of its directors meet the independence requirements of the Nasdaq Stock Market, with the exception of Pierre-Yves Lesaichere, Ph.D., due to his position as our President and Chief Executive Officer, and Timothy J. Stultz, Ph.D., due to his position as our President and Chief Executive Officer prior to his retirement from those positions in November 2017.

The Board has a standing Audit Committee, Compensation Committee and Nominating and Governance Committee. The following table provides membership and meeting information for fiscal 2018 for each of the Board standing committees:

Name	Audit	Compensation	Nominating and Governance
Bruce C. Rhine	X		X
J. Thomas Bentley		X	
Edward J. Brown, Jr.		X*	X
Robert G. Deuster	X	X	
Christopher A. Seams	X		X*
Christine A. Tsingos	X*	X	
Total meetings in fiscal 2018	9	6	4

\* Chair of the committee. For the Nominating and Governance committee, Mr. Rhine served as Chair until May 22, 2018, and Mr. Seams has served as Chair since May 22, 2018.

### Audit Committee

The Audit Committee of the Board of Directors oversees our financial reporting, our internal audit and control functions, the results and scope of the annual audit and quarterly reviews conducted by our independent registered public accounting firm, and our compliance with legal matters that may have a significant impact on our financial reports. In addition, the Audit Committee has the responsibility to consider and recommend the engagement of, and to review and approve fee arrangements with, our independent registered public accounting firm. The Audit Committee also monitors transactions between Nanometrics and our officers and directors for any potential conflicts of interest and assists the Board of Directors in its risk oversight role.

The Board of Directors has determined that each member of our Audit Committee is “independent” within the meaning of the rules of the Securities and Exchange Commission and the Listing Rules of Nasdaq, and has the qualifications or previous experience to be able to read and understand financial statements. Further, the Board of Directors has determined that Ms. Tsingos, Chair of the Audit Committee, qualifies as an “audit committee financial expert,” as such term is used in the Securities and Exchange Commission rules.

The report of the Audit Committee is included at the end of the “Corporate Governance” section of this Proxy Statement. The Board of Directors has adopted a written Audit Committee Charter, which is available on our website at <http://investor.nanometrics.com/corporate-governance>.

### Compensation Committee

The Compensation Committee has overall responsibility for evaluating and approving our executive officer compensation, including incentive compensation, benefit, severance, equity-based and other compensation plans, policies and programs. During the 2018 fiscal year, the Compensation Committee reviewed and approved our compensation policies and programs for the chief executive officer, as well as established and had oversight responsibility with regard to the compensation of other executive officers of Nanometrics. The Compensation Committee also has the responsibility to recommend to the Board of Directors a compensation program for non-employee members of the Board.

The Compensation Committee is also responsible for approving the grant of stock options and stock awards to our employees under our equity compensation plans. The Compensation Committee has delegated to Nanometrics’ officers the authority, within certain parameters, to approve the grant of stock options and restricted stock units, or RSUs, with respect to employees and consultants who are not executive officers for purposes of Section 16 of the Exchange Act and hold positions below the level of vice president. The Compensation Committee also assists the Board of Directors in assessing the risks, if any, associated with Nanometrics’ overall compensation policies. Although the Compensation Committee has not done so to date, the Compensation Committee may, to the extent permitted under applicable law, the rules of Nasdaq and the Securities and Exchange Commission, and Nanometrics’ Certificate of Incorporation and Bylaws, form and delegate its authority to a subcommittee, when appropriate, including delegating to a subcommittee consisting solely of independent, non-employee, outside directors to make grants of stock options or RSUs to executive officers and directors, provided that such grants are presented to the full Compensation Committee for approval at the following Compensation Committee meeting.

Each current member of our Compensation Committee is an “outside” director as defined in Section 162(m) of the Internal Revenue Code of 1986, as amended, and a “non-employee” director within the meaning of Rule 16b-3 of the Exchange Act. The Board of Directors has determined that each of the directors serving on our Compensation Committee is “independent” within the meaning of the Listing Rules of Nasdaq as currently in effect.

The Compensation Committee Report is included under the caption “Compensation Committee Report” of this Proxy Statement. The Board of Directors has adopted a written Compensation Committee Charter, which is available on our website at <http://investor.nanometrics.com/corporate-governance>.

*Compensation Committee Processes and Procedures.* Typically, the Compensation Committee meets at least quarterly, and with greater frequency, if necessary. The Compensation Committee meets regularly in executive session. However, from time to time, various members of management and other employees as well as outside consultants may be invited by the Compensation Committee to make presentations, to provide financial or other background information or advice, or to otherwise participate in Compensation Committee meetings. The Chief Executive Officer may not participate in, or be present during, any deliberations or determinations of the Compensation Committee regarding his compensation. The charter of the Compensation Committee grants the Compensation Committee full access to all books, records, facilities and personnel of Nanometrics, as well as authority to obtain, at the expense of Nanometrics, advice and assistance from internal and external legal, accounting or other advisers and consultants and other external resources that the Compensation Committee considers necessary or appropriate in the performance of its duties. In particular, the Compensation Committee has the authority to retain compensation consultants to assist in its evaluation of executive and director compensation, including the authority to approve the consultant’s reasonable fees and other retention terms.

The Compensation Committee typically makes most of the significant adjustments to annual compensation, determines bonus and equity awards, and approves annual performance objectives, at one or more meetings held during the first quarter of the year. However, the Compensation Committee also considers matters related to individual compensation, such as compensation for new executive hires, as well as high-level strategic issues, such as the efficacy of Nanometrics’ compensation strategy, potential modifications to that strategy and new trends, plans or approaches to compensation, at various meetings throughout the year. Generally, the Compensation Committee’s process comprises two related elements: the determination of compensation levels and the establishment of performance objectives for the current year. As discussed further in the Compensation Discussion and Analysis below, for executives other than the Chief Executive Officer, the Compensation Committee solicits and considers evaluations and recommendations submitted to the Committee by the Chief Executive Officer. In the case of the Chief Executive Officer, the Compensation Committee conducts the evaluation of his performance, which determines any adjustments to his compensation as well as awards to be granted. For all executives, as part of its deliberations, the Compensation Committee may review and consider, as appropriate, materials such as financial reports and projections, operational data, tax and accounting information, tally sheets that set forth the total compensation that may become payable to executives in various hypothetical scenarios, executive and director stock ownership information, company stock performance data, analyses of historical executive compensation levels, current company-wide compensation levels, and recommendations of the Compensation Committee’s compensation consultant, including analyses of executive compensation paid at other companies identified by the consultant. Under its charter, the Compensation Committee may select, or receive advice from, a compensation consultant, legal counsel or other adviser to the Compensation Committee, other than in-house counsel and certain other types of advisers, only after taking into consideration six factors, prescribed by the SEC and Nasdaq, that bear upon the adviser’s independence; however, there is no requirement that any adviser be independent.

During the past fiscal year, the Compensation Committee engaged Compensia, Inc. as its compensation consultant. Compensia has advised the committee for several years and is very familiar with the industry and geographies in which Nanometrics operates. The Compensation Committee requested that Compensia:

- evaluate the efficacy of Nanometrics’ existing compensation strategy and practices in supporting and reinforcing Nanometrics’ long-term strategic goals;
- assist in refining Nanometrics’ compensation strategy and in developing and implementing an executive compensation program to execute that strategy; and
- provide market information to assist Compensation Committee in establishing 2018 executive compensation.

As part of its engagement, the Compensation Committee requested that Compensia develop a comparative group of companies and to perform analyses of competitive performance and compensation levels for that group. The Committee instructed Compensia to select comparator companies similarly sized and in the same or closely related industry to that of Nanometrics using factors such as, but not limited to, revenue size, market capitalization, and number of employees. At the request of the Compensation Committee, Compensia also provided information regarding the labor markets in which Nanometrics competes. Compensia ultimately developed recommendations that were presented to the Compensation Committee for its consideration. Following an active dialogue with Compensia, the Compensation Committee made its independent determinations regarding the compensation of Nanometrics’ executive officers. These decisions are discussed in the Compensation Discussion and Analysis section of this Proxy Statement.

## **Nominating and Governance Committee**

The Nominating and Governance Committee assists the Board of Directors in identifying and qualifying candidates to join the Board of Directors and addresses various governance issues. The Nominating and Governance Committee utilizes a variety of methods for identifying and evaluating nominees. Its general policy is to assess the appropriate size and needs of the Board of Directors and whether any vacancies are expected due to retirement or otherwise. In addition, candidates for director nominees are typically reviewed in the context of the current composition of the Board, the operating requirements of Nanometrics, the current needs of the Board, and the long-term interests of stockholders, with the goal of maintaining a balance of knowledge, experience and capability. In the event those vacancies are anticipated, or otherwise arise, the Nominating and Governance Committee will consider recommending various potential candidates to fill such vacancies. Candidates may come to the attention of the Nominating and Governance Committee through its current members, stockholders or other persons. Pursuant to the Nominating and Governance Committee charter, the Committee will consider properly submitted stockholder recommendations for nominations for candidacy. Stockholders who wish to recommend individuals for consideration by the Nominating and Governance Committee to become nominees for election to the Board may do so by delivering a written recommendation to the Nominating and Governance Committee at our principal offices. Nominees may also be submitted directly by stockholders in accordance with Nanometrics' Bylaws as discussed under "Questions and Answers About These Proxy Materials and Voting - When are stockholder proposals and director nominations due for next year's annual meeting?" above. Although the Nominating and Governance Committee does not have a formal policy regarding stockholder recommendations for director nominees because the Board of Directors has an open policy regarding communications with stockholders and has not deemed it necessary to develop a formal policy regarding recommendations for director nominations by stockholders, the Nominating and Governance Committee intends to consider director candidates properly submitted by stockholders under the same criteria as candidates recommended by directors or others.

The Nominating and Governance Committee has no specific minimum qualifications for director candidates. In general, however, persons considered for Board of Directors positions must have demonstrated leadership capabilities, be of sound mind and high moral character, have no personal or financial interest that would conflict or appear to conflict with the interests of Nanometrics and be willing and able to commit the necessary time for Board of Directors and committee service. The Nominating and Governance Committee also intends to consider such factors as possessing relevant expertise upon which to be able to offer advice and guidance to management, demonstrated excellence in his or her field, having the ability to exercise sound business judgment and having the commitment to rigorously represent the long-term interests of Nanometrics' stockholders. However, the Nominating and Governance Committee retains the right to modify these qualifications from time to time.

At the direction of the Board of Directors, the Nominating and Governance Committee also manages the CEO selection process and the critical aspects of the succession planning process. This includes establishing the selection criteria that reflects Nanometrics' business strategies, as well as identifying and evaluating potential candidates for the Board's consideration.

The Nominating and Governance Committee also recommends to the Board of Directors certain guidelines regarding corporate governance and standards regarding the independence of outside directors applicable to Nanometrics and reviews such guidelines and standards and the provisions of the Nominating and Governance Committee charter on a regular basis to confirm that such guidelines, standards and charter remain consistent with sound corporate governance practices and with any legal or regulatory requirements of Nasdaq and the Securities and Exchange Commission. The Nominating and Governance Committee also monitors the Board of Directors, and Nanometrics' compliance with any commitments made to our regulators and changes in corporate governance practices.

The Nominating and Governance Committee does not have a stated policy with regard to diversity of the Board of Directors. However, the Committee believes that Board members should represent a balance of diverse backgrounds and skills, including marketing, finance, manufacturing, engineering, science, and international experience.

The Board of Directors has determined that each of the directors serving on our Nominating and Governance Committee is "independent" within the meaning of the Listing Rules of Nasdaq.

The Board of Directors has adopted a written Nominating and Governance Committee Charter, which is available on our website at <http://investor.nanometrics.com/corporate-governance>.

## **Voting For Directors – Majority Vote Policy**

If a nominee for director in an uncontested election receives a greater number of "Withhold" votes for election than "For" votes ("Majority Withheld Vote"), that director must promptly tender to the Board his or her offer of resignation. If a director receives a Majority Withheld Vote, our Nominating and Governance Committee (or such other committee as the Board may appoint) shall make a recommendation to the Board, which will decide whether to accept or reject the resignation previously tendered by such director.

The Board must act on the tendered resignation, taking into account the recommendation of such committee, within 90 days from the date of the certification of the election results. The director whose resignation is under consideration is not permitted to participate in the recommendation of the committee or deliberations of the Board with respect to his or her resignation. However, if the only directors who did not receive a Majority Withheld Vote in the same election constitute less than a majority of directors, all directors may participate in the action regarding whether to accept the resignation offers. If a director's resignation is not accepted by the Board, the director will continue to serve until the next annual meeting of shareholders or until his or her successor is duly elected and qualified, or his or her earlier resignation or removal. If a director's resignation is accepted by the Board, then the Board, in its sole discretion, must fill any resulting vacancy or decrease the size of the Board.

### **Stockholder Communication Policy**

We have established a formal process for stockholders to send communications to the Board of Directors or to individual directors. The names of all directors are available to stockholders in this Proxy Statement. Stockholder communications may be submitted in writing to Nanometrics Incorporated, 1550 Buckeye Drive, Milpitas, California 95035, Attention: Office of the Secretary. If we receive any stockholder communication intended for the full Board of Directors or any individual director, we will forward the communication to the full Board of Directors or the individual director, unless the communication is clearly of a marketing nature or is unduly hostile, threatening, illegal or similarly inappropriate.

### **Insider Trading Policy**

We have an insider trading policy that, in addition to prohibiting insider trading, has provisions prohibiting margining the company's securities, engaging in short sales of securities not owned, and trading in derivative securities.

### **Risks Associated With Compensation Plans**

In 2018, the Compensation Committee determined that our compensation policies and practices for our employees are not reasonably likely to cause employees to take risks that would have a material adverse effect on our company.

### **Code of Ethics**

We have adopted a Code of Business Conduct and Ethics that applies to all directors, executive officers and employees. We post our Code of Business Conduct and Ethics on our website at: <http://investor.nanometrics.com/corporate-governance>. If Nanometrics makes any substantive amendments to the Code of Business Conduct and Ethics or grants any waiver from a provision of the Code of Business Conduct and Ethics to any executive officer or director, Nanometrics will promptly disclose the nature of the amendment or waiver on its website.

### **Stock Ownership Guidelines**

We have a stock ownership policy that establishes for our non-employee directors and executive officers, guidelines for minimum levels of stock ownership in the company within five years of their appointment to the Board of Directors, hire date, or promotion, or 2019, whichever is later. The stock ownership guidelines are as follows:

- For non-employee directors, ownership of stock with a value equal to three times the annual Board retainer;
- For our Chief Executive Officer, ownership of stock with a value equal to three times his annual base salary; and
- For each other executive officer, ownership of stock with a value equal to his or her annual base salary.

All of our non-employee directors and executive officers were in compliance with this policy as of March 1, 2019.

### **Related Person Transaction Policy**

Nanometrics has a written policy regarding related party transactions that requires that the Audit Committee review any transaction or series of transactions in excess of \$50,000 in any year between Nanometrics, on the one hand, and an officer, director or 5% or greater stockholder, on the other. Nanometrics' Chief Financial Officer has the responsibility for bringing the facts concerning a proposed related party transaction to the Audit Committee. The policy permits approval only in the event of a finding that the transaction is on terms no less favorable than would have been obtained in an ordinary arms-length transaction with an independent third party.

## **Report of the Audit Committee of the Board of Directors\***

The Audit Committee reviews Nanometrics' financial reporting process on behalf of the Board of Directors. Management has the primary responsibility for establishing and maintaining adequate internal control over financial reporting, for preparing the financial statements and for the reporting process. The Audit Committee members do not serve as professional accountants or auditors, and their functions are not intended to duplicate or to certify the activities of management and the independent registered public accounting firm. Nanometrics' independent auditors are engaged to audit and report on the conformity of our financial statements to accounting principles generally accepted in the United States and the effectiveness of our internal control over financial reporting.

In this context, the Audit Committee reviewed and discussed with management the audited financial statements of Nanometrics for the year ended December 29, 2018. The Audit Committee has discussed with the independent registered public accounting firm the matters required to be discussed by Auditing Standard 1301, Communications with Audit Committees, as adopted by the Public Company Accounting Oversight Board ("PCAOB"). In addition, the Audit Committee has received the written disclosures and the letter from the independent registered public accounting firm required by applicable requirements of the PCAOB regarding the independent registered public accounting firm's communications with the Audit Committee concerning independence, and has discussed with the independent registered public accounting firm its independence.

Based on the foregoing, the Audit Committee recommended to the Board of Directors that our audited financial statements as of and for the year ended December 29, 2018, be included in our Annual Report on Form 10-K for the fiscal year ended December 29, 2018, for filing with the United States Securities and Exchange Commission.

The Audit Committee

Christine A. Tsingos (Chair)  
Robert G. Deuster  
Bruce C. Rhine  
Christopher A. Seams

\* The material in this report is not "soliciting material," is not deemed "filed" with the Securities and Exchange Commission and is not to be incorporated by reference in any filing of Nanometrics under the Securities Act or the Exchange Act, whether made before or after the date hereof and irrespective of any general incorporation language in any such filing.

## SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT

The following table sets forth beneficial ownership of Nanometrics common stock as of March 25, 2019, by each director, by each of the named executive officers, by all directors and executive officers as a group, and by all persons known to Nanometrics to be the beneficial owners of more than 5% of Nanometrics stock. Unless otherwise indicated, all persons and entities have sole voting and investment power over the shares reported. As of the close of business on March 25, 2019, there were 24,534,582 shares of common stock outstanding.

Name Of Beneficial Owner – Principal Stockholders	Amount and Nature of Beneficial Ownership <sup>(1)</sup> Shares	
	Number of Shares Beneficially Owned	Percent of Shares Beneficially Owned
Blackrock, Inc. <sup>(2)</sup>	3,643,493	14.9%
Dimensional Fund Advisors LP <sup>(3)</sup>	1,589,168	6.5%
The Vanguard Group <sup>(4)</sup>	1,838,726	7.5%
Name Of Beneficial Owner – Directors And Officers	Number of Shares Beneficially Owned	Percent of Shares Beneficially Owned
J Thomas Bentley <sup>(5)</sup>	72,612	*
Edward J. Brown Jr.	33,398	*
Robert Deuster	8,435	*
Pierre-Yves Lesaichere, Ph.D.	27,878	*
Bruce C. Rhine <sup>(6)</sup>	691,191	2.8%
Christopher A. Seams	19,188	*
Timothy J. Stultz, Ph.D. <sup>(7)</sup>	265,542	1.1%
Christine A. Tsingos <sup>(8)</sup>	341,367	1.4%
Greg Swyt	191	*
Janet Taylor	13,519	*
Rollin Kocher	16,212	*
James Barnhart	482	*
Jonathan Chou	—	*
All executive officers and directors as a group (13 persons) <sup>(9)</sup>	1,508,837	6.1%

\* Less than 1 percent

- (1) As determined in accordance with Rule 13d-3 under the Securities and Exchange Act of 1934. Information with respect to principal stockholders is obtained from Schedules 13G and 13G/A and except as indicated in the footnotes below, is as of December 31, 2018, and does not reflect changes, if any, since that date.
- (2) According to a Schedule 13G/A filed with the SEC on January 31, 2019, reporting beneficial ownership as of December 31, 2018, BlackRock, Inc. has sole voting power with respect to 3,560,400 of these shares and sole investment power over all these shares. The address of BlackRock, Inc. is 55 East 52nd Street, New York, NY 10055.
- (3) According to a Schedule 13G/A filed with the SEC on February 8, 2019, reporting beneficial ownership as of December 31, 2018, Dimensional Fund Advisors LP has sole voting power with respect to 1,520,282 of these shares and sole investment power over all these shares. All the shares are held by funds or other entities for which Dimensional Fund Advisors LP is an investment adviser. Dimensional Fund Advisors LP disclaims beneficial ownership of such securities. The address of Dimensional Fund Advisors LP is Building One, 6300 Bee Cave Road, Austin, Texas, 78746.
- (4) According to a Schedule 13G/A filed with the SEC on February 11, 2019, reporting beneficial ownership as of December 31, 2018, The Vanguard Group has sole voting power with respect to 46,779 of these shares, shared voting power with respect to 2,113 of these shares, sole investment power with respect to 1,791,638 of these shares, and shared investment power with respect to 47,088 of these shares. The address of The Vanguard Group is 100 Vanguard Blvd., Malvern, PA 19355.
- (5) Mr. Bentley has shared voting and dispositive power over 1,000 shares he gifted to a charitable foundation over which he disclaims beneficial ownership as he has no pecuniary interest in such shares.
- (6) Mr. Rhine has indirect beneficial ownership over 1,428 shares held in a family trust.
- (7) Includes 60,000 shares that may be acquired by exercise of stock options within 60 days of March 1, 2019.
- (8) Includes 314,899 shares held by Bio-Rad Laboratories, of which Ms. Tsingos is Executive Vice President and may be deemed to have shared voting and investment power over these shares.
- (9) Consists of shares held by our executive officers and directors as set forth above, and 18,822 shares held by our other executive officer not listed above.

## **SECTION 16(a) BENEFICIAL OWNERSHIP REPORTING COMPLIANCE**

Section 16(a) of the Exchange Act requires our executive officers and directors, and persons who own more than 10% of a registered class of our equity securities, to file reports of ownership and changes in ownership with the Securities and Exchange Commission. Executive officers, directors and greater than 10% stockholders are required by Securities and Exchange Commission regulations to furnish Nanometrics with copies of all Section 16(a) forms that they file. Nanometrics assists our executive officers and directors in the preparation and filing of Forms 4, and generally files the Forms 4 on behalf of our directors and executive officers using the powers of attorney given to certain executive officers of Nanometrics by our executive officers and directors delegating the authority to make the filings. Based solely on our review of the copies of such form received by us or written representations from certain reporting persons, we believe that our executive officers, directors and greater than 10% stockholders have complied with all applicable filing requirements.

## EXECUTIVE COMPENSATION

### 2018 Compensation Discussion and Analysis

#### INTRODUCTION

This Compensation Discussion and Analysis (CD&A) describes our compensation philosophy, process, plans and practices for the executive officers appearing in the summary compensation table in this proxy statement, whom we refer to as our “named executive officers,” during 2018. Our named executive officers are as follows:

Named Executive Officer	Title
Pierre-Yves Lesaichere, Ph.D.	President, Chief Executive Officer and Director
James Barnhart	Senior Vice President, Operations
Rollin Kocher	Senior Vice President, Sales & Marketing
Janet Taylor	General Counsel
Greg Swyt	Vice President, Finance
Jonathan Chou	Former Chief Financial Officer

Greg Swyt, our Vice President, Finance, was serving as our Principal Financial and Accounting Officer at the beginning of fiscal 2018 up until March 2018, at which time Jonathan Chou joined us as Chief Financial Officer and took over those positions. Mr. Chou departed Nanometrics in June 2018, at which time Mr. Swyt resumed the role as our Principal Financial and Accounting Officer.

In March 2018, James L. Barnhart joined Nanometrics as our Senior Vice President of Operations. In this role, his leadership responsibilities span the manufacturing, supply chain, service and facilities organizations.

#### Philosophy and Objectives

Nanometrics’ compensation program for our executive officers is intended to enable us to attract, retain and motivate key executive officers and to align their interests with those of the stockholders by tying executive compensation to our short-term and long-term company performance. The Compensation Committee acts on behalf of the Board of Directors and, by extension, on behalf of our stockholders, to establish, implement and continually monitor adherence to our compensation philosophy. The Compensation Committee’s philosophy is to design a compensation package that addresses the need for alignment between the interests of executive officers and stockholders in terms of producing short-term and long-term enhanced stockholder value, as well as achieves retention and motivation through appropriate incentives. This philosophy takes into account both internal equity and external market information relative to our industry and size. The Compensation Committee designs the executive compensation program with the goal of providing total compensation to our executive officers that is competitive and consistent with our compensation philosophy.

The Compensation Committee’s principal objectives are: (a) to develop, recommend and approve compensation packages that are consistent with our philosophy; (b) to link executive compensation to the achievement of our financial, management or other performance goals and; (c) to support our culture and core values by promoting equity among the executive team and maintaining the competitiveness of our overall compensation when compared with external opportunities.

#### Philosophy and Objectives Applied

Our executive compensation packages for the 2018 fiscal year included three primary components - base salaries, cash bonus award opportunities and long-term equity incentive awards. Other elements of compensation include limited perquisites, other benefits (including retirement (401(k) plan, including matching contributions), health, and welfare benefits), and severance arrangements. The Compensation Committee considered the three primary components individually and, in the aggregate, to assess their competitiveness and effectiveness in retaining our executive officers and motivating them to create short-term and long-term enhanced stockholder value.

In finalizing the compensation of our executive officers in 2018, the Compensation Committee considered input from an independent outside compensation consulting firm, Compensia, our human resources department, and (other than with respect to himself) Dr. Pierre-Yves Lesaichere, our Chief Executive Officer. In the Compensation Committee’s review of our executive compensation for the 2018 fiscal year, the Compensation Committee considered publicly available market data for companies that typically include similarly-sized semiconductor and semiconductor capital equipment or similar firms for each executive officer in a like or similar role. In November 2017, for compensation decisions for the 2018 fiscal year, Compensia recommended and the Compensation Committee approved modifications to the group of peer companies for conducting compensation analysis to better reflect our size and business. The Compensation Committee considered the following factors:

- primary focus on semiconductor and semiconductor equipment companies, and secondary focus on hardware companies;
- revenue between approximately half and two times Nanometrics trailing four quarter revenue at the time; and,
- market capitalization

In evaluating potential peers, the Compensation Committee also reviewed secondary factors such as revenue growth, whether potential peers include Nanometrics as a peer, and whether potential peers are included in the compensation peer groups for Nanometrics selected by leading proxy advisory firms. As a result of this review, five companies that were in our 2017 peer group were removed as they were either acquired or did not meet these criteria, and two new companies meeting these criteria were added.

Our peer group companies considered for compensation for the 2018 fiscal year are listed below:

<b>2018 Fiscal Year Peer Group Companies</b>	
Axcelis Technologies, Inc.	Photronics
Cabot Microelectronics	Rudolph Technologies Inc.
Cohu, Inc.	Veeco Instruments
Electro Scientific Industries, Inc.	Xcerra
Form Factor, Inc.	

Compensia gathered data with respect to base salary, target bonus awards and all equity awards, including stock options, restricted stock units (“RSUs”) and performance-based equity. We generally do not gather data regarding employee benefits such as 401(k) or health care coverage normally available to broad groups of employees.

While the market data may identify a certain percentile of the market in which we operate with regard to base salary, bonus or long-term incentives, the Compensation Committee did not target any specific percentile but instead looked at each element as compared to the total targeted cash package and the various components, in light of the desired results, internal equity and the information provided, and then decided if a change to compensation was warranted or not. The Compensation Committee also consulted with Dr. Lesaicherre with respect to the appropriate compensation for the executive officers who reported to him, including: Mr. Kocher, our Senior Vice President, Sales and Marketing; and Ms. Taylor, our General Counsel. Dr. Lesaicherre reviewed the experience and qualifications, and performance of these executive officers using the elements and framework described under “2018 Executive Compensation Components” below and made recommendations to the Compensation Committee about the structure of the overall compensation program and individual compensation arrangements. This framework provided a guide for the Compensation Committee’s deliberations and recommendations regarding proposals for base salary, bonus opportunities and long-term equity incentive awards for each executive position. The Compensation Committee considered those factors that are controllable by management such as expenses and cash, account penetration and long-term stockholder value delivery and others that are less within management control such as revenue, which is subject to the short-term industry cycles and the timing of customer capital spending cycles. The Compensation Committee did not apply formulas or assign specific mathematical weights to the peer group data or any of the factors or elements of compensation discussed above, but rather exercised its business judgment and discretion to make a subjective determination of both the amounts of compensation as well as the distribution of compensation among the various components, after considering all these measures collectively. The Compensation Committee then came to a conclusion based on the framework outlined above to approve an appropriate compensation package for each executive officer.

As discussed below, Dr. Lesaicherre’s 2018 compensation was determined in arm’s length negotiations with Dr. Lesaicherre when he joined our company in November 2017, which included direct input from Compensia. With respect to Mr. Chou, who served as our Chief Financial Officer for a portion of 2018, and Mr. Barnhart, who joined our company in March 2018, their compensation was determined in arms-length negotiations with these executive officers, which included direct input from both Compensia and Dr. Lesaicherre. Mr. Swyt was not an executive officer until late December 2017, nor during the time that Mr. Chou was our Chief Financial Officer, and Mr. Swyt’s base salary did not change during the time that he was an executive officer.

## 2018 Executive Compensation Components

For the 2018 fiscal year, the principal components of compensation for our named executive officers were:

- Base salary;
- Bonus; and
- Equity awards.

The Compensation Committee also establishes and reviews retirement and other benefits for our executive officers and considers these benefits to be meaningful to our executive officers as well.

The Compensation Committee has chosen these components because it believes that each supports achievement of one or more of our compensation objectives, and that together they will be effective in achieving such objectives. The use of each compensation component is based on a determination by the Compensation Committee of the importance of each compensation objective in supporting our business and talent strategies. These components are commonly used for executive officers at companies within our peer group and, therefore, the Compensation Committee finds these to be appropriate in our talent retention strategy. The Compensation Committee's determination varies for each executive officer depending on a number of factors, including but not limited to, scope of his or her responsibilities, leadership skills and values, and individual performance. The Compensation Committee did not apply formulas or assign specific mathematical weights to any of these factors, but rather exercised its business judgment and discretion to make a subjective determination after considering all of these measures collectively.

### *Base Salary*

Base salaries serve as the foundation of Nanometrics' compensation program. Other executive compensation elements, including annual short-term cash incentives and long-term equity incentives, the Compensation Committee derives by weighing them against base salary. Nanometrics provides executive officers with base salaries to compensate them for services rendered during the fiscal year and sets base salaries at levels which the Compensation Committee believes will effectively attract and retain top talent. The Compensation Committee determines base salaries for each executive officer based on his or her experience, position and responsibility, as well as the contribution that he or she brings to Nanometrics through performance. During its annual review of base salaries for executive officers, the Compensation Committee primarily considers:

- the salaries of executive officers in similar positions at our peer group companies as discussed in the above section titled "Philosophy and Objectives Applied";
- our financial performance over the past year based upon the ability to achieve Board-approved financial metrics including revenue targets, operating income targets and other operating results metrics; and
- the individual performance of each executive officer, and his or her duties and areas of responsibility, on a subjective basis, which may include, among other things: span of control; ability to influence, manage and produce results that increase the profitability of Nanometrics; and ability to streamline and create efficiencies in the organization.

The Compensation Committee considers salary levels annually as part of our performance review process as well as upon a promotion or other change in job responsibility. The Compensation Committee reviews and determines salaries after reviewing salary data supplied by Compensia, including data regarding our peer comparison group, as well as consideration of the compensation for our executive officers on a company-wide basis, based on their relative duties and responsibilities and the recommendations of our Chief Executive Officer (other than with respect to his compensation) as it relates to the executive officers who report to him. The Compensation Committee also considered comparisons of peer group compensation to peer group performance provided by Compensia. The Compensation Committee did not apply formulas or assign specific mathematical weights to any of these factors, but rather exercised its business judgment and discretion to make a subjective determination regarding each executive officer's base salary after considering all of these measures collectively.

For fiscal year 2018, based on all of the data considered, the Compensation Committee exercised its business judgment and discretion to make a subjective determination regarding each executive officer's 2018 base salary (other than Greg Swyt's, as he was not an executive officer at the time his 2018 base salary was determined) as set forth in the table below. Dr. Lesaichere's base salary was not adjusted as he had just recently joined our company in November 2017 and his base salary was designed to compensate him through fiscal 2018. As discussed above, each of Dr. Lesaichere's, Mr. Chou's and Mr. Barnhart's base salaries were determined based on arm's length negotiations with each of these executive officers.

<u>Named Executive Officer</u>	<u>Annual Base Salary Approved for Fiscal Year 2018</u>	<u>Year-Over-Year Percentage Increase Represented by Fiscal Year 2017 Base Salary</u>
Pierre-Yves Lesaichere, Ph.D. President, Chief Executive Officer and Director	\$ 550,000	0.0%
Jonathan Chou Former Chief Financial Officer	\$ 370,000	n/a
Rollin Kocher Senior Vice President, Sales and Marketing	\$ 310,000	6.9%
James Barnhart Senior Vice President, Operations	\$ 320,000	n/a
Janet Taylor General Counsel	\$ 300,000	7.1%

Greg Swyt received a 3% increase in salary, to \$244,000 per year, in April 2018 during the time that he was not an executive officer. This increase was based on market data obtained from an Aon PLC Radford Global Technology survey that takes into account industry, region and annual revenue for the Corporate Controller position at Mr. Swyt's level of responsibility during the time that he was not an executive officer. Mr. Swyt's ongoing job performance was also considered when determining his base compensation rate.

### ***Bonus***

The Compensation Committee views cash bonuses as part of its performance-based compensation program designed to align the recipient's interests with our annual goals and objectives and our stockholders' interests. At our 2017 annual meeting of stockholders, the stockholders approved the 2017 Executive Performance Bonus Plan (the "Plan"). Within the parameters of the Plan, the Compensation Committee established the 2018 Executive Performance Bonus Program (the "2018 Bonus Program"). The 2018 Bonus Program is intended to motivate senior executive officers to achieve short-term and long-term corporate objectives relating to the performance of Nanometrics or one of its business units as established by the Compensation Committee of the Board of Directors and to reward them when those objectives are achieved, thereby tying performance to stockholder value. Bonuses would be triggered upon our achievement of target metrics determined by the Compensation Committee.

As part of the 2018 Bonus Program, the Compensation Committee established the following target bonus opportunities based on market data and each executive officer's relative duties and responsibilities for the following named executive officers and, with respect to Dr. Lesaichere, Mr. Chou and Mr. Barnhart, arm's length negotiations with these executive officers in connection with the hiring of these executive officers:

<u>Named Executive Officer</u>	<u>Target Bonus Opportunity (as a % of annual base salary)</u>
Pierre-Yves Lesaichere, Ph.D.	100%
Jonathan Chou	65%
James Barnhart	60%
Rollin Kocher	60%
Janet Taylor	50%

For Dr. Lesaichere, Mr. Barnhart, Mr. Kocher and Ms. Taylor, 100% of the target bonus opportunity under the 2018 Bonus Program was based upon overall company financial performance objectives recommended by Dr. Lesaichere and approved by the Compensation Committee. Mr. Chou was also eligible to participate in the 2018 Bonus Program but left Nanometrics on June 25, 2018, and so received no bonus.

Mr. Swyt served as our Principal Financial and Accounting Officer until March 5, 2018 when Mr. Chou joined the company. Mr. Chou left Nanometrics on June 25, 2018, at which time Mr. Swyt once again became our Principal Financial and Accounting Officer. Mr. Swyt's target bonus was established in March 2018 at a time when he was not an executive officer and was established at 35% of base salary based on market data obtain from an Aon PLC Radford Global Technology survey that takes into account industry, region and annual revenue for the Corporate Controller and similarly leveled positions during the time that he was not an executive officer.

For Mr. Swyt, the target bonus opportunity was to be earned based on overall company financial performance objectives and individual management objectives. His actual bonus was to be determined by multiplying (a) his target bonus by (b)

the product obtained by multiplying the percentage achievement of company performance by the percentage achievement of individual performance. For Mr. Swyt, his individual management objectives related to (i) improved financial process reporting, (ii) accurately implementing new accounting rules and regulations, and (iii) other organization-wide initiatives. In addition, Mr. Swyt received a \$30,000 discretionary bonus in March 2018, after he ceased to be an executive officer, due to his having acted as our Principal Financial Officer for the first part of 2018.

In addition to his performance bonus opportunities and his discretionary bonus, Nanometrics entered into a retention bonus agreement with Mr. Swyt in December 2017 when he became our Principal Financial Officer. The Compensation Committee established the retention bonus amount of \$50,000 based on a retention period from December 2017 through July 2018 (8 months), or 2/3rds of a year. The Compensation Committee determined the amount of \$50,000 as it was approximately 1/3 of Mr. Swyt's base salary during the retention period, which the Compensation Committee determined was a reasonable incentive to reward him for his extra duties and provide an incentive for him to maintain his employment with Nanometrics during this period. In addition, Nanometrics entered into another retention bonus agreement with Mr. Swyt in July 2018, after Mr. Chou had left Nanometrics, in the amount of \$50,000 to be paid if he remained with Nanometrics through February 2019.

The maximum award that an executive officer could receive under the 2018 Bonus Program was two times the target bonus opportunity. Achievement of the bonus opportunity tied to the overall company performance for the 2018 Bonus Program was determined based on annual Revenues and Non-GAAP Operating Margin. The 2018 Bonus Program provided that the company performance would be measured by comparing actual company annual Revenues against target Revenues of \$285 million and actual Non-GAAP Operating Margin against target Non-GAAP Operating Margin of 17.9%.

The company performance factor would be zero when Non-GAAP Operating Margin is less than or equal to 0%. For the 2018 Bonus Program, Non-GAAP Operating Margin was defined as Operating Income/(Loss) as reported in accordance with generally accepted accounting principles in the United States, plus amortization of intangible assets, and any unusual charges, such as restructurings, litigation or acquisition costs, divided by Annual Revenues.

For fiscal year 2018, based on achieved Revenues (\$324.5 million) and Non-GAAP Operating Income (21.6%), the Compensation Committee determined that the performance factor was 1.92% and approved the following bonus amounts for the following named executive officers:

<u>Named Executive Officer</u>	<u>Approved Bonus under 2018 Bonus Program</u>
Pierre-Yves Lesaichere, Ph.D.	\$ 1,056,000
Jonathan Chou	\$ —
James Barnhart	\$ 368,640
Rollin Kocher	\$ 357,120
Janet Taylor	\$ 288,000
Greg Swyt <sup>(1)</sup>	\$ 163,973

(1) Calculated pursuant to the 2018 Bonus Program instead of under Mr. Swyt's performance bonus arrangement but would not have been materially different under his prior performance arrangement.

### ***Long-Term Incentive Compensation***

The Compensation Committee believes that equity compensation plans are an essential tool to link the long-term interests of Nanometrics' stockholders and our employees, particularly our executive officers, and serve to motivate executive officers to make decisions that will, in the long run, optimize returns to our stockholders. Equity compensation plans also enable us to provide an opportunity for increased equity ownership by executive officers, thereby increasing the link between the incentives of our executive officers and the interests of our stockholders and maintain competitive levels of total compensation. Each year the Compensation Committee considers incentive and retention needs, market competitiveness and industry and business conditions to make its subjective determination of the appropriate balance of RSUs, which provide a more predictable value, and performance-based RSUs ("PSUs"), which provide value to the extent pre-defined performance metrics based on relative stock price performance within the industry are achieved for predetermined performance periods. The Compensation Committee considered both the broader market environment and the individual equity profile of each executive officer in awarding all executive officers RSUs for 2018 (other than to Dr. Lesaichere, Mr. Chou and Mr. Barnhart), and awarding Mr. Kocher PSUs for 2018. The Compensation Committee awarded each of Dr. Lesaichere and Mr. Chou a PSU and RSU in 2018, and to Mr. Barnhart an RSU based on the terms of their respective employment agreements, which were negotiated with Dr. Lesaichere in November 2017, and Mr. Chou and Mr. Barnhart in March 2018, respectively.

**Restricted Stock Unit Grants (RSUs).** All of the executive officers received RSU awards during the 2018 fiscal year. The Compensation Committee believes that RSUs, which increase in value as the market price of our common stock increases, both encourage our executive officers to work toward the longer-term goal of creating stockholder value and provide retention value. RSUs align the interests of our executive officers to the interests of our stockholders because an executive officer that holds RSUs is exposed to the same market risks to which our stockholders are exposed. The Compensation Committee approved RSU award levels for 2018 (other than with respect to Dr. Lesaicherre, Mr. Chou and Mr. Barnhart, whose RSU amounts were negotiated as part of their employment agreements) based on an analysis of peer group data related to the size of equity awards as described under our section “Philosophy and Objectives Applied” above. The Compensation Committee did not benchmark to a specific target percentile, but instead considered proposed RSU awards in the context of each executive officer’s cash and total compensation package. In addition, the Compensation Committee considered other factors when determining each executive officer’s RSU award, including: the level of resulting alignment with the interests of our stockholders; such executive officer’s position within the organization and the appropriate level of equity compensation for such position relative to others in the organization’s hierarchy; such executive officer’s contributions to our financial, operational and general performance; our stock price; and the value of such awards based on the company’s currency stock price. The Compensation Committee did not apply formulas or assign specific mathematical weights to any of these factors, but rather exercised its business judgment and discretion to make a subjective determination regarding whether to grant, and the size of grants of, RSUs to each executive officer.

Based on these criteria (and their employment agreements with us with respect to Dr. Lesaicherre, Mr. Chou and Mr. Barnhart), the Compensation Committee granted RSUs to acquire the following number of shares to our named executive officers:

<u>Executive Officer</u>	<u>Number of Shares Subject to 2018 RSUs</u>
Pierre-Yves Lesaicherre	25,662
Jonathan Chou <sup>(1)</sup>	34,741
Greg Swyt	3,753
James Barnhart <sup>(2)</sup>	22,519
Rollin Kocher	19,391
Janet Taylor	16,482

(1) Granted in connection with his joining our company, with a value of \$900,000, the amount determined in arm’s length negotiations with Mr. Chou.

(2) Granted in connection with his joining our company, with a value of \$600,000, the amount determined in arm’s length negotiations with Mr. Barnhart.

**Performance Stock Unit Grants (PSUs).** The Compensation Committee granted PSUs to our Chief Executive Officer, as well as to our former Chief Financial Officer, Mr. Chou, in connection with his becoming our Chief Financial Officer, and to Mr. Kocher. PSUs are granted with a target amount of shares to vest if the target performance metrics are met, and additional shares may be received, up to a maximum amount that may be received of 150% of the target amount, in the event that the target performance metrics are exceeded.

The Compensation Committee granted PSUs to acquire 38,493 shares (target amount 25,662 shares) of our common stock, having a value of \$695,000, to Dr. Lesaicherre in connection pursuant to the terms of his employment agreement with us. The Compensation Committee granted PSUs to acquire 17,370 shares (target amount 11,580 shares) of our common stock, having a value of \$300,000, to Mr. Chou in connection with his joining our company, which amount was determined based on arm’s length negotiations with Mr. Chou. The Compensation Committee determined to grant PSUs to acquire 7,270 shares (target amount 4,847 shares) of our common stock to Mr. Kocher due to his current and projected performance with the size of the award based on an analysis of peer group data related to the size of equity awards as described under our section “Philosophy and Objectives Applied” above.

The 2018 PSUs granted to Dr. Lesaicherre, Mr. Chou and Mr. Kocher are earned based on Nanometrics’ stock price performance relative to the Top 30 companies in the Philadelphia Stock Exchange Semiconductor Index over a one, two and three-year performance period. To earn the target number of shares, Nanometrics’ stock price performance must be at the 50th percentile of the Index; for stock price performance at or above the 75th percentile, the recipient earns 150% of the target shares (maximum payout is 150% of target). If Nanometrics’ stock price performance for any period is negative, the number of shares earned is capped at target, regardless of performance relative to the Index.

Our Compensation Committee grants equity awards under our 2005 Equity Incentive Plan to the executive officers and other employees as incentive compensation. The Compensation Committee meeting schedule is determined several months in advance, and, therefore, proximity of any award date to a material news announcement or a change in our stock price, if any, is coincidental. We do not backdate equity awards or make equity awards retroactively. In addition,

we do not coordinate our equity grants to precede announcements of favorable information or follow announcements of unfavorable information. Equity awards are priced using the thirty-day average closing market price as of the Compensation Committee approval

### ***Compensation Arrangements with Dr. Lesaicherre***

On November 8, 2017, our Board appointed Dr. Pierre-Yves Lesaicherre as a director and as our new President and Chief Executive Officer, which appointment became effective on November 27, 2017. In connection with Dr. Lesaicherre's appointment as our President and Chief Executive Officer, the Compensation Committee of Nanometrics approved the compensation terms for Dr. Lesaicherre, namely: (1) a base salary of \$550,000 per year, and a target bonus for 2017 and 2018 of \$550,000 for each year (prorated for period of service for 2017) with actual bonus to be determined based on performance; (2) an RSU grant to acquire shares of Nanometrics common stock having a value of \$1.625 million (but no more than 62,500 underlying shares), vesting with respect to 1/3 of the shares each year for three years, subject to accelerated vesting in the event Nanometrics terminates Dr. Lesaicherre's employment without "cause" or Dr. Lesaicherre resigns for "good reason" within two years of employment; (3) a PSU grant to acquire shares of Nanometrics common stock having a value of \$1,625 million vesting with respect to 2/3 of the shares on the second anniversary of grant and the rest on the third anniversary of grant, subject to meeting specified stock price performance metrics and Dr. Lesaicherre's continued service with Nanometrics; (4) annual RSU and PSU grants commencing in 2018, each vesting over three years (subject to meeting performance criteria for the PSU grant), each with a value of each of \$625,000; and (5) a sign-on bonus of \$100,000. In addition, the Compensation Committee approved entering into a General Severance Benefits and Change in Control Severance Benefits Agreement with Dr. Lesaicherre, as describe under the caption "Employment Contracts and Termination of Employment and Change-in-Control Arrangements." The terms of Dr. Lesaicherre compensation were determined by the Compensation Committee in arms-length negotiations with Dr. Lesaicherre as well as a market analysis of Nanometrics' peers performed by Compensia.

### ***Other Elements of Compensation***

All Nanometrics employees in the United States, including our executive officers, are eligible to participate in our 401(k) plan, medical, dental and vision insurance, employee stock purchase plan, as well as our life and disability insurance policy. Nanometrics' 401(k) Plan and other generally available benefits programs allow us to remain competitive for employee talent, and we believe that the availability of these benefits programs generally enhances employee productivity and loyalty to Nanometrics. The main objectives of Nanometrics' benefits programs are to give employees access to quality healthcare, financial protection from unforeseen events, assistance in achieving retirement financial goals, and enhanced health and productivity, all in full compliance with applicable legal requirements. These generally available benefits typically do not specifically factor into decisions regarding an individual executive officer's total compensation or equity award package.

### ***Perquisites***

Nanometrics provides certain executive officers with a limited number of perquisites that the Compensation Committee believes are reasonable and consistent with our overall compensation program. Although the Compensation Committee seeks the advice of the human resources department on general market competitiveness for these benefits, it does not use a formal benchmarking process. The aggregate incremental costs to Nanometrics of these perquisites are included in the Summary Compensation Table in the "All Other Compensation" column. Dr. Lesaicherre received a car allowance. All executive officers (other than Greg Swyt) are eligible to participate in an Executive Healthcare Reimbursement plan that provides for reimbursement of usual and customary costs that may not be covered under the medical, dental and eye care plans available to all other Nanometrics employees; actual amounts reimbursed are included in the Summary Compensation Table as "All Other Compensation."

### ***Severance Benefits***

The Compensation Committee considers maintaining a stable and effective management team to be essential to protecting and enhancing the best interests of Nanometrics and its stockholders. Accordingly, the Compensation Committee has taken steps to encourage the continued attention, dedication and continuity of members of our management to their assigned duties without the distraction that may arise from the potential termination of employment. Specifically, we have entered into agreements with our executive officers (other than Greg Swyt) providing for severance payments and benefits, consisting of cash severance and continued health care benefits upon a termination of employment without cause or resignation for good reason and, if the termination of employment is in connection with a "change in control" of Nanometrics, accelerated vesting of equity awards, all as described in greater

detail below in the section titled “Employment Contracts and Termination of Employment and Change-in-Control Arrangements.”

When entering into these agreements, the Compensation Committee analyzed data and suggestions from Compensia as well as our human resources department. The Compensation Committee then exercised its business judgment and discretion to make a subjective determination after considering this information.

After considering industry practices, the Compensation Committee determined that our severance and benefits agreements are necessary and appropriate in substance and scope to provide competitive compensation to the types of individuals that Nanometrics desires to attract, hire and retain. The Compensation Committee also believes that these agreements are consistent with our overall compensation philosophy. The Compensation Committee periodically monitors industry practice in this area to ensure that these agreements remain consistent with industry practice and our overall compensation philosophy of offering competitive compensation to preserve our ability to attract and retain key executive officers.

### **Tax and Accounting**

As part of its role, the Compensation Committee reviews and considers both tax and accounting related implications as they apply and as they evolve.

As part of its role, prior to 2018 the Compensation Committee reviewed and considered the deductibility of executive compensation under Section 162(m) of the Internal Revenue Code, which prior to our fiscal year 2018 provided that we may deduct compensation of more than \$1,000,000 that is paid to certain executive officers if certain exemption requirements are met. However, for our fiscal year 2018 and after, this availability is generally no longer available, subject to certain “grandfathering” provisions. To maintain flexibility in compensating our executive officers in a manner that promotes varying corporate goals, the Compensation Committee has not adopted a policy that all compensation must be deductible.

Section 4999 and Section 280G of the Internal Revenue Code provide that executive officers could be subject to additional taxes if they receive payments or benefits that exceed certain limits in connection with a change in control of Nanometrics and that Nanometrics could lose an income tax deduction for such payments. We have not provided any executive officer with a tax “gross up” or other reimbursement for tax amounts the executive officer might be required to pay under Section 4999 or Section 280G of the Internal Revenue Code as the Compensation Committee determined that this was not consistent with best practices.

Section 409A of the Internal Revenue Code imposes additional taxes and interest on underpayments in the event that an executive officer defers compensation under a compensation plan that does not meet the requirements of Section 409A. We believe that we are operating in good faith compliance with Section 409A and have structured our compensation and benefits programs and individual arrangements in a manner intended to comply with the requirements thereof.

### **Results of Shareholder Advisory Votes to Approve Executive Compensation**

At our 2014, 2015, 2016, 2017 and 2018 annual meetings of stockholders, we requested our stockholders to approve, on an advisory (non-binding) basis, the compensation paid to our executive officers as reported in the proxy statements for those annual meetings. Our stockholders expressed substantial support for our executive compensation, with approximately, 96.1%, 95.1%, 92.7%, 94.5%, and 96.3%, respectively, of the shares present and entitled to vote voting for approval of the “say-on-pay” advisory vote approving our executive compensation. Because of the high level of support expressed by our stockholders for the executive compensation, the Compensation Committee has continued to apply a similar approach for executive compensation decisions and policies. The next “say-on-pay” advisory vote approving our executive compensation is scheduled for our 2019 annual meeting of stockholders.

### **Clawback Policy**

We have established a clawback policy. This policy provides that in the event of a material restatement of our consolidated financial statements resulting from fraud or intentional misconduct by any Section 16 officer who has either erroneously been awarded or paid a greater amount of incentive compensation than he or she would have received had the financial statements been fairly stated, the Board or its designated committee has the discretion to direct that the company either recoup or cancel payment, though not forced, of all or a portion of the excess of performance-based cash or equity compensation to the Section 16 officer(s). This clawback policy is effective for compensation awarded or paid after implementation of the policy and applies to current Section 16 officers as well as those who terminate after the clawback program has been approved by the Board. The covered period is the three-year period preceding the effective date for which it is determined that a restatement is required.

## Summary Compensation

The following table sets forth compensation information for (i) our Chief Executive Officer, (ii) our Vice President, Finance and our former Chief Financial Officer, and (iii) each of our other three highest compensated executive officers during fiscal 2018, all of whom are collectively referred to as the “named executive officers.”

	Year	Summary Compensation Table					Total
		Salary	Bonus	Stock Awards <sup>(1),(2)</sup>	Non-Equity Incentive Plan Compensation <sup>(3)</sup>	All Other Compensation	
Pierre-Yves Lesaichere, Ph.D. <sup>(4)</sup> President, Chief Executive Officer and Director	2018	\$ 550,000	\$ -	\$ 1,311,585	\$ 1,056,000	\$ 19,300 <sup>(5)</sup>	\$ 2,936,885
	2017	42,308	100,000	2,232,200	52,885	1,200	2,428,593
Jonathan Chou <sup>(6)</sup> Former Chief Financial Officer	2018	115,269	-	1,193,577	-	203,281 <sup>(7)</sup>	1,512,127
Greg Swyt <sup>(8)</sup> Vice President, Finance	2018	242,094	130,000 <sup>(9)</sup>	159,202	163,973	4,767 <sup>(10)</sup>	700,036
	2017	235,042	-	67,128	75,400	2,821	380,391
James Barnhart <sup>(11)</sup> Senior Vice President, Operations	2018	252,308	-	955,256	368,640	6,467 <sup>(12)</sup>	1,582,671
Rollin Kocher <sup>(13)</sup> Senior Vice President, Sales and Marketing	2018	309,615	-	630,085	357,120	8,641 <sup>(14)</sup>	1,305,461
	2017	285,124	-	410,653	247,755	6,363	949,895
	2016	269,909	-	244,156	339,473	4,800	858,338
Janet Taylor General Counsel	2018	299,615	-	436,608	288,000	27,046 <sup>(15)</sup>	1,051,269
	2017	278,923	-	318,659	122,220	7,992	727,794
	2016	274,500	-	132,300	155,250	7,218	569,268

- (1) Amounts shown do not reflect compensation actually received by the named executive officer. Instead, the amounts shown are the aggregate grant date fair value of equity awards granted for financial statement reporting purposes in accordance with Financial Accounting Standards Board (“FASB”) Accounting Standards Codification (“ASC”) Topic 718. The assumptions used to calculate the value of the restricted stock units (“RSUs”) and/or performance stock units (“PSUs”) are set forth under Note 12 of the Notes to Consolidated Financial Statements included in Nanometrics’ Annual Report on Form 10-K for the fiscal year ended December 29, 2018, filed with the SEC on February 25, 2019.
- (2) The amount with respect to PSUs granted in 2018 is based on the probable outcome of the satisfaction of the performance conditions, which was \$646,169 for Dr. Lesaichere, \$177,821 for Mr. Chou, and \$116,417 for Mr. Kocher; the grant date fair value assuming satisfaction of the performance conditions was \$969,254 for Dr. Lesaichere, \$266,731 for Mr. Chou, and \$174,625 for Mr. Kocher. The amount with respect to PSUs in 2017 is based on the probable outcome of the satisfaction of the performance conditions, which was \$607,206 for Dr. Lesaichere and \$104,325 for Mr. Kocher; the grant date fair value assuming satisfaction of the performance conditions was \$1,063,313 for Dr. Lesaichere and \$156,488 for Mr. Kocher. No PSUs were granted to the named executive officers in 2016.
- (3) Amounts reflected for each fiscal year are those earned, but not paid until the following fiscal year, under our executive performance bonus programs.
- (4) Dr. Lesaichere became our President and Chief Executive Officer on November 27, 2017.
- (5) Represents additional compensation as follows: car allowance in the amount of \$14,400 and an employer 401(k) match of \$4,900.
- (6) Mr. Chou served as our Chief Financial Officer from March 5, 2018 to June 25, 2018.
- (7) Represents additional compensation as follows: reimbursements under our Executive Health Care Plan of \$400, an employer 401(k) match of \$1,736, relocation expenses of \$51,145, and severance of \$150,000.
- (8) Mr. Swyt served as our Principal Financial Officer from December 5, 2017 until February 22, 2018 and has served as our Principal Financial Officer since June 26, 2018.
- (9) Represents a \$30,000 discretionary bonus paid to Mr. Swyt in March 2018 due to his acting as our principal financial officer prior to Mr. Chou’s employment, a \$50,000 retention bonus paid to Mr. Swyt during 2018 for remaining our employee from December 2017 through July 2018, and a \$50,000 retention bonus earned primarily in 2018 and paid to Mr. Swyt in 2019 for remaining our employee from July 2018 through February 2019 and acting as principal financial officer after Mr. Chou’s termination.
- (10) Represents additional compensation as follows: an employer 401(k) match of \$4,767.
- (11) Mr. Barnhart joined Nanometrics in March 2018.
- (12) Represents additional compensation as follows: reimbursements under our Executive Health Care Plan of \$3,809, and an employer 401(k) match of \$2,658.
- (13) Mr. Kocher became an executive officer in September 2016.
- (14) Represent additional compensation as follows: reimbursements under our Executive Health Care Plan of \$3,741, and an employer 401(k) match of \$4,900.
- (15) Represent additional compensation as follows: reimbursements under our Executive Health Care Plan of \$22,146, and an employer 401(k) match of \$4,900.

## 2018 Grants of Plan-Based Awards

The following table sets forth information with respect to grants of plan-based awards during the 2018 fiscal year that ended December 29, 2018, to each of the named executive officers.

### Grants of Plan-Based Awards For Fiscal Year 2018

Name	Grant Date	Estimated future payouts under non-equity incentive plan awards			Estimated future payouts under equity incentive plan awards <sup>(1)</sup>			All other stock awards <sup>(2)</sup>	Grant date fair value of stock awards <sup>(3)</sup>
		Threshold (\$)	Target (\$)	Maximum (\$)	Threshold (#)	Target (#)	Maximum (#)	Number of Shares of stock or units (#)	
Pierre-Yves Lesaichere, Ph.D.	11/27/17	—	\$ 550,000	\$ 1,100,000					
	4/26/18				2,566	25,662	38,493		\$ 969,254
	4/26/18							25,662	\$ 665,146
Jonathan Chou	3/5/18	—	\$ 240,500	\$ 481,000					
	3/5/18				1,158	11,580	17,370		\$ 399,510
	3/5/18							34,741	\$ 927,237
Greg Swyt	2/23/18	—	\$ 85,402	\$ 170,805					
	6/1/18							3,753	\$ 159,202
James Barnhart	3/12/18	—	\$ 192,000	\$ 384,000					
	6/1/18							22,519	\$ 955,256
Rollin Kocher	2/23/18	—	\$ 186,000	\$ 372,000					
	2/23/18				485	4,847	7,270		\$ 174,625
	2/23/18							19,391	\$ 513,668
Janet Taylor	2/23/18	—	\$ 150,000	\$ 300,000					
	2/23/18							16,482	\$ 436,608

(1) Reflects PSU awards under our 2017 Executive Performance Bonus Plan as described under "Compensation Discussion and Analysis". All PSUs awarded in 2018 vest in equal annual installments over a three-year period subject to achievement of certain stock-price performance metrics.

(2) Reflects RSUs awarded under our 2005 Equity Incentive Plan. All RSUs awarded in 2018 vest in equal annual installments over a three-year period. No stock options were granted to any of our named executive officers during 2018.

(3) Amounts shown do not reflect compensation actually received by the named executive officer. Instead, the amounts shown are the aggregate grant date fair value of equity awards granted for financial statement reporting purposes, as determined pursuant to ASC Topic 718. The assumptions used to calculate the value of the RSUs and PSUs are set forth under Note 12 of the Notes to Consolidated Financial Statements included in Nanometrics' Annual Report on Form 10-K for the fiscal year ended December 29, 2018, filed with the SEC on February 25, 2019. The amount with respect to PSUs is also based on the probable outcome of the satisfaction of the performance conditions.

### Narrative Disclosure to Summary Compensation Table and Grants of Plan-Based Awards Table

See "2018 Compensation Discussion and Analysis" above for a description of the material terms and considerations of compensation paid to our named executive officers.

Our 401(k) savings plan allows employees to contribute up to 100% of their annual compensation to the plan on a pre-tax or after-tax basis, limited to a maximum annual amount as set periodically by the Internal Revenue Service. The plan provides a 20% match by Nanometrics of all employee contributions.

In the 2018 fiscal year, all corporate officers and non-employee directors were eligible to participate in a Nanometrics self-funded Executive Reimbursement Plan (currently administered by Benefit and Risk Management Services). This plan is intended to supplement our basic health plan by reimbursing expenses that are not covered by our health plan. Dr. Lesaichere is also entitled to a car allowance. Attributed costs of the perquisites described above for the named executive officers for the fiscal year ended December 29, 2018, are included in the "Summary Compensation Table." All such perquisites are taxable to the executive and included as a portion of such executive's wages.

## Outstanding Equity Awards at Fiscal 2018 Year End

The following table sets forth the number of shares covered by stock awards held by each of the named executive officers at the end of the fiscal year, which ended December 29, 2018, other than Mr. Chou, who did not hold any stock awards as of December 29, 2018. None of the named executive officers held any stock options at December 29, 2018.

Name	Grant Date	Stock Awards			
		Number of Shares or Units of Stock That Have Not Vested <sup>(1)</sup>	Market Value of Shares or Units of Stock That Have Not Vested <sup>(2)</sup>	Number of Unearned Shares, Units of Stock That Have Not Vested	Market Value of Unearned Shares, Units of Stock That Have Not Vested <sup>(2)</sup>
Pierre-Yves Lesaichere, Ph.D.	4/26/18			38,493 <sup>(3)</sup>	\$ 1,064,331
	11/27/17			62,500 <sup>(4)</sup>	\$ 1,728,125
	4/26/18	25,662	\$ 709,554		
	11/27/17	39,653	\$ 1,096,405		
Greg Swyt	6/1/18	3,753	\$ 103,770		
	6/2/17	1,596	\$ 44,129		
	11/23/16	2,741	\$ 75,789		
James Barnhart	6/1/18	22,519	\$ 622,650		
Rollin Kocher	2/23/18			7,270 <sup>(3)</sup>	\$ 201,016
	2/8/17			3,900 <sup>(5)</sup>	\$ 107,835
	2/23/18	19,391	\$ 536,161		
	2/8/17	7,866	\$ 217,495		
	5/27/16	4,329	\$ 119,697		
Janet Taylor	2/23/18	16,482	\$ 455,727		
	2/8/17	8,183	\$ 226,260		
	2/22/16	3,333	\$ 92,157		

(1) Restricted stock units that vest annually over three years on each anniversary of the respective award date.

(2) The closing market price of Nanometrics common stock on December 28, 2018, the last trading day of our 2018 fiscal year, was \$27.65 per share.

(3) Performance stock units that vest annually, subject to stock performance metrics, over three years on each anniversary of February 23, 2018.

(4) Performance stock units that vest in two tranches, subject to stock performance metrics, the first after two years and the second after the third year of the anniversary of November 27, 2017.

(5) Performance stock units that vest annually, subject to stock performance metrics, over three years on each anniversary of February 8, 2017.

## Option Exercises and Stock Vested

The following table provides, on an aggregate basis, the value realized upon the vesting of stock awards, by the named executive officers during the 2018 fiscal year that ended December 29, 2018. None of the named executive officers exercised any stock options during the 2018 fiscal year that ended December 29, 2018.

### Option Exercises and Stock Vested For Fiscal 2018

Name	Stock Awards	
	Number of Shares Acquired On Vesting	Value Realized on Vesting <sup>(1)</sup>
Pierre-Yves Lesaichere, Ph.D.	19,827 <sup>(2)</sup>	\$ 620,783
Jonathan Chou	—	—
Greg Swyt	3,540 <sup>(3)</sup>	118,497
Jim Barnhart	—	—
Rollin Kocher	11,260 <sup>(4)</sup>	373,594
Janet Taylor	14,091 <sup>(5)</sup>	486,579

- (1) The value realized on vesting is calculated by multiplying the number of shares shown in the table by the market value of the shares on the vesting date.
- (2) Consists of 19,827 RSUs released on November 27, 2018, with a fair market value of \$31.31 per share on that date.
- (3) Consists of 798 RSUs released on June 2, 2018, with a fair market value of \$42.42 per share on that date, and 2,742 RSUs released on November 23, 2018, with a fair market value of \$30.87 per share on that date.
- (4) Consists of 617 PSUs released on February 8, 2018, with a fair market value of \$24.54 per share on that date, 3,934 RSUs released on February 8, 2018, with a fair market value of \$24.54 per share on that date, 4,329 RSUs released on May 27, 2018, with a fair market value of \$38.67 per share on that date, and 2,380 RSUs released on May 29, 2018, with a fair market value of \$39.71 per share on that date.
- (5) Consists of 4,092 RSUs released on February 8, 2018, with a fair market value of \$24.54 per share on that date, 3,333 RSUs released on February 22, 2018, with a fair market value of \$26.30 per share on that date, and 6,666 RSUs released on August 28, 2018, with a fair market value of \$44.78 per share on that date.

## Employment Contracts and Termination of Employment and Change-in-Control Arrangements

### *Pierre-Yves Lesaichere, Ph.D.*

On November 27, 2017, Dr. Lesaichere became our President and Chief Executive Officer. In connection with Dr. Lesaichere's appointment as President and Chief Executive Officer, we entered into an employment agreement pursuant to which Dr. Lesaichere receives or will receive: (1) a base salary of \$550,000 per year, and had a target bonus for 2017 and 2018 of \$550,000 for each year (prorated for period of service for 2017) with actual bonus to be determined based on performance; (2) a restricted stock unit (RSU) grant to acquire shares of Nanometrics common stock having a value of \$1.625 million (59,480 shares), vesting with respect to 1/3 of the shares each year for three years, subject to accelerated vesting in the event Nanometrics terminates Dr. Lesaichere's employment without "cause" or Dr. Lesaichere resigns for "good reason" within two years of employment; (3) a performance restricted stock unit (PRSU) grant to acquire 62,500 shares of Nanometrics common stock vesting with respect to 2/3 of the shares on the second anniversary of grant and the rest on the third anniversary of grant, subject to meeting specified stock price performance metrics and Dr. Lesaichere's continued service with Nanometrics; (4) annual RSU and PRSU grants commencing in 2018, each vesting over three years (subject to meeting performance criteria for the PRSU grant), each with a value of each of \$625,000; and (5) a sign-on bonus of \$100,000.

In addition, the agreement provides that: (a) in the event Nanometrics terminates Dr. Lesaichere's employment without "cause" or Dr. Lesaichere resigns for "good reason" not within 12 months of a "change of control", Dr. Lesaichere will receive continued base salary for 12 months, a lump sum payment of his target bonus and COBRA health coverage at Nanometrics' expense for 12 months, and accelerated vesting of his initial RSUs granted on his date of hire; and (b) in the event Nanometrics terminates Dr. Lesaichere's employment without "cause" or Dr. Lesaichere resigns for "good reason" within 12 months of a "change of control", Dr. Lesaichere will receive continued base salary for 18 months, a lump sum payment of his target bonus, COBRA health coverage at Nanometrics' expense for 18 months, accelerated vesting of all of his outstanding RSUs, and accelerated vesting of his PRSUs granted in 2017 at target level. In addition, Nanometrics entered into its standard form of indemnification agreement with Dr. Lesaichere.

### *Jonathan Chou*

In connection with Mr. Chou's appointment as Chief Financial Officer in March 2018, we entered into an employment agreement with Mr. Chou that provided for: (1) a base salary of \$370,000 per year, and a target bonus for 2018 of 65% of base salary; (2) a restricted stock unit grant to acquire shares of Nanometrics common stock having a value of \$900,000, vesting with respect to 1/3 of the shares each year for three years; (3) a performance restricted stock unit grant to acquire shares of

Nanometrics common stock having a value of \$300,000 vesting with respect to 1/3 of the shares each year for three years, subject to specified stock price performance metrics and Mr. Chou's continued service with Nanometrics; and (4) relocation assistance not to exceed \$35,000.

In addition, Nanometrics and Mr. Chou entered into a General Severance Benefits and Change in Control Severance Benefits Agreement pursuant to which: (a) in the event Nanometrics terminates Mr. Chou's employment without "cause" or Mr. Chou resigns for "good reason" not within 12 months of a "change of control" (each to be defined in the employment agreement), Mr. Chou will receive continued base salary for 12 months, a lump sum payment of his target bonus and COBRA health coverage at Nanometrics' expense for 12 months; and (b) in the event Nanometrics terminates Mr. Chou's employment without "cause" or Mr. Chou resigns for "good reason" within 12 months of a "change of control", Mr. Chou will receive continued base salary for 18 months, a lump sum payment of his target bonus, COBRA health coverage at Nanometrics' expense for 18 months, and accelerated vesting of all of his outstanding equity grants. In addition, Nanometrics entered into its standard form of indemnification agreement with Mr. Chou.

In connection with Mr. Chou's termination in June 2018, we entered into a separation agreement with Mr. Chou that provided for: (1) a lump sum severance payment of \$150,000, and (2) COBRA health coverage at Nanometrics' expense for up to 12 months.

#### *Severance Agreements with Named Executive Officers*

Dr. Lesaichere's and Mr. Chou's severance arrangements are discussed above under "-Pierre-Yves Lesaichere, Ph.D.," and "-Jonathan Chou," respectively.

Nanometrics entered into severance benefits and change in control severance benefits agreements (the "Severance Agreements") with Janet Taylor in July 2015, Rollin Kocher in November 2016, and James Barnhart in March 2018. The general severance benefits will become payable under the Severance Agreements in the event of the executive officer's termination without cause or resignation for good reason which occurs other than on or within 12 months following a qualifying change in control event. With respect to Ms. Taylor, the general severance benefits consist of 12 months of base salary continuation and COBRA premium benefits, and with respect to Messrs. Kocher and Barnhart, the general severance benefits consist of six months of base salary continuation and COBRA premium benefits.

The change in control severance benefits will become payable under the severance agreements in the event that (i) a qualifying change in control event occurs and (ii) the executive's termination without cause or resignation for good reason occurs within the period commencing on and ending 12 months following the qualifying change in control event. With respect to Ms. Taylor, Mr. Kocher, and Mr. Barnhart, the change in control severance benefits consist of (i) a lump sum payment of 12 months' base salary and 100% of the annual target bonus, (ii) 12 months of COBRA premium benefits, and (iii) full acceleration of the vesting and exercisability of all then outstanding equity awards, except performance-based incentive awards, will generally apply.

For purposes of the severance agreements, a qualifying change of control event generally includes any of the following events: (i) an acquisition by any person, entity or group of the beneficial ownership of securities of Nanometrics representing more than fifty percent of the total voting power of Nanometrics' then outstanding securities; (ii) a change in a majority of the members constituting the Board within a two year period that is not approved by a majority of the incumbent Board members, (iii) a merger or consolidation involving Nanometrics and, immediately after the consummation of such transaction, the stockholders of Nanometrics immediately prior thereto do not own, directly or indirectly, outstanding voting securities representing more than fifty percent of the combined outstanding voting power of the surviving or resulting entity; and (iv) a sale, lease or other disposition of all or substantially all of the assets of Nanometrics.

Payment of general severance benefits or change in control severance benefits, as applicable, is in all cases conditioned upon the executive officer providing a timely and effective release of claims against Nanometrics and the executive officer's ongoing compliance with the non-competition, non-solicitation and other requirements set forth in the severance agreements.

In addition, under the terms of our 2005 Equity Incentive Plan, in the event of a merger or change in control in which outstanding stock options or restricted stock units held by the named executive officers are not assumed or substituted with stock options or restricted stock units of the surviving company, such awards will vest and become fully exercisable or payable.

#### *Greg Swyt*

In June 2018, we and Greg Swyt entered into a Retention Bonus Agreement pursuant to which Mr. Swyt received a retention bonus of \$50,000 as Mr. Swyt remained employed by us and performed his duties and responsibilities in a satisfactory manner, through February 28, 2019.

## Termination of Employment and Change-in-Control Potential Payouts

The table below estimates amounts payable upon a separation as if the individuals were separated on December 29, 2018, which was the last day of our 2018 fiscal year. Mr. Chou is not included in the table as his employment with us terminated before the end of fiscal 2018. His actual severance payments are discussed above. Mr. Swyt is not included in this table since we have not entered into a severance agreement with him.

		Not in connection with Change in Control	In Connection with Change in Control
		Termination Without Cause/ Good Reason	Termination Without Cause For Good Reason Or Due to Disability or Death
Pierre-Yves Lesaicherre, Ph.D.	Severance pay	\$ 550,000	\$ 825,000
	Equity vesting acceleration <sup>(1)</sup>	1,096,405	2,958,043
	Bonus	550,000	550,000
	Health care benefits continuation	31,434	47,152
		<u>\$ 2,227,839</u>	<u>\$ 4,380,195</u>
James Barnhart	Severance pay	\$ 160,000	\$ 320,000
	Equity vesting acceleration <sup>(1)</sup>	—	622,650
	Bonus	—	192,000
	Health care benefits continuation	15,717	31,434
		<u>\$ 175,717</u>	<u>\$ 1,166,084</u>
Rollin Kocher	Severance pay	\$ 155,000	\$ 310,000
	Equity vesting acceleration <sup>(1)</sup>	—	873,353
	Bonus	—	186,000
	Health care benefits continuation	15,717	31,434
		<u>\$ 170,717</u>	<u>\$ 1,400,787</u>
Janet Taylor	Severance pay	\$ 300,000	\$ 300,000
	Equity vesting acceleration <sup>(1)</sup>	—	774,145
	Bonus	—	150,000
	Health care benefits continuation	11,920	11,920
		<u>\$ 311,920</u>	<u>\$ 1,236,065</u>

(1) Represents the estimated potential incremental value of additional restricted stock units and performance stock units that would have vested for our named executive officers as of December 29, 2018. Accelerated restricted stock unit award value is calculated by multiplying the number of accelerated shares by the closing price of our stock on December 28, 2018, \$27.65 per share. Accelerated performance stock unit award value is calculated by multiplying the number of target level accelerated shares by the closing price of our stock on December 28, 2018, \$27.65 per share.

## CEO Pay Ratio

As required by Item 402(u) of Regulation S-K, we are providing the following information about the relationship of the annual total compensation of our median employee and the annual total compensation of Dr. Lesaicherre, our Chief Executive Officer (“CEO”). CEO compensation is from the Summary Compensation Table.

Nanometrics chose November 1, 2018, as the date for establishing the employee population used in identifying the median employee and used fiscal 2018 as the measurement period. Nanometrics identified the median employee using a consistently applied compensation measure which consists of annual base salary or wages, overtime pay (if any), and cash bonuses. Regular employees who joined in 2018 and regular employees who were on leave during 2018 were assumed to have worked for the entire year. All U.S. and non-U.S. employees employed as of November 1, 2018, were captured. No cost-of-living adjustments were made.

The annual total compensation of the median employee and the annual total compensation of Dr. Lesaicherre were calculated in accordance with the requirements of Item 402(c)(2)(x) of Regulation S-K. Dr. Lesaicherre’s total compensation in 2018 on an annualized basis was \$2,936,885, and our median employee’s annual total compensation in 2018 was \$93,629. As a result, our 2018 CEO to median employee pay ratio was approximately 31:1.

## COMPENSATION COMMITTEE REPORT<sup>1</sup>

The Compensation Committee has reviewed and discussed with management the Compensation Discussion and Analysis contained in this Proxy Statement. Based on this review and discussion, the Compensation Committee has recommended to the Board of Directors that the Compensation Discussion and Analysis be included in this Proxy Statement and incorporated into Nanometrics Incorporated's Annual Report on Form 10-K for the fiscal year ended December 29, 2018.

The Compensation Committee

Edward J. Brown Jr., Chairman  
J. Thomas Bentley  
Robert G. Deuster  
Christine A. Tsingos

<sup>1</sup> The material in this report is not "soliciting material," is furnished to, but not deemed "filed" with, the Securities and Exchange Commission and is not deemed to be incorporated by reference in any filing of the company under the Securities Act or the Exchange Act, other than the company's Annual Report on Form 10 K, where it shall be deemed to be "furnished," whether made before or after the date hereof and irrespective of any general incorporation language in any such filing.

## COMPENSATION OF DIRECTORS

During the 2018 fiscal year, non-employee directors received an annual retainer fee of \$60,000. In addition, the Chairman of the Board, Audit Committee Chairman, Compensation Committee Chairman and Nominating and Governance Committee Chairman received an incremental \$30,000, \$20,000, \$20,000 and \$10,000 annual retainer, respectively, for serving in such capacities. Committee members, other than the chairpersons, received an incremental \$10,000 annual retainer for service on the Audit or Compensation Committee and an incremental \$7,500 annual retainer for service on the Nominating and Governance Committee. All retainer fees are paid annually, as of the date of our annual stockholders meeting, and in advance of the provision of services to which the retainer relates.

Non-employee directors are also eligible to participate in our 2005 Equity Incentive Plan, and in fiscal year 2018, each such director received equity incentives, issued in restricted stock units, valued at \$130,000. We calculated the number of such equity incentives using the 30-day average of the closing market price of our stock on the Nasdaq Stock Market as of the date of our annual stockholders meeting. These awards vest on the earlier of the first anniversary date of the grant or the date of the next annual meeting of stockholders.

Any new non-employee director will be eligible to receive restricted stock units valued at \$130,000 pro-rated to reflect the amount of time served before the next annual meeting of stockholders.

Non-employee directors are eligible to participate in Nanometrics' self-funded Executive Reimbursement Plan, which is intended to supplement our basic health plan by reimbursing expenses that are not covered by our health plan. All such reimbursements are considered taxable income to our non-employee directors.

### 2018 Director Compensation

The following table sets forth information regarding the compensation for each of our non-employee directors for the 2018 fiscal year that ended December 29, 2018. Nanometrics' non-employee director compensation program for the 2018 fiscal year comprised: (a) cash compensation, consisting of annual retainer fees, additional fees for chairing Board committees, and additional fees for serving as a committee member; and (b) equity compensation, consisting of restricted stock units. Each of these components is detailed below.

**Director Compensation Table For Fiscal Year 2018**

	Fees Earned or Paid in Cash	Stock Awards <sup>(1)(2)</sup>	All Other Compensation <sup>(3)</sup>	Total
Bruce C. Rhine	\$ 110,000	\$ 159,117	\$ 2,486	\$ 271,603
J. Thomas Bentley	70,000	159,117	122	229,239
Edward J. Brown Jr.	87,500	159,117	2,465	249,082
Robert Deuster	80,000	159,117	-	239,117
Christopher Seams	77,500	159,117	2,486	239,103
Timothy J. Stultz, Ph.D.	60,000	159,117	-	219,117
Christine A. Tsingos	90,000	159,117	-	249,117

(1) On May 22, 2018, each non-employee director received a restricted stock unit award in the amount of 4,134 shares of common stock. All RSUs vest one year from the first anniversary date of the award or the next annual meeting, if earlier. The fair market value for these RSUs was \$159,117, or \$38.49 per share, on the date of the grant. At December 29, 2018, each non-employee director, except Dr. Stultz, held 4,134 unvested restricted stock units. At December 29, 2018, Dr. Stultz had 129,467 outstanding options to purchase shares of common stock and 69,467 unvested restricted stock units.

(2) The number of shares underlying the 2018 restricted stock award received by each director was calculated by dividing an approved grant date value of \$130,000 by the 30-day average of the closing market price of our stock as of the date of our 2018 annual stockholders' meeting, or \$31.45 per share, (discussed above under "Compensation of Directors"). However, the dollar amounts shown in this column for such awards do not reflect compensation actually received by the named director (i.e., the \$130,000), instead, the amounts shown are the aggregate grant date fair value calculated for financial statement reporting purposes, as determined pursuant to Accounting Standards Codification ("ASC") Topic 718. The assumptions used to calculate the value of awards are set forth under Note 12 of the Notes to Consolidated Financial Statements included in our Annual Report on Form 10-K for fiscal 2018 filed with the SEC on February 25, 2019.

(3) Representing health care reimbursements extended to Directors.

## COMPENSATION COMMITTEE INTERLOCKS AND INSIDER PARTICIPATION

During the 2018 fiscal year, the Compensation Committee consisted of Edward J. Brown Jr. (Chair), J. Thomas Bentley, Robert G. Deuster and Christine A. Tsingos. None of Nanometrics' executive officers serve as a member of the board of directors or compensation committee of any entity that has one or more executive officers serving as a member of Nanometrics' Board or Compensation Committee.

## **PROPOSAL 2: ADVISORY (NON-BINDING) VOTE ON EXECUTIVE COMPENSATION**

At each of the 2011 and 2017 Annual Meetings of Stockholders, the stockholders indicated their preference that Nanometrics solicit a non-binding advisory vote on the compensation of the named executive officers, commonly referred to as a “say-on-pay” vote, every year. The Board of Directors adopted a policy that is consistent with that preference. In accordance with this policy, this year we are again requesting our stockholders to approve an advisory resolution on Nanometrics’ executive compensation as reported in this Proxy Statement, and as required by Section 14A(a)(1) of the Exchange Act. This vote is not intended to address any specific item of compensation, but the overall compensation of our named executive officers and the philosophy, policies and practices described in this Proxy Statement.

As described more fully in the Compensation Discussion and Analysis section and other compensation-related disclosures in the proxy statement, consistent with its compensation philosophy and pay-for-performance principles, Nanometrics’ executive compensation program has been designed to provide competitive compensation packages that enable Nanometrics to attract and retain talented executives, motivate executive officers to achieve Nanometrics’ short- and long-term business strategies and objectives, and align the interests of executives with those of stockholders, and are consistent with current market practices and good corporate governance principles.

We encourage you to read the Compensation Discussion and Analysis, compensation tables and related narrative discussion in this Proxy Statement.

The Compensation Committee and the Board of Directors believe that the policies and procedures articulated in the “Compensation Discussion and Analysis” are effective in achieving our goals and that the compensation of our named executive officers reported in this Proxy Statement has contributed to our recent and long-term success.

In accordance with Section 14A(a)(1) of the Exchange Act, as a matter of good corporate governance, and in accordance with the policy adopted by the Board of Directors to provide an annual “say-on-pay” advisory vote, we are asking stockholders to approve the following advisory resolution at the annual meeting:

**RESOLVED**, that the stockholders of Nanometrics approve, on an advisory basis, the compensation of Nanometrics’ named executive officers disclosed in the Compensation Discussion and Analysis, the Summary Compensation Table and the related compensation tables, notes and narratives in the Proxy Statement for Nanometrics’ 2019 Annual Meeting of Stockholders.

This advisory, “say-on-pay” resolution is non-binding on Nanometrics, the Compensation Committee and the Board of Directors. Although this resolution is non-binding, the Compensation Committee and the Board of Directors value the opinions that stockholders express in their votes and in any additional dialogue, and will review and consider the outcome of the vote and those opinions when making future compensation decisions.

**THE BOARD OF DIRECTORS UNANIMOUSLY RECOMMENDS THAT STOCKHOLDERS VOTE “FOR” THE ADVISORY RESOLUTION APPROVING THE COMPANY’S EXECUTIVE COMPENSATION.**

### PROPOSAL 3: RATIFICATION OF APPOINTMENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

The Audit Committee of the Board of Directors has appointed PricewaterhouseCoopers LLP as our independent registered public accounting firm to audit the consolidated financial statements of Nanometrics for the fiscal year ending December 28, 2019.

Approval by the stockholders of the selection of the independent registered public accounting firm is not required, but the Audit Committee believes it is desirable as a matter of good corporate governance to submit this matter to the stockholders. If the holders of a majority of the shares present in person or by proxy at the meeting and entitled to vote on the matter at the annual meeting do not ratify the appointment of PricewaterhouseCoopers LLP as Nanometrics' independent registered public accounting firm for the fiscal year ending December 28, 2019, the Audit Committee will consider whether it should select another independent registered public accounting firm. Representatives of PricewaterhouseCoopers LLP are expected to attend the annual meeting and will have an opportunity to make a statement and respond to appropriate questions from stockholders.

#### *Audit Fees*

The following table summarizes the aggregate fees that we paid or expect to pay our independent registered public accounting firm, PricewaterhouseCoopers LLP, for the 2018 and 2017 fiscal years. We did not pay any audit related fees or tax fees to PricewaterhouseCoopers LLP, for the 2018 and 2017 fiscal years.

	<u>Fiscal 2018</u>	<u>Fiscal 2017</u>
Audit Fees <sup>(1)</sup>	\$ 1,333,197	\$ 1,225,779
All Other Fees <sup>(2)</sup>	2,700	1,800
Total	<u>\$ 1,335,897</u>	<u>\$ 1,227,579</u>

(1) Fees to PricewaterhouseCoopers LLP in 2018 and 2017 for audit services consist of:

- Audit of our annual financial statements including management's assessment of internal controls over financial reporting;
- Reviews of our quarterly financial statements; and
- Statutory and regulatory audits, consents and other services.

(2) Paid to PricewaterhouseCoopers LLP for accounting research and database tool and disclosure questionnaires.

In considering the nature of the services provided by the independent registered public accounting firm, the Audit Committee determined that such services are compatible with the provision of independent audit services. The Audit Committee discussed these services with the independent registered public accountants and our management to determine that they are permitted under the rules and regulations concerning auditors' independence promulgated by the Securities and Exchange Commission to implement the Sarbanes-Oxley Act of 2002, as well as the American Institute of Certified Public Accountants.

#### *Audit Committee Pre-Approval Policy*

Pursuant to our Audit Committee charter, our Audit Committee must pre-approve all audit and permissible non-audit services, and the related fees, provided to us by our independent registered public accounting firm, or subsequently approve permissible non-audit services in those circumstances where a subsequent approval is necessary and permissible under the Exchange Act or the rules of the Securities and Exchange Commission. The policy generally pre-approves specified services in the defined categories of audit services, audit-related services and tax services up to specified amounts. Pre-approval may also be given as part of the Audit Committee's approval of the scope of the engagement of the independent auditor or on an individual, explicit, case-by-case basis before the independent auditor is engaged to provide each service. The pre-approval of services may be delegated to one or more of the Audit Committee's members. Accordingly, the Audit Committee pre-approved all services and fees provided by PricewaterhouseCoopers LLP, during the year ended December 29, 2018, and has concluded that the provision of these services is compatible with the accountants' independence.

**THE BOARD OF DIRECTORS UNANIMOUSLY RECOMMENDS THAT STOCKHOLDERS VOTE "FOR" THE RATIFICATION OF THE APPOINTMENT OF PRICEWATERHOUSECOOPERS LLP, AS NANOMETRICS' INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM FOR THE FISCAL YEAR ENDING DECEMBER 29, 2018.**

## EQUITY COMPENSATION PLAN INFORMATION

The following table gives information about the common stock that may be issued under all our existing equity compensation plans as of December 29, 2018.

Plan Category	Number of securities to be issued upon exercise of outstanding options, warrants and rights	Weighted-average exercise price of outstanding options, warrants and rights	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in first column)
Equity Compensation plans approved by security holders <sup>(1)</sup>	83,394	\$ 15.80	1,411,835
Equity compensation plans not approved by security holders	—	—	—
<b>Total</b>	<b>83,394</b>	<b>\$ 15.80</b>	<b>1,411,835</b>

- (1) Consists of shares issuable under the company's Accent Optical Technologies, Inc. Stock Incentive Plan, 2000 Employee Stock Option Plan, 2000 Director Stock Option Plan, 2003 Employee Stock Purchase Plan and 2005 Equity Incentive Plan ("ESPP"). As of December 29, 2018, a total of 443,694 shares of our common stock remained available for issuance under the ESPP, and up to a maximum of 66,658 shares of our common stock may be purchased in the current purchase period. The shares issuable pursuant to our ESPP are not included in the number of shares to be issued pursuant to rights outstanding and the weighted-average exercise price of such rights as of December 29, 2018, as those numbers are not known. The weighted-average exercise price does not take into account 881,166 shares issuable upon vesting of outstanding awards of restricted stock units and performance-based shares, which have no exercise price.

## **HOUSEHOLDING OF PROXY MATERIALS**

The SEC has adopted rules that permit companies and intermediaries (e.g., brokers) to satisfy the delivery requirements for Notices of Internet Availability of Proxy Materials or other Annual Meeting materials with respect to two or more stockholders sharing the same address by delivering a single Notice of Internet Availability of Proxy Materials or other Annual Meeting materials addressed to those stockholders. This process, which is commonly referred to as “householding,” potentially means extra convenience for stockholders and cost savings for companies.

This year, a number of brokers with account holders who are Nanometrics stockholders will be “householding” Nanometrics’ proxy materials. A single Notice of Internet Availability of Proxy Materials will be delivered to multiple stockholders sharing an address unless contrary instructions have been received from the affected stockholders. Once you have received notice from your broker that they will be “householding” communications to your address, “householding” will continue until you are notified otherwise or until you revoke your consent. If, at any time, you no longer wish to participate in “householding” and would prefer to receive a separate Notice of Internet Availability of Proxy Materials, please notify your broker or Nanometrics. Direct your written request to Investor Relations Department, Nanometrics Incorporated, 1550 Buckeye Drive, Milpitas, California 95035 or contact Investor Relations at 408-545-6000. Stockholders who currently receive multiple copies of the Notice of Internet Availability of Proxy Materials at their addresses and would like to request “householding” of their communications should contact their brokers.

## OTHER MATTERS

The Board of Directors knows of no other matters that will be presented for consideration at the Annual Meeting. If any other matters are properly brought before the meeting, it is the intention of the persons named in the accompanying proxy to vote on such matters in accordance with their best judgment.

BY ORDER OF THE BOARD OF DIRECTORS

/s/ Bruce C. Rhine

Bruce C. Rhine

Chairman of the Board of Directors

Milpitas, California  
April 3, 2019

**A copy of Nanometrics' Annual Report to the Securities and Exchange Commission on Form 10-K for the fiscal year ended December 29, 2018, is available without charge upon written request to: Investor Relations Department, Nanometrics, Incorporated, 1550 Buckeye Drive, Milpitas, California 95035.**

**FORM 10-K**

FOR THE FISCAL YEAR ENDED DECEMBER 29, 2018

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NANOMETRICS INCORPORATED

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**UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION**

Washington, D.C. 20549

**FORM 10-K**

(Mark One)

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended December 29, 2018

OR

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from \_\_\_\_\_ to \_\_\_\_\_

Commission file number: 000-13470

**NANOMETRICS INCORPORATED**

(Exact name of registrant as specified in its charter)

Delaware  
(State or other jurisdiction of incorporation or organization)

94-2276314  
(I.R.S. Employer Identification Number)

1550 Buckeye Drive  
Milpitas, California  
(Address of principal executive offices)

95035  
(Zip Code)

Registrant's telephone number, including area code: (408) 545-6000

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Name of each exchange on which registered
Common Stock, \$0.001 par value per share	The Nasdaq Stock Market LLC (Nasdaq Global Select Market)

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the Registrant is a well-known seasoned issuer as defined in Rule 405 of the Securities Act. Yes  No .

Indicate by check mark if the Registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes  No .

Indicate by check mark whether the Registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the Registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes  No .

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes  No .

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of Registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K .

Indicate by check mark whether the Registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or 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	<input checked="" type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input type="checkbox"/>	Smaller reporting company	<input type="checkbox"/>
		Emerging growth company	<input type="checkbox"/>

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 13(a) of the Exchange Act.

Indicate by check mark whether the Registrant is a shell company (as defined by Rule 12b-2 of the Act) Yes  No .

As of June 30, 2018, the last business day of the Registrant's most recently completed second fiscal quarter, the aggregate market value of the common stock of Registrant held by non-affiliates, based upon the closing sales price for the Registrant's common stock for such date, as quoted on the Nasdaq Global Select Market, was approximately \$787.4 million. Shares of common stock held by each officer and director and by each person affiliated with an officer or director have been excluded because such persons may be deemed to be "affiliates" as that term is defined under the rules and regulations of the Exchange Act. This determination of affiliate status is not necessarily a conclusive determination for any other purpose.

The number of shares of the Registrant's common stock outstanding as of February 22, 2019 was 24,463,681.

**DOCUMENTS INCORPORATED BY REFERENCE**

The Registrant has incorporated by reference into Part III of this Annual Report on Form 10-K portions of its Proxy Statement for its 2019 Annual Meeting of Stockholders to be filed pursuant to Regulation 14A. The Proxy Statement will be filed within 120 days of Registrant's fiscal year ended December 29, 2018.

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**NANOMETRICS INCORPORATED**  
**FORM 10-K**  
**FOR THE FISCAL YEAR ENDED DECEMBER 29, 2018**

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## CAUTIONARY INFORMATION REGARDING FORWARD-LOOKING STATEMENTS

*This Annual Report on Form 10-K for the year ended December 29, 2018, or “Form 10-K,” contains forward-looking statements concerning our business, operations, and financial performance and condition as well as our plans, objectives, and expectations for business operations and financial performance and condition. Any statements contained herein that speak to future events, performance, results or other matters may be deemed to be forward-looking statements. You can identify these statements by words such as “anticipate,” “believe,” “could,” “estimate,” “expect,” “intend,” “may,” “plan,” “should,” “will,” “would,” and other similar expressions that are predictions of or indicate future events and future trends. These forward-looking statements are based on current expectations, estimates, forecasts, and projections about our business and the industry in which we operate and management’s beliefs and assumptions and are not guarantees of future performance or development and involve known and unknown risks, uncertainties, and other factors that are in some cases beyond our control. As a result, any or all of our forward-looking statements in this Form 10-K may turn out to be inaccurate. Factors that could materially affect our business operations and financial performance and condition include, but are not limited to, those risks and uncertainties described herein under “Item 1A - Risk Factors.” You are urged to consider these factors carefully in evaluating the forward-looking statements and are cautioned not to place undue reliance on the forward-looking statements. The forward-looking statements are based on information available to us as of the filing date of this Form 10-K. Unless required by law, we do not intend to publicly update or revise any forward-looking statements to reflect new information or future events or otherwise. You should, however, review the factors and risks we describe in the reports we will file from time to time with the Securities and Exchange Commission, or SEC, after the date of this Form 10-K.*

## PART I

### ITEM 1. BUSINESS

#### Overview

Nanometrics Incorporated and its subsidiaries (“Nanometrics”, the “Company”, or “we”) is a leading provider of advanced, high-performance process control metrology and inspection systems used primarily in the fabrication of semiconductors and other solid-state devices as well as industrial and scientific applications. Our automated and integrated metrology systems measure critical dimensions, device structures, topography, shape, and various thin film properties, including three-dimensional features and film thickness, as well as optical, electrical and material properties. Our process control solutions are deployed throughout the semiconductor fabrication process, from front-end-of-line substrate manufacturing, to high-volume production of semiconductors and other devices, to advanced three-dimensional wafer-level packaging and industrial applications. Our systems enable advanced process control for manufacturers, providing improved yield at reduced manufacturing cycle time, supporting accelerated product life cycles in the semiconductor, industrial and scientific markets.

We were incorporated in California in 1975 and reincorporated in Delaware in 2006. We have been publicly traded since 1984 (Nasdaq: NANO). We have an extensive installed base of thousands of systems in the majority of advanced semiconductor device production factories worldwide.

Additional information about us is available on our website at <http://www.nanometrics.com>. The information that can be accessed through our website, however, is not part of this Annual Report. The investor relations section of our website is located at <http://www.nanometrics.com/investor.html>. Our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and any amendments to those reports are available on the investor relations section of our website free of charge as soon as reasonably practicable after we electronically file or furnish such materials to the United States Securities and Exchange Commission (“SEC”). In addition, the reports and materials that we file with the SEC are available at the SEC’s website (<http://www.sec.gov>).

#### Industry Background

We participate in the sale, design, manufacture, marketing and support of process control systems for optical critical dimension metrology, thin film metrology, wafer inspection, and advanced analytics used for semiconductor manufacturing as well as industrial applications and scientific research. Our principal market is semiconductors. Semiconductors, primarily packaged as integrated circuits within electronic devices, include consumer electronics, server and enterprise systems, mobile computing (including smart phones and tablets), data storage devices, and embedded automotive and control systems. Our core focus is the measurement and control of the structure, composition, and geometry of the devices as they are fabricated on silicon wafers to improve device performance and manufacturing yields. Our end customers manufacture many types of integrated circuits for a multitude of applications, each having unique manufacturing challenges. This includes integrated circuits to enable information processing and management (logic integrated circuits), memory storage (NAND, 3D-NAND, NOR, and DRAM), analog devices (e.g., Wi-Fi and 4G radio integrated circuits, power devices) MEMS sensor devices (accelerometers, pressure sensors, microphones), image sensors, and other end markets including components for hard disk drives, LEDs, and power management.

Demand for our products continues to be driven by our customers' desire for higher overall chip performance, including improvements in power efficiency, logic processing capability, data storage volume and manufacturing yield. To achieve these goals, our customers have increased their use of more complex materials and processing methods in their manufacturing flow. The primary paths for performance gains are geometric scaling, known as node shrinks, or scaling in three dimensions. In some cases, our customers are implementing new materials and methods in high volume manufacturing, including materials and device architectures to reduce power consumption, and stacked devices. To shrink features, new methods, including multiple patterning lithography and extreme ultra-violet lithography (EUV), have been developed. To scale NAND memory a new 3D stacking architecture has been implemented with as many as 96 device layers for a device in production. Additional innovation continues in Data Storage, Power Devices, MEMS, and Image Sensors. We believe the use of these new materials and manufacturing methods has increased demand for our products.

#### Our Business

We offer a diverse line of process control products and technologies to address the manufacturing requirements of the semiconductor (and other solid-state device) manufacturing industry. Our metrology systems measure and characterize the physical dimensions, material composition, optical and electrical characteristics and other critical parameters of solid-state devices, from initial wafer substrate manufacturing through final packaging.

We are continually working to strengthen our competitive position by developing innovative technologies and products in our market segment. We have expanded our product offerings to address growing applications within the semiconductor manufacturing and adjacent industries. In pursuit of our goals, we have:

- Introduced new products, applications, and upgrades in every core product line and primary market served;
- Diversified our product line and strengthened our position with our top customers securing tool of record positions of one or more products in each of the top six customers (as defined by capital expenditures for wafer fab equipment), who combined represent a substantial majority of all wafer fab equipment expenditures;
- Acquired 4D Technology Corporation in November 2018, whose dynamic high-performance interferometric measurement and inspection systems will enable us to serve new markets in advanced process control metrology and inspection; and
- Continued development of new measurement and inspection technologies for advanced fabrication processes.

## **Nanometrics Products**

We offer a diverse line of systems to address the broad range of process control requirements of the semiconductor device and industrial manufacturing markets. In addition, we believe that our product development and engineering expertise and strategic acquisitions will enable us to develop and offer advanced process control solutions that, in the future, should address industry advancement and trends.

### **Automated Systems**

Our automated systems primarily consist of fully automated metrology systems that are employed in semiconductor production environments. The Atlas<sup>®</sup> family of products represent our line of high-performance metrology systems providing optical critical dimension (“OCD”<sup>®</sup>), thin film metrology and wafer stress metrology for transistor and interconnect metrology applications. The thin film and OCD technology is supported by our NanoCD suite of solutions including our NanoDiffract<sup>®</sup> software, SpectraProbe<sup>™</sup> software and NanoGen<sup>™</sup> scalable computing engine that enables visualization, modeling, and analysis of complex structures.

### **Integrated Systems**

Our integrated metrology (“IM”) systems are installed directly onto wafer processing equipment to provide near real-time measurements for improved process control and maximum throughput. Our IM systems are sold directly to end user customers. The IMPULSE family of products include the latest technology for OCD, and thin film metrology, and have been successfully qualified on numerous independent Wafer Fabrication Equipment Suppliers’ platforms. Our NanoCD suite of solutions is sold in conjunction with our IMPULSE systems.

### **Software**

NanoDiffract<sup>®</sup> is a modeling, visualization and analysis software that takes signals from the metrology systems, providing critical dimension, thickness, and optical properties from in-line measurements. The software has an intuitive three-dimensional modeling interface to provide visualization of today’s advanced and complex semiconductor devices. There are proprietary fitting algorithms in NanoDiffract that enable very accurate and very fast calculations for signal processing for high fidelity model-based measurements. SpectraProbe is a model-less fitting engine that enables fast time to solution for in-line excursion detection and control. SpectraProbe complements the high-fidelity modeling of NanoDiffract with a simple machine learning interface for rapid recipe deployment. The software is supported by NanoGen, an enterprise scale computing hardware system that is deployed to run the computing intensive analysis software. NanoGen leverages commercial server chips and networking architecture and is optimized to support the workload of NanoDiffract and SpectraProbe analysis.

## **Materials Characterization**

Our materials characterization products include systems that are used to monitor the physical, optical, electrical and material characteristics of discrete electronic industry, opto-electronic, HB-LED (high brightness LEDs), solar PV (solar photovoltaics), compound semiconductor, strained silicon and silicon-on-insulator (“SOI”) devices, including composition, crystal structure, layer thickness, dopant concentration, contamination and electron mobility.

We have a broad portfolio of products for materials characterization including photoluminescence mapping and Fourier-Transform Infrared (“FTIR”) spectroscopy in automated and manual systems for substrate quality and epitaxial thickness metrology. The NanoSpec<sup>®</sup> line supports thin film measurement across all applications in both low volume production and research applications.

## Industrial, Scientific, and Research Markets: 4D Technology

In November of 2018 we acquired 4D Technology Corporation, based in Tucson Arizona. The 4D business unit offers a line of interferometry systems for the measurement and inspection of high precision surfaces. End markets include high precision optics surfaces and components, aerospace and defense components, and unique research and scientific instrumentation that requires the unique high-speed results of the 4D systems.

### Customers

We sell our metrology and inspection systems worldwide to semiconductor manufacturers, producers of solid-state devices, wafer manufacturers and industrial and scientific research customers. We sell the majority of our systems to customers located in Asia and the United States

With respect to customer concentration, the following presents customers who represented 10% or more of total net revenue for any the years ended December 29, 2018, December 30, 2017 and December 31, 2016.

10% or more of total net revenues	2018	2017	2016
Intel Corporation	*	*	*
Micron Technology, Inc.	^	*	*
Samsung Electronics Co. Ltd.	*	*	^
SK hynix	*	*	*
Taiwan Semiconductor Manufacturing Company Limited	^	^	*
Toshiba Corporation	*	*	^

\* The customer accounted for more than 10% of total revenues during the period

^ The customer accounted for less than 10% of total revenues during the period

Product revenues represented 85%, 83%, and 84% of total net revenues in 2018, 2017 and 2016, respectively.

### Sales and Marketing

We believe that the capability for direct sales and support is beneficial for developing and maintaining close customer relationships and for rapidly responding to changing customer requirements. We provide local direct sales, service and application support through our worldwide offices located in the United States, South Korea, Japan, Taiwan, China, Singapore and France, and work with selected dealers and sales representatives in Asia, in the United States and other countries. Our applications team is composed of technically experienced sales engineers who are knowledgeable in the use of metrology systems generally and the unique features and advantages of our specific products. Supported by our technical applications team, our sales and support teams work closely with our customers to offer cost-effective solutions to complex measurement and process problems.

### Customer Service and Support

We believe that customer service and technical support for our systems are crucial factors that distinguish us from our competitors and are essential to building and maintaining close, long-term relationships with our customers. We provide a standard one-year warranty on non-consumable parts and labor for most of our products, under which we provide the non-consumable parts and labor necessary to repair the systems during the warranty period. We provide system support to our customers through factory technical support and globally deployed field service personnel. The factory technical support operations provide customers with telephonic technical support access, direct training programs, operating manuals and other technical support information to enable effective use of our metrology and measurement instruments and systems. We have field service operations based in various locations throughout the United States, South Korea, Taiwan, China, Japan, Singapore, Israel, and other locations in Europe.

Service revenues, including sales of replacement parts, represented 15%, 17%, and 16% of total net revenues in 2018, 2017 and 2016, respectively.

### Backlog

As of December 29, 2018, and December 30, 2017, our backlog was \$36.4 million and \$34.0 million, respectively. Backlog includes orders received and booked, both shipped and not yet recognized as revenue, and not shipped, for products, services and upgrades where written customer requests have been received and we expect to ship and/or recognize revenue within 12 months. Orders are subject to cancellation or delay by the customer subject to possible penalties. However, historically, order cancellations have not been significant. Because orders presently in backlog could be cancelled or rescheduled and some orders

can be received and shipped within the same quarter, we do not believe that current backlog is an accurate indication of our future revenues or financial performance.

### **Competition**

We offer various products for various semiconductor manufacturing process steps, and several of our products extend across the same process flow. However, for process control of each of these process steps, we have multiple established and potential competitors, some of whom may have greater financial, research, engineering, manufacturing and marketing resources than we have. We may also face future competition from new market entrants from other overseas and domestic sources. We expect our competitors to continue to improve the design and performance of their current products and processes, and to introduce new products and processes with improved price and performance characteristics. In order to remain competitive, we believe that we will require significant financial resources to offer a broad range of products, and to maintain customer service and support centers worldwide, and to invest in product research and development.

In every market in which we participate, the global semiconductor equipment industry is intensely competitive, and driven by rapid technological adoption cycles. Our ability to effectively compete depends upon our ability to continually improve our products, applications and services, and our ability to develop new products, applications and services that meet constantly evolving customer requirements.

In automated systems for the semiconductor industry, our principal competitors are KLA Corporation ("KLA") and Nova Measuring Instruments Ltd. ("Nova") for thin film and critical dimension OCD metrology, and other suppliers for advanced packaging. Our primary competitor in integrated systems is Nova. The opto-electronics, discrete device and industrial and scientific markets are addressed primarily by our material characterization and 4D business unit systems, served by numerous competitors in which no single competitor or group of competitors has established a majority position.

We believe that our competitive position in each of our markets is based on the ability of our products and services to address customer requirements related to numerous competitive factors. Competitive selections are based on many factors involving technological innovation, productivity, total cost of ownership of the system, including impact on end of line yield, price, product performance and throughput capability, quality, reliability and customer support.

### **Manufacturing**

Our manufacturing operations are in Milpitas California, Tucson Arizona, and at various contract manufacturers around the world. It is our strategy to outsource all assemblies that do not contain elements that we believe lead to a direct competitive advantage. Most of our automated and integrated products are currently manufactured at our Milpitas facility. We currently do not expect our manufacturing operations to require additional major investments in capital equipment.

We manufacture key modular assemblies and integrated tools and make reasonable efforts to ensure that externally purchased parts or raw materials are available from multiple suppliers, but this is not always possible. Certain components, subassemblies and services necessary for the manufacture of our systems are obtained either from a sole supplier or limited group of suppliers. We also have long-term supply agreements with strategic suppliers for the supply of key assemblies for use in our products.

### **Research and Development**

We continue to invest in research and development ("R&D") to provide our customers with products that add value to their manufacturing processes and that provide a better and differentiated solution than our competitors so that our products stay in the forefront of current and future market demands. Whether it is for an advancement of current technology, yield and manufacturing improvement, enabling new end device technology, or the development of a new application in our core or emerging markets, we are committed to product excellence and longevity.

In our automated markets, our R&D efforts resulted in the successful product launch of the Atlas III product in the marketplace, our flagship product for OCD. In our integrated markets, the IMPULSE system has been further developed for which incorporates performance and productivity enhancements. Nano Diffract and SpectraProbe have regular semi-annual customer releases with a focus on improved capability and performance. The materials characterization suite of products has had significant refresh and customization for customer needs including the latest FTIR for improved substrate metrology. 4D Technology has ongoing projects for the interferometry line of products including the recently launched InSpec for industrial shop floor inspection as well as new versions of the AccuFiz line for large aperture interferometers.

## Patents and Intellectual Property

Our success depends in large part on the technical innovation of our products and protecting such innovations through a variety of methods. We actively pursue a program of filing patent applications to seek protection of technologically sensitive features of our metrology and inspection systems.

As of December 29, 2018, we had 181 patents, including foreign patents, with expiration dates ranging from 2019-2036. We believe that our success will depend to a great degree upon innovation, technological expertise and our ability to adapt our products to new technology. While we attempt to establish our intellectual property rights through patents and trademarks and protect intellectual property rights through non-disclosure agreements, we may not be able to fully protect our technology, and competitors may be able to develop similar technology independently. Others may obtain patents and assert them against us. In addition, the laws of certain foreign countries may not protect our intellectual property to the same extent as do the laws of the United States. From time to time we receive communications from third parties asserting that our metrology systems may contain design features that the third parties claim may infringe upon their proprietary rights.

## Employees

At December 29, 2018, we employed 701 persons worldwide with sales, applications and service support in key geographic areas aligned with our customer locations. None of our employees are represented by a union and we have never experienced a work stoppage because of union actions. We consider our employee relations to be good. Many of our employees have specialized skills that are of value to us. Our future success will depend in large part upon our ability to attract, retain and motivate highly skilled scientific, technical and managerial personnel, who are in great demand in our industry.

## Environmental Matters

Our operations are subject to various federal, state and local environmental protection regulations governing the use, storage, handling and disposal of hazardous materials, chemicals, and certain waste products. We believe that compliance with federal, state and local environmental protection regulations will not have a material adverse effect on our capital expenditures, earnings and competitive and financial position.

If we fail to comply with such laws and regulations, we could be liable for damages, penalties and fines. We further discuss the impact of environmental regulation under “Risk Factors- *We are subject to various environmental laws and regulations that could impose substantial costs upon us and may harm our business, operating results and financial condition.*” in Item 1A.

## Executive Officers of the Registrant

The names of our executive officers and their ages, titles and biographies as of February 25, 2019, are set forth below:

Name	Age	Position
Dr. Pierre-Yves Lesaicherre	55	President, Chief Executive Officer and Director
Greg Swyt	58	Vice President, Finance (Principal Financial Officer)
Rollin Kocher	53	Sr. Vice President, Sales and Marketing
Kevin Heidrich	48	Sr. Vice President, Corporate Development
Janet Taylor	61	General Counsel
James Barnhart	56	Sr. Vice President, Operations

Dr. Pierre-Yves Lesaicherre joined Nanometrics as President and Chief Executive Officer in November 2017. From January 2012 to February 2017, Dr. Lesaicherre was Chief Executive Officer of Lumileds, an integrated manufacturer of LED components and Automotive Lighting Lamps, where he was responsible for all aspects of the company’s business. Prior to being named Chief Executive Officer, Dr. Lesaicherre also held other management positions at Lumileds from 2006 to 2012. Before Lumileds, Dr. Lesaicherre was Senior Vice President and general manager of the Microcontrollers & Logic business lines at NXP Semiconductors, formerly Philips Semiconductors. He holds an MBA with a focus on international business and strategy from INSEAD and has MS and Ph.D. degrees in Material Science from the National Polytechnic Institute of Grenoble.

Greg Swyt assumed the role of Principal Financial Officer of Nanometrics from November 2017 to February 2018 and subsequently from June 2018. Mr. Swyt has served as the Vice President, Finance of Nanometrics from August 2016. Prior to joining Nanometrics, Mr. Swyt was Managing Director, Finance, at Intevac Corporation, a public company delivering thin film solutions, from May 2008 to July 2016, where he managed the Global Financial Planning and Analysis Organization, which also included Manufacturing Finance, Government Finance and Regional Finance. Mr. Swyt received an MBA and a BS in Finance from San Jose State University.

Rollin Kocher joined Nanometrics in March 2013 as Vice President, Global Sales. In September 2016, Mr. Kocher was promoted to Senior Vice President, Commercial Operations. He has assumed the role of Senior Vice President, Sales and Marketing in January 2018. Prior to joining Nanometrics, Mr. Kocher held several senior management positions over 17 years at KLA, including Global Sales for Films and Scatterometry, Sales for Taiwan, North America and Europe, and Senior Director of Sales for the Samsung Business Unit. His last position at KLA was General Manager of the Samsung Business Unit, and in that capacity, was responsible for Sales, Marketing, Applications, and Service. Mr. Kocher holds a B.S. degree in Electrical Engineering Technology from the University of North Texas.

Kevin Heidrich, Senior Vice President, Corporate Development, joined Nanometrics in 2006. Mr. Heidrich has participated in many functions, expanding his scope to include corporate marketing and business development. He assumed the role of Vice President, Marketing and Business Development in May 2009; Senior Vice President, Strategic Marketing and Business Development in September 2012; and Senior Vice President, Corporate Development in January 2018. Mr. Heidrich is now responsible for both corporate strategy and marketing, as Nanometrics expands its overall solution space within process control metrology. Prior to Nanometrics, Mr. Heidrich spent a decade at Intel Corporation in a variety of roles including process research and development at Intel's Technology Development facility. Mr. Heidrich received B.S. and M.S. degrees from the Colorado School of Mines in Chemical Engineering.

Janet Taylor joined Nanometrics as General Counsel in July 2015. Ms. Taylor served as Senior Vice President, General Counsel and Company Secretary of STATS ChipPAC Ltd., from June 2005 to June 2015, where she was responsible for all legal matters, including corporate governance, intellectual property, litigation and securities compliance. Prior to joining STATS ChipPAC Ltd, Ms. Taylor was engaged in transactional practices at international law firms in New York, Singapore and London. Ms. Taylor was admitted to the Bar in New York in 1990 and in Singapore in 2010. Ms. Taylor holds a J.D. from the Harvard Law School and a B.A. in History from the University of Texas at Austin.

Jim Barnhart joined Nanometrics as Senior Vice President, Operations in March 2018. After completing U.S. Naval Nuclear Power postgraduate school, Mr. Barnhart joined Applied Materials where for 17 years he held progressively higher positions including Strategic Worldwide Account Operations General Manager, Chief Operating Officer of the etch products business group, and Managing Director of corporate asset services. Mr. Barnhart left Applied Materials in 2006 to serve in senior operational roles at Johnson & Johnson and AREVA Solar as Senior Vice President, Global Operations. Most recently, he served as Senior Vice President, Global Operations for Cymer Light Sources from April 2010 until joining Nanometrics. Mr. Barnhart holds a B.S. in Electrical Engineering from Washington State University and an MBA from the University of California at Berkeley, Walter A. Haas School of Business.

## ITEM 1A. RISK FACTORS

*In addition to the other information contained in this Annual Report on Form 10-K, we have identified the following risks and uncertainties that may have a material adverse effect on our business, financial condition or results of operations. Investors should carefully consider the risks described below before making an investment decision. The risks described below are not the only ones we face. Additional risks not currently known to us or that we currently believe are immaterial may also impair our business operations. Our business could be harmed by any of these risks. The trading price of our common stock could decline due to any of these risks and investors may lose all or part of their investment. This section should be read in conjunction with the Consolidated Financial Statements and Notes thereto, and Management's Discussion and Analysis of Financial Condition and Results of Operations contained in this Annual Report on Form 10-K.*

***The Global economic conditions and the cyclical nature of the semiconductor industry can affect demand for our products which in turn may negatively impact our financial performance.***

Global economic conditions, and the cyclical nature of the semiconductor industry have impacted, and could in the future impact, customer demand for our products and our financial performance. Demand for our products is largely dependent on our customers' capital spending on semiconductor equipment, which depends, in large part, on consumer spending, required manufacturing capacity, and customer access to capital. Economic uncertainty, unemployment, higher interest rates, higher tax rates, fluctuations in foreign currency exchange rates, tariffs and other trade barriers, and other economic factors may lead to a decrease in consumer spending and may cause certain customers to cancel existing orders or delay placing orders. If we are unable timely and appropriately to adapt to changes resulting from unfavorable economic conditions, it may cause volatility in our operating results, business, and financial condition, and results of operations may be adversely affected.

In addition, demand for our products is highly inelastic which means we have little ability to control product revenues created by customer demand for more capacity. The market for our products is characterized by constant and rapid technological change, price erosion, product obsolescence, evolving standards, short product life cycles and significant volatility in supply and demand. Due to the inelastic nature of demand in the semiconductor industry, we may need to take actions to reduce costs in the future, which could reduce our ability to significantly invest in research and development at levels we believe are necessary. If we are unable to effectively align our cost structure with prevailing market conditions, our business, financial condition and results of operations may be materially and adversely affected.

We may also experience supplier or customer issues as a result of adverse macroeconomic conditions. If our customers have difficulties in obtaining capital or financing, this could result in lower sales. Customers with liquidity issues could also result in an increase in bad debt expense. These conditions could also affect our key suppliers, which could affect their ability to supply parts and result in delays of our customer shipments.

***Our largest customers account for a substantial portion of our net revenues, and our net revenues would materially decline if one or more of these customers were to purchase significantly fewer of our systems.***

Historically, a significant portion of our net revenues in each quarter and each year has been derived from sales to relatively few customers, and we expect this trend to continue. In fiscal year 2018, five customers represented a substantial majority of our total net revenues. There are only a limited number of large companies operating in the semiconductor manufacturing industry. Accordingly, we expect that we will continue to depend on a small number of large customers for a significant portion of our net revenues for the foreseeable future. If our current relationships with our large customers are impaired, or if we are unable to develop similar collaborative relationships with important customers in the future, our net revenues could decline significantly. In addition, because there are a limited number of customers, customers may seek concessions related to price, terms and conditions and intellectual property. Any of these changes could negatively impact our financial performance and results of operations.

***We rely on a limited number of outside suppliers and subcontractors to supply certain components and subassemblies, and on a single or a limited group of outside suppliers for certain materials for our products, which could result in a potential inability to obtain an adequate supply of required components due to the suppliers' failure or inability to provide such components in a timely manner, or at all, and reduced control over pricing and timely delivery of components and materials, any of which could adversely affect our results of operations.***

Our manufacturing activities consist of integrating, assembling and testing components and subassemblies. We rely on a limited number of outside suppliers and subcontractors to manufacture certain components and subassemblies. We order one of the most critical components of our technology, the spectroscopic ellipsometer component incorporated into our advanced measurement systems, from external suppliers.

We procure some of our other critical systems' components, subassemblies and services from single suppliers or a limited group of outside suppliers to ensure overall quality and timeliness of delivery. Many of these components and subassemblies have significant production lead times. To date, we have been able to obtain adequate supplies of components and subassemblies for our systems in a timely manner. However, disruption or termination of certain of these sources could have a significant adverse impact on our ability to manufacture our systems. In addition, our failure to timely use components in our manufacturing processes due to delays or cancellation of orders may lead to write-downs of inventory. A disruption in supply or inventory window would, in turn, have a material adverse effect on our business, financial condition and results of operations. Our reliance on a sole supplier or a limited group of suppliers and our reliance on subcontractors involve several risks, including:

- a potential inability to obtain an adequate supply of required components due to the suppliers' failure or inability to provide such components in a timely manner, or at all; and
- reduced control over pricing and timely delivery of components.

Although the timeliness, yield and quality of deliveries to date from our subcontractors have been acceptable, manufacture of certain of these components and subassemblies is an extremely complex process, and long lead times are required. Any inability to obtain adequate deliveries or any other circumstance that would require us to seek alternative sources of supply or to manufacture such components internally could delay our ability to ship our products, which could damage relationships with current and prospective customers and have a material adverse effect on our business, financial condition and results of operations.

***We are subject to risks associated with our competitors' strategic relationships and their introduction of new products, and we may lack the financial resources or technological capabilities of certain of our competitors needed to capture increased market share.***

We operate in the highly competitive semiconductor industry and expect to face significant competition from multiple current and future competitors. We believe that other companies are developing systems and products that are competitive to our products and are planning to introduce new products, which may affect our ability to sell our existing or future products. We face a greater risk if our competitors enter into strategic relationships with leading semiconductor manufacturers covering products similar to those we sell or may develop, as this could adversely affect our ability to sell products to those manufacturers.

Some of our competitors have greater financial, engineering, manufacturing, research and development, marketing and customer support resources than we do. As a result, our competitors may be able to respond more quickly to new or emerging technologies or market developments by devoting greater resources to the development, promotion and sale of products, which could impair sales of our products. Moreover, there has been merger and acquisition activity among our competitors and potential competitors. These transactions by our competitors and potential competitors may provide them with a competitive advantage over us by enabling them to rapidly expand their product offerings and service capabilities to meet a broader range of customer needs. Many of our customers and potential customers in the semiconductor industry are large companies that require global support and service for their metrology systems. Some of our larger or more geographically diverse competitors might be better equipped to provide this global support and service.

In addition, our competitors may provide innovative technology that may have performance advantages over systems we currently offer or may offer in the future. They may be able to develop products comparable or superior to those that we offer or may adapt more quickly to new technologies or evolving customer requirements. In particular, while we currently are developing additional product enhancements that we believe will address future customer requirements, we may fail in a timely manner to complete the development or introduction of these additional product enhancements successfully, or these product enhancements may not achieve market acceptance or be competitive.

Further, customers that may otherwise desire to purchase our products from us and purchase other products from our competitors may nevertheless purchase competing products from our competitors rather than purchase our products due to a variety of reasons, including to gain favor or volume pricing from our competitors.

***Because of the high cost of switching equipment vendors in our markets, it may be difficult for us to attract customers from our competitors even if our metrology systems are superior to theirs.***

We believe that once a semiconductor customer has selected one vendor's metrology system, the customer generally relies upon that system and, to the extent possible, subsequent generations of the same vendor's system, for the life of the application. Once a vendor's metrology system has been installed, a customer must often make substantial technical modifications and may experience downtime to switch to another vendor's metrology system. Accordingly, unless our systems offer performance or cost advantages that outweigh a customer's expense of switching to our systems; it will be difficult for us to achieve significant sales from that customer once it has selected another vendor's system for an application.

***Our integrated metrology systems are integrated onto systems sold independently by Wafer Fabrication Equipment Suppliers, and a decrease in sales by these suppliers, or the development of competing systems by these suppliers, could harm our business.***

We believe that sales of integrated metrology systems will continue to be an important source of our net revenues. Sales of our integrated metrology systems depend upon the ability of a small number of Wafer Fabrication Equipment Suppliers to sell semiconductor manufacturing equipment products that are compatible with our metrology systems as components. If these suppliers, such as Applied Materials, Inc., Ebara Corporation, Lam Research Corporation and Tokyo Electron, are unable to sell such products, if they choose to focus their attention on products that do not integrate our systems, or if they choose to develop competing systems, our business could suffer.

***We are subject to order and shipment uncertainties. Our profitability will decline if we fail to accurately forecast customer demand when managing inventory.***

We typically plan production and inventory levels based on internal forecasts of customer demand, which can be highly unpredictable and can fluctuate substantially, which could lead to excess inventory write-downs and resulting negative impacts on gross margin and net income. We have limited visibility into our customers' inventories, future customer demand and the product mix that our customers will require, which could adversely affect our production forecasts and operating margins. In addition, innovation in our industry could render significant portions of our inventory obsolete. If we overestimate our customers' requirements, we may have excess inventory, which could lead to obsolete inventory and unexpected costs. Conversely, if we underestimate our customers' requirements, we may have inadequate inventory, which could lead to foregone revenue opportunities, loss of potential market share and damage to customer relationships as product deliveries may not be made on a timely basis, disrupting our customers' production schedules. In response to anticipated long lead times to obtain inventory and materials from outside suppliers and foundries, we periodically order materials in advance of customer demand. This advance ordering has in the past and may in the future result in excess inventory levels or unanticipated inventory write-downs if expected orders fail to materialize, or other factors make our products less saleable. In addition, any significant future cancellation or deferral of product orders could adversely affect our revenue and margins, increase inventory write-downs due to obsolete inventory, and adversely affect our operating results and stock price.

***If we do not manage our supply chain effectively, our operating results may be adversely affected.***

We need to continually evaluate our global supply chains and assess opportunities to reduce costs. We must also enhance quality, speed and flexibility to meet changing demand for our products and product mix and uncertain market conditions. Our success also depends in part on refining our cost structure and supply chains so that we have flexibility and can maintain and improve profitability. Although the current tariff environment has not had a material adverse effect on our costs to date, further deterioration in the tariff environment, or changes in suppliers, may cause our costs to increase, which if we are not able to offset by charging higher sales prices, will cause a decline in our margins. To improve our margins on a product, we will need to establish high volume supply agreements with our vendors. We cannot be certain that we will be able to timely negotiate vendor supply agreements on improved terms and conditions, or at all. Failure to achieve the desired level of cost reductions could adversely affect our financial results. Despite our efforts to control costs and increase efficiency in our facilities, changes in demand could still cause us to realize lower operating margins and profitability.

***If we choose to acquire new and complementary businesses, or products or technologies instead of developing them ourselves, we may be unable to complete these acquisitions or may not be able to successfully integrate an acquired business in a cost-effective and non-disruptive manner.***

Our success depends on our ability to continually enhance and broaden our product offerings in response to changing technologies, customer demands and competitive pressures. To achieve this, from time to time we have acquired complementary businesses, products, or technologies instead of developing them ourselves and may choose to do so in the future. For example, in November 2018 we acquired 4D Technology Corporation ("4D"), which we are currently in the process of integrating into Nanometrics. If we do identify suitable additional transactions in the future, we may not be able to complete them on commercially acceptable terms, or at all. We also face intense competition for acquisitions from other acquirers in our industry. These competing acquirers may have significantly greater financial and other resources than us, which may prevent us from successfully pursuing a transaction.

Potential risks associated with acquisitions, such as our acquisition of 4D, include, among other things:

- our inability to realize the benefits or cost savings that we expect to realize as a result of the acquisition;
- diversion of management's attention;
- our inability to successfully integrate our businesses with the business of the acquired company;

- motivating, recruiting and retaining executives and key employees; conforming standards, controls, procedures and policies, business cultures and compensation structures among our company and the acquired company;
- consolidating and streamlining sales, marketing and corporate operations;
- potential exposure to unknown liabilities of acquired companies;
- loss of key employees and customers of the acquired business; and
- managing tax costs or inefficiencies associated with integrating our operations following completion of the acquisitions.

If an acquisition is not successfully completed or integrated into our existing operations, our business, financial condition and results of operations could be adversely impacted.

In addition, to finance any acquisitions we may be required to raise additional funds through public or private equity or debt financings; however:

- to obtain such financing we may be forced to obtain financing on terms that are not favorable to us and, in the case of equity or convertible debt financing, the financing may result in dilution to our stockholders; or
- such financing may not be available to us at all, which could prevent us from entering or completing the acquisition.

***Our success depends on the performance of key personnel, including our senior management and on our ability to identify, hire and retain key management personnel.***

We believe our continued ability to recruit, hire, retain and motivate highly-skilled engineering, operations, sales, administrative and managerial personnel is key to our future success. Competition for these employees is intense, particularly with respect to attracting and retaining qualified technical and senior management personnel. We do not have employment agreements with key members of our technical staff and all of our senior management team. Further, we do not have key person life insurance on any of our executives and these individuals or other key employees may leave us. We have experienced turnover in our senior management team in the past. Our business may be harmed if we are unable to recruit, retain and effectively integrate our senior management into our business operations and our ability to implement our strategy could be compromised.

***If we deliver systems with defects, our credibility will be harmed, revenue from, and market acceptance of, our systems will decrease, and we could expend significant capital and resources as a result of such defects.***

Our products are complex and frequently operate in high-performance, challenging environments. Notwithstanding our internal quality specifications, our systems have sometimes contained errors, defects and bugs, when introduced. If we deliver systems with errors, defects or bugs, our credibility and the market acceptance and sales of our systems would be harmed. Further, if our systems contain errors, defects or bugs, we may be required to expend significant capital and resources to alleviate such problems and incur significant costs for product recalls and inventory write-offs. Defects could also lead to product liability lawsuits against us or against our customers. We have agreed to indemnify our customers in some circumstances against liability arising from defects in our systems. In the event of a successful product liability claim, we could be obligated to pay damages significantly in excess of our product liability insurance limits.

***If we experience significant delays in shipping our products to our customers, our business and reputation may suffer.***

Our products are complex and require technical expertise to design and manufacture properly. Various problems occasionally arise during the manufacturing process that may cause delays and/or impair product quality. Any significant delays stemming from the failure of our products to meet or exceed our internal quality specifications, or for any other reasons, would delay our shipments. Shipment delays could harm our business and reputation in the industry.

***Net average selling prices of our products may decrease over time, which could have a material adverse effect on our revenues and profitability.***

It is common in our industry for the average selling price of a given product to decrease over time as production volumes increase, competing products are developed or latest technologies featuring higher performance or lower cost emerge. To combat the negative effects that erosion of average selling prices have had in the past and may have in the future on our net revenues, we attempt to actively manage the prices of our existing products and regularly introduce new process technologies and products in the market that exhibit higher performance, that are in demand, or that lower manufacturing cost. Failure to maintain our current prices or to successfully execute on our new product development strategy will cause our net revenues and gross margin to decline, which adversely affect our operating results and stock price.

***Third party infringement claims could be costly to defend, and successful infringement claims by third parties could result in substantial damages, lost product sales and the loss of important intellectual property rights by us.***

The semiconductor industry is generally subject to litigation regarding patents and other intellectual property rights. Our commercial success depends, in part, on our ability to avoid infringing or misappropriating patents or other proprietary rights owned by third parties. From time to time we may receive communications from third parties asserting that our metrology systems may contain design features which are claimed to infringe on their proprietary rights. Our new or current products may infringe valid intellectual property rights, but even if our products do not infringe, we may be required to expend significant sums of money to defend against infringement claims, or to actively protect our intellectual property rights through litigation. In the event that a claim is made and there is an adverse result of any intellectual property rights litigation, we could be required to pay substantial damages for infringement, expend significant resources to develop non-infringing technology, incur material liability for royalty payments or fees to obtain licenses to the technology covered by the litigation, or be subjected to an injunction, which could prevent us from selling our products and materially and adversely affect our net revenues and results of operations. We cannot be sure that we will be successful in any such non-infringing development or that any such license would be available on commercially reasonable terms, if at all. Any claims relating to the infringement of third-party proprietary rights, even if not meritorious, could result in costly litigation, lost sales or damaged customer relationships, and diversion of management's attention and resources.

***Our intellectual property may be infringed by third parties despite our efforts to protect it, which could threaten our future success and competitive position and harm our operating results.***

Our future success and competitive position depend in part upon our ability to obtain and maintain proprietary technology for our principal product families, and we rely, in part, on patent, trade secret and trademark law to protect that technology. If we fail to adequately protect our intellectual property, it will be easier for our competitors to sell competing products. We own or may license patents relating to our systems and have filed applications for additional patents. Any of our pending patent applications may be rejected, and we may not in the future be able to develop additional proprietary technology that is patentable. In addition, the patents we own, have been issued or licensed, may not provide us with competitive advantages and may be challenged by third parties. Third parties may also design around these patents.

In addition to patent protection, we rely upon trade secret protection for our confidential and proprietary information and technology. We routinely enter into confidentiality agreements with our employees. However, in the event that these agreements may be breached, we may not have adequate remedies. Our confidential and proprietary information and technology might also be independently developed by or become otherwise known to third parties.

We may be required to initiate litigation to enforce patents issued to or licensed by us, or to determine the scope or validity of a third party's patent or to enforce trade secret, confidentiality or other proprietary rights. Any such litigation, regardless of outcome, could be expensive and time consuming, and could subject us to significant liabilities or require us to re-engineer our product or obtain expensive licenses from third parties, any of which would adversely affect our business and operating results.

Despite our efforts to protect our proprietary rights, unauthorized parties may attempt to copy or otherwise obtain or use our products or technology. Our ability to enforce our patents and other intellectual property is limited by our financial resources and is subject to general litigation risks. If we seek to enforce our rights, we may be subject to claims that the intellectual property rights are invalid, are otherwise not enforceable or are licensed to the party against whom we assert a claim. In addition, our assertion of intellectual property rights could result in the other party seeking to assert alleged intellectual property rights of its own against us, which is a frequent occurrence in such litigation.

***Our efforts to protect our intellectual property may be less effective in some foreign countries where intellectual property rights are not as well protected as in the United States.***

In 2018, 2017, and 2016, 91%, 87% and 86%, respectively, of our total net revenues were derived from sales to customers in foreign countries, including certain countries in Asia, such as Japan, South Korea, China, Singapore and Taiwan. The laws of some foreign countries do not protect our proprietary rights to as great an extent as do the laws of the United States, and many U.S. companies have encountered substantial problems in protecting their proprietary rights against infringement in these countries. If we fail to adequately protect our intellectual property in these countries, it would be easier for our competitors to sell competing products and our business would suffer.

***Variations in the amount of time it takes for us to sell our systems may cause volatility in our operating results, which could cause our stock price to decline.***

Variations in the length of our sales and product acceptance cycles could cause our revenues to fluctuate widely from period to period. Our customers generally take long periods of time to evaluate our metrology systems. We expend significant resources educating and providing information to our prospective customers regarding the uses and benefits of our systems. The length of time that it takes for us to complete a sale depends upon many factors, including:

- the efforts of our sales force and our independent sales representatives;
- the complexity of the customer's metrology needs;
- the internal technical capabilities and sophistication of the customer;
- the customer's budgetary constraints; and
- the quality and sophistication of the customer's current processing equipment.

Because of the number of factors influencing the sales process, the period between our initial contact with a customer and the time at which we recognize revenue from that customer, if at all, varies widely. Our sales cycles, including the time it takes for us to build a product to customer specifications after receiving an order, typically range from three to nine months. Occasionally our sales cycles can be much longer, particularly with customers in Asia who may require longer evaluation and acceptance periods. During the sales cycles, we commit substantial resources to our sales efforts in advance of receiving any revenue, and we may never receive any revenue from a customer despite our sales efforts.

If we do complete a sale, customers often purchase only one of our systems and then evaluate its performance for a lengthy period of time before purchasing additional systems. The purchases are generally made through purchase orders rather than through long-term contracts. The number of additional products that a customer purchases, if any, depends on many factors, including a customer's capacity requirements, and/or shifting to more and advanced manufacturing processes that require more or different products to control. If they change their rate of capacity or have technological change, we cannot compensate for this fluctuation in demand by adjusting the price of our products. The period between a customer's initial purchase and any subsequent purchases and acceptance is unpredictable and can vary from three months to a year or longer. Variations in the length of this period could cause fluctuations in our operating results, which could adversely affect our stock price.

***Relatively small fluctuations in our system sales volume may cause our operating results to vary significantly each quarter.***

During any quarter, a significant portion of our revenue is derived from the sale of a relatively small number of systems, which have a vast range of selling prices depending on the system. Accordingly, a slight change in the number or mix of systems that we sell could cause significant changes in our operating results.

***We depend on new products and processes for our success. Consequently, we are subject to risks associated with rapid technological change.***

Rapid technological changes in semiconductor manufacturing processes subject us to increased pressure to develop technological advances enabling such processes. We believe that our future success depends in part upon our ability to develop and offer new products with improved capabilities and to continue to enhance our existing products. We cannot make assurances if or when the products and solutions where we have focused our research and development expenditures will become commercially successful. If new products have reliability or quality problems, our performance could be impacted by reduced orders, higher manufacturing costs, and delays in acceptance or payment for new products, and additional service and warranty expenses. We might not be able to develop and manufacture new products successfully, or new products that we introduce may fail in the marketplace. Our failure to complete commercialization of these new products in a timely manner could result in unanticipated costs and inventory obsolescence, which would adversely affect our financial results. Any significant delay in releasing new systems could adversely affect our reputation, give a competitor a first-to-market advantage or allow a competitor to achieve greater market share.

To develop new products and processes, we expect to continue to make significant investments in research and development and to pursue joint development relationships with customers, suppliers or other members of the industry. We must manage product transitions and joint development relationships successfully, as introduction of new products could adversely affect our sale of existing products.

***If we are unable to adjust the scale of our business in response to rapid changes in demand in the semiconductor equipment industry, our operating results and our ability to compete successfully may be impaired.***

The business cycle in the semiconductor equipment industry has historically been characterized by frequent periods of rapid change in demand that challenge our management to adjust spending and resources allocated to operating activities. During periods of growth or decline in demand for our products and services, we face significant challenges in maintaining adequate financial and business controls, management processes, information systems and procedures and in training, managing, and appropriately sizing our supply chain, our work force, and other components of our business on a timely basis. Our success will depend, to a significant extent, on the ability of our executive officers and other members of our senior management to identify and respond to these challenges, our gross margins and earnings may be impaired during periods of demand decline, and we may lack the infrastructure and resources to scale up our business to meet customer expectations and compete successfully during periods of demand growth.

***We manufacture all of our systems at a limited number of facilities, and any prolonged disruption in the operations of those facilities could reduce our revenues.***

We produce the majority of our systems in our manufacturing facilities located in Milpitas, California. We use contract manufacturers in China, Israel, Japan and the United States. Our manufacturing processes are highly complex and require sophisticated, costly equipment and specially designed facilities. As a result, any prolonged disruption in the operations of our manufacturing facilities, such as those resulting from acts of war, terrorism, political instability, health epidemics, fire, earthquake, flooding or other natural disaster could seriously harm our ability to satisfy our customer order deadlines.

***We may outsource select manufacturing activities to third-party service providers, which decreases our control over the performance of these functions and may result in lower quality and functionality of our products.***

We may outsource product manufacturing to third-party service providers. Outsourcing reduces our control over the performance of the outsourced functions. Dependence on outsourcing may also adversely affect our ability to bring new products to market. If we do not effectively manage our outsourcing strategy or if third party service providers do not perform as anticipated, we may experience operational difficulties, increased costs, manufacturing interruptions or inefficiencies in the operation of our supply chain, any or all of which could delay our delivery of products to our customers, and materially and adversely affect our business, financial condition, and results of operations.

***If our network security measures are breached and unauthorized access is obtained to a customer's data, to our data, or to our information technology systems, we may incur significant legal and financial exposure and liabilities.***

As part of our business, we store our data and certain data about our customers, vendors and employees in our information technology system. While we have security measures in place that are designed to protect this information and prevent data loss and other security breaches, if these measures are breached as a result of third-party action, employee error, malfeasance, break-ins or otherwise, and someone obtains unauthorized access to our customers', vendors' or employees' data, we could face loss of business, regulatory investigations or court orders, our reputation could be severely damaged, we could be required to expend significant capital and other resources to alleviate the problem, as well as incur significant costs and liabilities, including due to litigation, indemnity obligations, damages for contract breach, penalties for violation of applicable laws or regulations, and costs for remediation and other incentives offered to customers.

Cyber-attacks and other malicious internet-based activities continue to increase. Because the techniques used to obtain unauthorized access or sabotage systems change frequently and generally are not identified until they are launched against a target, we may be unable to anticipate these techniques or to implement adequate preventative measures. In addition, third parties may attempt to fraudulently induce employees or users to disclose information to gain access to our data or our customers' data. If any of these events occur, our or our customers' and vendors' information could be accessed or disclosed improperly. Any or all of these issues could negatively affect our ability to attract new customers, cause existing customers to choose to purchase from our competitors, result in reputational damage or subject us to third-party lawsuits, regulatory fines or other action or liability, which could adversely affect our operating results.

The General Data Protection Regulation (GDPR) is a regulation in European Union (EU) law on data protection and privacy for all individuals within the EU and the European Economic Area (EEA). It also addresses the export of personal data outside the EU and EEA areas. We need to put in appropriate technical and organizational measures to implement these data protection principles. The GDPR requirements have been reviewed and are in the process of being implemented. We may also be subject to other data privacy laws in the United States and the other countries in which we operate.

***Changes in our effective income tax rate could affect our results of operations.***

We are subject to taxation in numerous U.S. states and territories. 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. Our effective tax rate, however, may be different than experienced in the past due to numerous factors, including the passage of the Tax Cuts and Jobs Act, changes in the jurisdictions in which our profits are determined to be earned and taxed, increases in expenses not deductible for tax purposes, the results of examinations and audits of our tax filings, our inability to secure or sustain acceptable agreements with tax authorities, our utilization of net operating losses, changes in available tax credits, 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.

On December 22, 2017, the President signed into law the Tax Cuts and Jobs Act that significantly reforms the Internal Revenue Code of 1986, as amended, or the Code. The Tax Cuts and Jobs Act, among other things, contains significant changes to corporate taxation, including reduction of the corporate tax rate from a top marginal rate of 35% to a flat rate of 21%, limitation of the tax deduction for interest expense to 30% of adjusted earnings (except for certain small businesses), limitation of the deduction of future net operating losses to 80% of current year taxable income and elimination of net operating loss carrybacks, one-time taxation of offshore earnings at reduced rates regardless of whether they are repatriated, elimination of U.S. tax on foreign earnings (subject to certain important exceptions), immediate deductions for certain new capital investments instead of deductions for depreciation expense over time, and modifying or repealing many business deductions and credits, including the deductibility of executive compensation. Notwithstanding the reduction in the corporate income tax rate, the overall impact of the Tax Cuts and Jobs Act is uncertain and our business and financial condition could be adversely affected. The Tax Act became law in December 2017, and interpretations of this legislation are being released by various regulatory agencies and it is possible that there could be significant changes in interpretations that we may not be yet aware of, and which could adversely impact our financial results.

***We may incur impairments to goodwill or long-lived assets.***

We review our long-lived assets, including goodwill and other intangible assets, for impairment annually or more frequently when events or changes in circumstances indicate that the carrying amount of these assets may not be recoverable or it becomes more likely than not that the fair value is reduced below the carrying value of the reporting unit. Our valuation methodology for assessing impairment requires management to make judgments and assumptions based on historical experience and to rely heavily on projections of future operating performance. As of December 29, 2018, the carrying value of our goodwill was \$26.4 million, and the carrying value of our intangible assets, net, was \$27.3 million. If we determine that any of our long-lived assets are impaired, we may be required to take a significant charge for the impairment, which could significantly and negatively affect our results of operations.

***Our investment portfolio may suffer losses from changes in market interest rates and changes in market conditions, which could materially and adversely affect our financial condition and liquidity.***

Our investment portfolio primarily comprises corporate debt securities, commercial paper, debt securities issued by U.S. governmental agencies and certificates of deposits. These investments are subject to general credit, liquidity, and market and interest rate risks. Substantially all of these securities are subject to interest rate and credit risk and will decline in value if interest rates increase or one or more of the issuers' credit ratings is reduced. As a result of any of the foregoing, we may experience a reduction in value or loss of liquidity of our investments, which may have a negative adverse effect on our results of operations, liquidity and financial condition. We follow an established investment policy and set of guidelines to monitor, manage and limit our exposure to interest rate and credit risk. The policy sets forth credit quality standards and limits our exposure to any one issuer, as well as our maximum exposure to various asset classes.

***Our operating results have varied in the past and probably will continue to vary significantly in the future, which will cause volatility in our stock price.***

Our quarterly and annual operating results have varied significantly in the past and are likely to vary in the future, which volatility could cause our stock price to decline. Some of the factors that may influence our operating results and subject our stock to extreme price and volume fluctuations include:

- general economic growth or decline in the U.S. or foreign markets;
- changes in customer demand for our systems;
- the gain or loss of a key customer or significant changes in the financial condition or one or more key customers;
- economic conditions in the semiconductor industries;

- the timing, cancellation or delay of customer orders and shipments;
- the timing of customer acceptance due to delays or failure to meet required specifications;
- market acceptance of our products and our customers' products;
- our ability to recover the higher costs associated with meeting our customers' increasing service demands;
- competitive pressures on product prices and changes in pricing by our customers or suppliers;
- the timing of new product announcements and product releases by us or our competitors and our ability to design, introduce and manufacture new products on a timely and cost-effective basis;
- fluctuations in foreign currency exchange rates, particularly the Japanese yen, the Korean won, European euro and the British pound sterling;
- the occurrence of trade wars or barriers, or the perception that trade wars or barriers will occur;
- the occurrence of tax valuation allowances;
- the occurrence of potential impairments of long-lived assets;
- the timing of acquisitions of businesses, products or technologies;
- the effects of war, natural disasters, acts of terrorism or political unrest;
- the loss of key personnel; and
- the levels of our fixed expenses, relative to our revenue level.

The foregoing factors are difficult to forecast, and these, as well as other factors, could materially and adversely affect our quarterly and annual operating results. If our operating results in any period fall below the expectations of securities analysts and investors, the market price of our common stock would likely decline.

***We are highly dependent on international sales and operations, which exposes us to foreign political and economic risks.***

A majority of our sales and operations are outside of the United States. As a result, we are subject to regulatory, geopolitical and other risks associated with doing business in foreign countries. We anticipate that international sales will continue to account for a significant portion of our revenues. International sales and operations carry inherent risks such as:

- regulatory limitations imposed by foreign governments;
- trade wars between the United States and other foreign countries where we sell our products;
- obstacles to the protection of our intellectual property, political, military and terrorism risks;
- foreign currency controls and currency exchange rate fluctuations;
- periodic local or international economic downturns;
- political instability, natural disasters, acts of war or terrorism in regions where we have operations;
- repatriation of cash earned in foreign countries;
- longer payment cycles and difficulties in collecting accounts receivable outside of the U.S.;
- disruptions or delays in shipments caused by customs brokers or other government agencies;
- uncertainty regarding liability under foreign laws;
- changes in regulatory requirements (including import and export requirements), tariffs, customs, duties and other trade barriers;
- difficulties in staffing and managing foreign operations;
- potentially adverse tax consequences resulting from changes in tax laws; and
- other challenges caused by distance, language and cultural differences.

On June 23, 2016, the U.K. held a referendum in which British citizens approved an exit from the European Union (EU), commonly referred to as “Brexit.” We ship some spare parts from the EU to the U.K. that would possibly be subject to some delays if the trade agreements between the EU and the U.K. are not finalized, however the volume of these shipments is immaterial, and we have alternative shipment methods to meet the needs of our customers.

If any of these risks materialize and we are unable to manage them, our international sales and operations would suffer.

***We are exposed to fluctuations in the foreign currency exchange rates.***

As a global concern, we face exposure to adverse movements in foreign currency exchange rates. Our exposure to foreign currency exchange rate fluctuations arise in part from current intercompany accounts in which costs are charged between our U.S. headquarters and foreign subsidiaries. These exposures may change over time as business practices evolve and could have a material adverse impact on our financial results and cash flow.

***We are exposed to risks related to our banking arrangements and accounts receivable factoring.***

We maintain bank accounts with both domestic and foreign financial institutions, any one of the institutions may prove to not be financially viable. If any of these financial institutions experiences financial difficulties or otherwise are unable to honor our deposit arrangements, we may experience material financial losses due to lack of access to our funds which could have an adverse impact on our operating results, financial condition and cash flows. In addition, we enter into factoring arrangements with certain financial institutions to sell a certain portion of our trade receivables. If we were to stop entering into these factoring arrangements, our operating results, financial condition and cash flows could be adversely impacted by delays or failure to collect the trade receivables.

***Anti-takeover provisions in our charter documents and Delaware law could discourage, delay or prevent a change in control of our company and may affect the trading price of our common stock.***

The anti-takeover provisions of the Delaware General Corporation Law may discourage, delay or prevent a change in control of our company by limiting our ability to engage in a business combination with an interested stockholder, even if a change of control would be beneficial to our existing stockholders. In addition, our certificate of incorporation and bylaws may discourage, delay or prevent a change in our management or control over us that stockholders may consider favorable. Our certificate of incorporation and bylaws:

- authorize the issuance of “blank check” preferred stock that could be issued by our board of directors to thwart a takeover attempt;
- limit who may call special meetings of stockholders; and
- prohibit stockholder action by written consent, requiring all actions to be taken at a meeting of the stockholders.

***We are exposed to various risks related to legal proceedings that could result in substantial costs and disruption to normal business operations.***

From time to time, and in the future, we may be, involved in legal proceedings or claims that involve breach of contract, product liability, employment, possible infringement of patents and intellectual property rights of third parties or by third parties. It is difficult to predict the outcome of litigation matters, and there can be no assurance that we will prevail in any litigation. For example, in August 2017, we were named as a defendant in a complaint brought by Optical Solutions, Inc. alleging claims arising from a purported exclusive purchase contract between OSI and us pertaining to certain product. Adverse determinations in such litigation could result in loss of our property rights, subject us to significant liabilities, any of which could significantly and adversely affect our business, financial condition and results of operations.

***We rely upon certain critical information systems for our daily business operations. Our inability to use or access our information systems at critical points in time could unfavorably impact our business operations.***

Our global operations are dependent upon certain information systems, including telecommunications, the internet, our corporate intranet, network communications, email and various computer hardware and software applications. System failures or malfunctions could disrupt our operations and our ability to timely and accurately process and report key components of our financial results. Difficulties with our enterprise resource planning (“ERP”) system (whether in connection with the regular operation, periodic enhancements, modifications or upgrades, or the integration of an acquired business into such system), which is integral to our ability to accurately and efficient maintain our books and records, record transactions, provide critical information to our management, and prepare our financial statements, could adversely affect our ability to complete important business processes, such as the evaluation of our internal controls over financial reporting pursuant to Section 404 of the Sarbanes-Oxley Act of 2002.

***We are subject to various environmental laws and regulations that could impose substantial costs upon us and may harm our business, operating results and financial condition.***

Some of our operations use substances regulated under various federal, state, local, and international laws governing the environment, including those relating to the storage, use, discharge, disposal, labeling, and human exposure to hazardous and toxic materials. We could incur costs, fines and civil or criminal sanctions, third-party property damage or personal injury claims, or could be required to incur substantial investigation or remediation costs, if we were to violate or become

liable under environmental laws. Liability under environmental laws can be joint and several and without regard to comparative fault. Compliance with current or future environmental laws and regulations could restrict our ability to expand our facilities or require us to acquire additional expensive equipment, modify our manufacturing processes, or incur other significant expenses. We may unintentionally violate environmental laws or regulations in the future as a result of human error, equipment failure or other causes.

***We may be exposed to liabilities under the FCPA and other anti-corruption laws, and any determination that we violated these laws could have a material adverse effect on our business.***

We are subject to the Foreign Corrupt Practice Act of 1977 ("FCPA"), and other laws that prohibit improper payments or offers of payments to foreign governments and their officials and political parties by U.S. persons and issuers as defined by the statute, for the purpose of obtaining or retaining business. Also, similar worldwide anti-bribery laws, such as the U.K. Bribery Act and Chinese anti-corruption laws, generally prohibit companies and their intermediaries from making improper payments to non-U.S. officials for the purpose of obtaining or retaining business. Some of our distribution partners are located in parts of the world that have experienced governmental corruption to some degree and, in certain circumstances, strict compliance with anti-bribery laws may conflict with local customs and practices. Although we have implemented policies and procedures to discourage these practices by our employees, our existing safeguards and any future improvements may prove to be less than effective, and our employees, consultants, sales agents or distributors may engage in conduct for which we might be held responsible. Violations of the FCPA or international anti-corruption laws may result in severe criminal or civil sanctions, and we may be subject to other liabilities, which could negatively affect our business, operating results and financial condition. In addition, the U.S. government may seek to hold us liable for successor liability FCPA violations committed by companies in which we invest or that we acquire. We cannot assure you that our internal control policies and procedures will protect us from reckless or negligent acts committed by our employees, distributors, partners, consultants or agents.

***Regulations related to conflict minerals could adversely impact our business.***

The Dodd-Frank Wall Street Reform and Consumer Protection Act contains provisions to improve transparency and accountability concerning the supply of tin, tantalum, tungsten and gold, known as conflict minerals, originating from the Democratic Republic of Congo, or DRC, and adjoining countries. As a result, in August 2012 the United States Securities and Exchange Commission, or SEC, adopted annual disclosure and reporting requirements for public companies that use conflict minerals mined from the DRC and adjoining countries in their products. We have determined that we use at least one of these conflict minerals in the manufacture of our products, although we have not yet determined the source of the minerals that we use. These disclosure requirements require us to use diligent efforts to determine which conflict minerals we use and the source of those conflict minerals and disclose the results of our findings. There have been and will continue to be costs associated with complying with these disclosure requirements, including those costs incurred in conducting diligent efforts to determine which conflict minerals we use, and the sources of conflict minerals used in our products. Further, the implementation of these rules could adversely affect the sourcing, supply and pricing of materials used in our products. As there may be only a limited number of suppliers offering conflict free minerals, we cannot be sure that we will be able to obtain necessary conflict free conflict minerals in sufficient quantities or at competitive prices. In addition, we may face reputational challenges if we determine that our products contain minerals not determined to be conflict free or if we are unable to sufficiently verify the origins for all conflict minerals used in our products through the procedures we implement. If we determine it is necessary to redesign our products to not use conflict minerals, we would incur costs associated with doing so.

**ITEM 1B. UNRESOLVED STAFF COMMENTS**

None.

**ITEM 2. PROPERTIES**

At December 29, 2018, our owned or leased facilities included those described below:

<u>Type</u>	<u>Location</u>	<u>Square Footage</u>	<u>Use</u>
Owned	Milpitas, California	134,158	Corporate headquarters, manufacturing and corporate housing
Leased	Taiwan	18,896	Sales and service
Leased	South Korea	24,742	Sales, service and corporate housing
Leased	United States	63,533	Engineering, sales and service
Leased	Japan	14,924	Sales, service and corporate housing
Leased	China	14,269	Sales and service
Leased	Singapore	9,795	Sales and service
Leased	France	828	Sales and service
	Total	281,145	

We believe that our existing facilities are suitable for their respective uses and adequate for our current needs and anticipated growth.

**ITEM 3. LEGAL PROCEEDINGS**

The information set forth under Note 10, Commitments and Contingencies, in the Notes to Consolidated Financial Statements is incorporated by reference here.

**ITEM 4. MINE SAFETY DISCLOSURES**

N/A.

## PART II

### ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

#### Market for our Common Stock

Our common stock is quoted on the Nasdaq Global Select Market under the symbol "NANO."

#### Stockholders

On February 22, 2019, there were approximately 127 holders of record of our common stock. Because brokers and the institutions on behalf of stockholders hold many of our shares of common stock, we are unable to estimate the total number of stockholders represented by these record holders.

#### Dividend Policy

We have never declared or paid any cash dividends on our capital stock. We currently expect to retain future earnings, if any, for use in the operation, expansion of our business and repurchase of shares and do not anticipate paying any cash dividends in the foreseeable future.

#### Recent Sales of Unregistered Securities

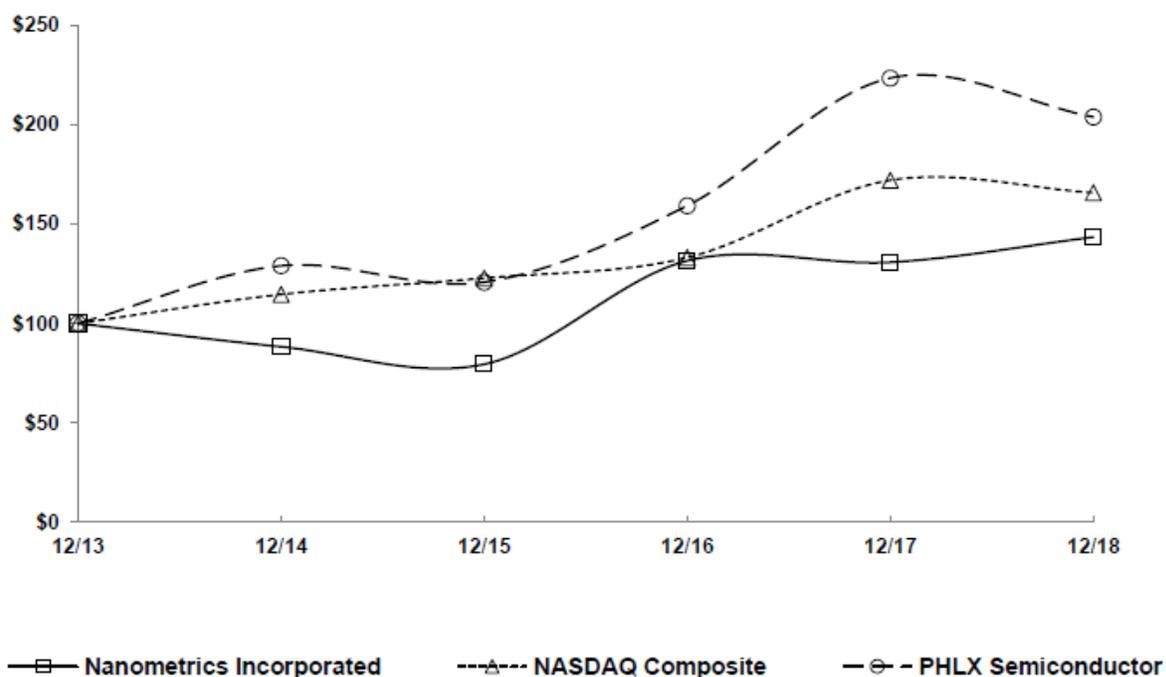
On November 15, 2018, we closed our acquisition of 4D Technology Corporation ("4D"). As part of the consideration, we issued an aggregate of 125,117 shares of our common stock to James Wyant, James Millerd and Neal Brock, the three principal stockholders of 4D (the "Principal Stockholders"). Pursuant to the terms of the Stock Purchase Agreement and related Escrow Agreement, the shares of our common stock were placed in escrow to fund any post-closing adjustments to the purchase price and to secure the indemnification obligations of the Principal Stockholders to Nanometrics. The Principal Stockholders agreed to indemnify us for inaccuracies in the representations or the breach of the warranties or covenants made by 4D, and for certain other matters, subject to certain limitations. The shares of our common stock were issued to the Principal Stockholders in consideration for the shares of 4D common stock held by the Principal Stockholders and were sold in reliance on Section 4(a)(2) under the Securities Act of 1933, as amended, and Rule 506 of Regulation D promulgated thereunder, as the Principal Stockholders represented that they are "accredited investors" as defined in Regulation D.

## Stock Performance Graph

The following graph presentation compares cumulative five-year stockholder returns on an indexed basis, assuming a \$100 initial investment and reinvestment of dividends, of Nanometrics Incorporated, a broad-based equity market index and an industry-specific index. The broad-based equity market index used is the Nasdaq Composite Index and the industry-specific index used is the PHLX Semiconductor Index.

This performance graph shall not be deemed “filed” for purposes of Section 18 of the Securities Exchange Act of 1934, as amended or otherwise subject to the liabilities under that Section and shall not be deemed to be incorporated by reference into any of our filings under the Securities Act of 1933, as amended or the Exchange Act.

### COMPARISON OF 5 YEAR CUMULATIVE TOTAL RETURN\* Among Nanometrics Incorporated, the NASDAQ Composite Index and the PHLX Semiconductor Index



\*\$100 invested on 12/31/13 in stock or index, including reinvestment of dividends.  
Fiscal year ending December 31.

	12/13	12/14	12/15	12/16	12/17	12/18
Nanometrics Incorporated	100.00	88.29	79.48	131.55	130.81	143.46
Nasdaq Composite	100.00	114.62	122.81	133.19	172.11	165.84
PHLX Semiconductor	100.00	129.03	120.80	159.29	223.53	203.91

## ITEM 6. SELECTED FINANCIAL DATA

The selected consolidated financial data set forth below is not necessarily indicative of results of future operations and should not be relied upon as an indicator of our future performance. This data should be read in conjunction with “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and the consolidated financial statements and related notes included elsewhere in this Annual Report on Form 10-K. Our fiscal years 2018, 2017, 2016, 2015, and 2014, as referred to below, refer to our fiscal years ended December 29, 2018, December 30, 2017, December 31, 2016, December 26, 2015 and December 27, 2014, respectively.

	Fiscal Year				
	2018 <sup>(1)</sup>	2017 <sup>(2)</sup>	2016 <sup>(3)</sup>	2015	2014 <sup>(4)</sup>
	(in thousands, except per share data)				
<b>Consolidated Statement of Operations Data:</b>					
Total net revenues	\$ 324,523	\$ 258,621	\$ 221,129	\$ 187,367	\$ 166,443
Gross profit	\$ 184,094	\$ 136,701	\$ 114,124	\$ 89,667	\$ 75,822
Income (loss) from operations	\$ 66,487	\$ 42,806	\$ 29,095	\$ 4,973	\$ (11,653)
Net income (loss)	\$ 57,648	\$ 30,202	\$ 44,035	\$ 2,905	\$ (31,118)
Basic net income (loss) per share	\$ 2.39	\$ 1.19	\$ 1.79	\$ 0.12	\$ (1.30)
Diluted net income (loss) per share	\$ 2.34	\$ 1.17	\$ 1.75	\$ 0.12	\$ (1.30)

- (1) Our net income included the impacts of the Tax Cuts and Jobs Act that was signed into law on December 22, 2017, including the impact resulting from additional guidance that was issued in 2018.
- (2) Our net income included a \$2.9 million additional tax expense from the remeasurement of deferred tax assets relating to the Tax Cuts and Jobs Act that was signed into law on December 22, 2017.
- (3) Our net income included a release of non-cash valuation allowance of \$27.4 million against a significant portion of our U.S. and foreign deferred tax assets.
- (4) Our net loss included a non-cash valuation allowance of \$21.1 million on certain U.S. deferred tax assets.

	Fiscal Year Ended				
	(in thousands)				
	2018	2017	2016	2015	2014
<b>Consolidated Balance Sheet Data:</b>					
Cash, cash equivalents and marketable securities	\$ 151,792	\$ 117,029	\$ 129,961	\$ 83,085	\$ 83,962
Working capital	\$ 211,108	\$ 196,019	\$ 174,353	\$ 132,903	\$ 119,797
Total assets	\$ 375,630	\$ 309,699	\$ 287,830	\$ 235,540	\$ 223,236
Long-term liabilities	\$ 3,005	\$ 3,221	\$ 2,030	\$ 3,001	\$ 5,497
Total stockholders’ equity	\$ 312,852	\$ 262,383	\$ 243,774	\$ 187,328	\$ 179,537

## ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

### Overview

*You should read the following discussion and analysis of our financial condition and results of operations together with "Selected Financial Data" and our consolidated financial statements and related notes appearing elsewhere in this Annual Report on Form 10-K. This discussion and analysis contains forward-looking statements that involve risks, uncertainties and assumptions. The actual results may differ materially from those anticipated in these forward-looking statements as a result of certain factors, including, but not limited to, those presented under "Risk Factors" in Item 1A and elsewhere in this Annual Report on Form 10-K. Please see "Cautionary Information Regarding Forward-Looking Statements" at the beginning of this Form 10-K for additional information you should consider regarding forward-looking statements.*

We are an innovator in the field of optical metrology systems, optical inspection systems and advanced analytics for semiconductor manufacturing and other industries. Our systems and solutions are designed to precisely monitor optical critical dimensions, film thickness, and other parameters that are necessary to control the manufacturing process, identify defects, and detect manufacturing equipment anomalies that can affect production yields and device performance.

Principal factors that impact our revenue growth include capital expenditures by manufacturers of semiconductors to increase capacity and to enable their development of new technologies, and our ability to improve market share. The increasing complexity of the manufacturing processes for semiconductors is an important factor in the demand for our innovative metrology systems. Our strategy is to continue to innovate organically as well as to evaluate strategic acquisitions to address business challenges and opportunities.

In November of 2018 we acquired 4D Technology Corporation ("4D"), based in Tucson Arizona. The 4D business unit offers a line of interferometry systems for the measurement and inspection of high precision surfaces. 4D's solutions are used primarily in the manufacture of advanced aerospace and industrial systems as well as for scientific research and semiconductor applications.

We derive our revenues primarily from product sales but also from customer service and system upgrades for the installed base of our products. In 2018, we derived 85% of our total net revenues from product sales and 15% of our total net revenues from services.

### Important Themes and Significant Trends

The semiconductor equipment industry is characterized by new manufacturing processes (node) coming to market every two to three years. At every new node, in the semiconductor industry our customers drive the need for metrology as a major component of device manufacturing. These trends include:

- **Proliferation of Optical Critical Dimension Metrology across Fabrication Processes.** Device dimensions must be carefully controlled during each step of processing. These patterned structures are measured at many subsequent production steps including Chemical Mechanical Polishing, Etch, and Thin Film processing, all driving broader OCD adoption. Our proprietary OCD systems can provide the critical process control of these circuit dimensions that is necessary for successful manufacturing of these state-of-the-art devices. Nanometrics OCD technology is broadly adopted across 3D-NAND, DRAM, and logic semiconductor manufacturing processes.
- **Proliferation of 3D Transistor Architectures.** Our end customers continue to improve device density and performance by scaling front-end-of-line transistor architectures. Many of these designs, including FinFET transistors, have buried features and high aspect ratio stacked features that enable improved performance and density. The advanced designs require additional process control to manage the complex shapes and materials properties, driving additional applications of our systems.
- **Proliferation of High-Density 3D-NAND.** Our end customers have migrated to multi (many) layered high aspect ratio 3D-NAND devices. Many stacks of NAND cells are formed in parallel. This 3D-NAND architecture enables cost effective density scaling, removing the burden of density from lithography to deposition and etch processes. These devices require additional process control of deposition stacks, planarization processes, and critical high aspect ratio etch processes. Nanometrics thin films and OCD technologies are adopted across the 3D-NAND process including the periphery CMOS processing, NAND cell formation, and Interconnect of the devices.
- **Adoption of New Types of Thin Film Materials.** The need for ever increasing device circuit speed coupled with lower power consumption has pushed semiconductor device manufacturers to new materials and processing methods with single atom/sub nanometer control over these processes.

- **Need for Improved Process Control to Drive Process Efficiencies.** Competitive forces influencing semiconductor device manufacturers, such as price-cutting, shorter product life cycles and time to market, place pressure on manufacturers to rapidly achieve production efficiency. Device manufacturers are using our integrated and automated systems, as well as advanced metrology algorithms and analytics throughout the fabrication process to ensure that manufacturing processes scale rapidly, are accurate and can be repeated on a consistent basis.

### Critical Accounting Policies

The preparation of our financial statements conforms to accounting principles generally accepted in the United States of America, which requires management to make estimates and judgments in applying our accounting policies that have an important impact on our reported amounts of assets, liabilities, revenue, expenses and related disclosures at the date of our financial statements. On an ongoing basis, management evaluates its estimates including those related to revenue, bad debts, inventory valuations, warranty obligations, impairment and income taxes. Management bases its estimates and judgments on historical experience and on various other factors that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from management's estimates. We believe that the application of the following accounting policies requires significant judgments and estimates on the part of management. For a summary of all of our accounting policies, including those discussed below, see Note 1 to our consolidated financial statements.

*Revenue Recognition* - We recognize revenue when control of a good or service has transferred to a customer. The amount of revenue recognized reflects the amount which we expect to be entitled to in exchange for the transfer of the goods or services in a contract with a customer. Revenue excludes amounts collected on behalf of third parties including taxes assessed by governmental authorities that are both imposed on and concurrent with a specific revenue producing transaction. Shipping and handling costs associated with outbound freight both before and after control over a product has transferred to a customer are accounted for as a fulfillment cost and are included in cost of revenues. We record revenue on a gross basis, rather than net, as we act as the principal in all of our contractual arrangements and not as an agent.

Accordingly, we follow a 5-Step process to evaluate our contracts with customers to determine the amount and timing of revenue recognition. This determination includes certain estimates and areas in which judgment is needed during each step of the process.

We first identify whether a legally enforceable contract with a customer exists. We evaluate the following criteria in our evaluation and if all criteria are not met, a contract does not exist and any revenue that otherwise would be recorded because a good or service had been transferred to a customer is deferred until such time that a contract exists: (1) both parties have approved the contract and are committed to perform, (2) we can identify each party's rights regarding the goods or services to be transferred, (3) we can identify the payment terms for the goods or services to be delivered, (4) the contract has commercial substance, and (5) it is probable that we will collect substantially all of the consideration to which we will be entitled in exchange for the goods or services that will be transferred to the customer. Historically, we have not experienced customer payment defaults that would lead us to conclude that we do not have a contract under the new standard.

Once the contract has been identified, we evaluate the promises in the contract to identify performance obligations. We apply judgement in evaluating whether the performance obligations are distinct; that is, have stand-alone value to the customer. Many of the contracts include more than one performance obligation – for example the delivery of a system generally includes the promise to install the system in the customer's facility. Additionally, a contract could include the purchase of multiple systems or the purchase of a system and an upgrade. Promises in contracts which do not result in the transfer of a good or service are not performance obligations, as well as those promises that are administrative in nature, or are immaterial in the context of the contract. Our determination of the number of performance obligations in a contract requires judgement and could impact the amount and timing of revenue recognition.

Once the performance obligations in the contract have been identified, we estimate the transaction price of the contract. The estimate includes amounts that are fixed as well as those that can vary based on contractual terms (e.g., performance bonuses/penalties, amounts payable to customers, rebates, prompt payment discounts, etc.) These variable consideration items are rare as most of our contracts include only fixed amounts. It is expected that estimates of variable consideration will be immaterial for us and would occur if customers did not meet their contractual purchase commitments and we would be entitled to recover additional contract consideration.

Once the transaction price of the contract has been identified, we allocate the transaction price to the identified performance obligations. This is done on a relative selling price basis using standalone selling prices ("SSP"). For most performance obligations, we do not have observable SSP's as they are not regularly sold on a standalone basis however if a performance obligation does have an observable SSP it is used for allocation purposes. Without observable SSP's, we estimate the SSP

using a methodology which maximizes the use of observable inputs – namely a cost-plus gross margin approach. Our determination of the SSP requires judgment and could impact the amount and timing of revenue recognition.

Lastly, we record the amount allocated to each performance obligation as revenue when control of that good or service has transferred to the customer. We first evaluate whether a good or service is transferred over time, and if it is not, then it is recorded at a point in time. For service contracts, we record revenue based on its measurement of progress, and the best method to determine this is the percentage of the stand-ready obligation that is completed to date as this best reflects the value of the service transferred to the customer. The timing of satisfaction of the performance obligation to payment is dependent upon the negotiated payment terms but generally occurs within 30 to 60 days. We evaluate the following indicators to determine the point in time at which control transfers to the customer and may apply judgment in this evaluation based on present right to payment, legal title, physical possession, risk and rewards of ownership and customer acceptance. Typically, for new product introductions, we defer revenue recognition until formal customer acceptance is received from the customer. Additionally, for system shipments to Japan, revenue is deferred because typical contractual terms indicate that payment is not due, and title does not transfer until customer acceptance occurs.

We warrant our products against defects in manufacturing. In those instances, in which extended warranty services are separately quoted to the customer or if the warranty includes services beyond just an assurance that the product will work as intended, an additional performance obligation is created, and the associated revenue is deferred and recognized as service revenue ratably over the term of the extended warranty period. The portion of service contracts and extended warranty services agreements that are uncompleted at the end of any reporting period are included in deferred revenue.

Frequently, we deliver products and various services in a single transaction. Our deliverables consist of tools, installation, upgrades, billable services, spare parts, and service contracts. Our typical multi-element arrangements include a sale of one or multiple tools that include installation and standard warranty. Other arrangements consist of a sale of tools bundled with service elements or delivery of different types of services. Our tools, upgrades, and spare parts are generally delivered to customers within a period of up to six months from order date. Installation is usually performed soon after delivery of the tool. We defer the estimated portion of revenue associated with installation based on relative selling price and that revenue is recognized upon completion of the installation and receipt of final acceptance.

When performance obligations are not transferred to a customer at the end of a reporting period, the amount allocated to those performance obligations is deferred until control of these performance obligations is transferred to the customer. When we determine that performance obligations cannot be accounted for as separate units of accounting, we account for the entire arrangement as a single unit of accounting and we defer revenue until all elements are delivered and all revenue recognition requirements are met. The amount of revenue recognized in the twelve months ended December 29, 2018 that was included in the contract liability balance as of the beginning of the year was \$5.2 million. The impact of Topic 606 adoption on our financial statements is summarized in the Notes to the Consolidated Financial Statements and is incorporated herein by reference.

*Business combinations* - We account for business combinations under the acquisition method of accounting, which requires us to recognize separately from goodwill the assets acquired, and the liabilities assumed at their acquisition date fair values. While we use our best estimates and assumptions to accurately value assets acquired and liabilities assumed at the acquisition date as well as contingent consideration, where applicable, our estimates are inherently uncertain and subject to refinement. As a result, during the measurement period, which may be up to one year from the acquisition date, we record adjustments to the assets acquired and liabilities assumed with the corresponding offset to goodwill. Upon the conclusion of the measurement period or final determination of the values of assets acquired or liabilities assumed, whichever comes first, any subsequent adjustments are recognized in our consolidated statements of operations. Accounting for business combinations requires our management to make significant estimates and assumptions, especially at the acquisition date including our estimates for intangible assets, contractual obligations assumed, restructuring liabilities, pre-acquisition contingencies, and contingent consideration, where applicable. Although we believe the assumptions and estimates we have made in the past have been reasonable and appropriate, they are based, in part, on historical experience and information obtained from the management of the acquired companies and are inherently uncertain. Critical estimates in valuing certain acquired intangible assets under the income approach include growth in future expected cash flows from product sales, customer contracts and acquired technologies, technology obsolescence rates, expected costs to develop in-process research and development, or IPR&D, into commercially viable products, estimated cash flows from the projects when completed and discount rates. Unanticipated events and circumstances may occur that may affect the accuracy or validity of such assumptions, estimates or actual results.

*Allowance for Doubtful Accounts* – We maintain allowances for estimated losses resulting from the inability of our customers to make their required payments. We establish credit limits through a process of reviewing the financial history and stability of our customers. Where appropriate and available, we obtain credit rating reports and financial statements of customers when determining or modifying their credit limits. We regularly evaluate the collectability of our trade receivable balances based on

a combination of factors such as the length of time the receivables are past due, customary payment practices in the respective geographies and our historical collection experience with customers. We believe that our allowance for doubtful accounts adequately reflects our risk associated with our receivables. If the financial condition of a customer were to deteriorate, resulting in their inability to make payments, we would assess the necessity of recording additional allowances. This would result in additional general and administrative expenses being recorded for the period in which such determination was made

*Inventories* – Inventories are valued at standard costs, which approximates actual cost calculated on a first-in, first-out basis, not in excess of net realizable value. We apply judgment in determining standard rates for material burden, direct labor and overhead used in valuing inventory, and periodically review such rates to ensure that the rates result in an inventory valuation not in excess of net realizable value. We have established inventory reserves when conditions exist that suggest that our inventory may be in excess of anticipated demand or is obsolete based upon our assumptions about future demand for our products and market conditions. Once a reserve has been established, it is maintained until the part to which it relates is sold or is otherwise disposed of. Therefore, a sale of reserved inventory has a higher gross profit margin. We regularly evaluate our ability to realize the value of our inventory based on a combination of factors including the following: historical usage rates, forecasted sales of usage, product end-of-life dates, estimated current and future market values and new product introductions. Inventory includes evaluation tools placed at customer sites. For demonstration inventory, we also consider the age of the inventory and potential cost to refurbish the inventory prior to sale. We amortize demonstration inventory over its useful life and the amortization expense is included in total inventory write down on our statements of cash flows. When recorded, our reserves are intended to reduce the carrying value of our inventory to its net realizable value. If actual demand for our products deteriorates, or market conditions are less favorable than those that we project, additional reserves may be required, which would adversely affect gross margin and net income.

*Product Warranties* – We sell the majority of our products with a standard twelve-month repair or replacement warranty from the date of acceptance or shipment date. We provide an accrual for estimated future warranty costs based upon the historical relationship of warranty costs to the cost of products sold. The estimated future warranty obligations related to product sales are reported in the period in which the related revenue is recognized. The estimated future warranty obligations are affected by the warranty periods, sales volumes, product failure rates, material usage and labor and replacement costs incurred in correcting a product failure. If actual product failure rates, material usage, labor or replacement costs differ from our estimates, revisions to the estimated warranty obligations would be required. For new product introductions where limited or no historical information exists, we may use warranty information from other previous product introductions to guide us in estimating our warranty accrual. The warranty accrual represents the best estimate of the amount necessary to settle future and existing claims on products sold as of the balance sheet date. We periodically assess the adequacy of our recorded warranty reserve and adjust the amounts in accordance with changes in these factors.

*Goodwill and Intangible Assets* - Intangible assets with finite lives are amortized over their useful lives and are subject to an impairment assessment, as well as an evaluation of the appropriateness of their estimated useful lives, whenever events or changes in circumstances indicate that the carrying amount(s) may not be recoverable. During the annual impairment test performed on intangible assets, we will determine from the business owner as to whether the underlying technology is being utilized or have potential for further utilization. If it is deemed that the asset has no future benefit to the company, and it is fully amortized for both book and tax purposes, then it will be written off. Goodwill and indefinite lived assets are not amortized but tested annually for impairment. The goodwill impairment assessment involves three tests, Step 0, Step 1 and Step 2. The Step 0 test involves performing an initial qualitative assessment to determine whether it is more likely than not that the asset is impaired and thus whether it is necessary to proceed to Step 1 and calculate the fair value of the reporting unit. We may proceed directly to the Step 1 test without performing the Step 0 test. The Step 1 test involves measuring the recoverability of goodwill at the reporting unit level by comparing the reporting unit's carrying amount, including goodwill, to the fair value of the reporting unit.

We perform a Step 0 assessment of the goodwill during the fourth quarter of each fiscal year, or whenever events or circumstances occur which indicate that an impairment may have occurred. As part of this assessment, we consider the trading value of our stock, industry trends, and our sales forecast and products plans to determine if it is more likely than not that the fair value is higher than the carrying value of our reporting unit. If, after assessing the qualitative factors, we determine that it is not likely that the fair value of a reporting unit is less than its carrying value, then performing the two-step impairment test is unnecessary. However, if we conclude otherwise, then we are required to perform the Step 1 of the two-step goodwill impairment test. The Step 1 test requires a comparison of the fair value of our reporting unit to its net book value. If the fair value of the reporting unit is greater than its net book value, then no impairment is deemed to have occurred. If the fair value is less, then the Step 2 must be performed to determine the amount, if any, of actual impairment.

The process of evaluating the potential impairment of goodwill is highly subjective and requires significant judgment. In estimating the fair value of goodwill at the reporting unit level, we make estimates and judgments about future revenues and cash flows for the reporting unit. To determine the fair value, our review process includes the income method and is based on a discounted future cash flow approach that uses estimates including the following for the reporting unit: estimated revenue, market segment growth rates and market share assumptions; estimated costs; and appropriate discount rates based on the reporting unit's weighted average cost of capital. Our estimates of market segment growth, our market segment share and costs are based on historical data, various internal estimates and certain external sources, and are based on assumptions that are consistent with the plans and estimates we are using to manage the underlying businesses. Our business consists of both established and emerging technologies and our forecasts for emerging technologies are based upon internal estimates and external sources rather than historical information. We also consider our market capitalization on the dates of our impairment tests in determining the fair value of the respective businesses. As part of this assessment, we consider the trading value of our stock and our implied value, as compared to our net assets, as well as the valuation of our acquired businesses. If the carrying amount of the reporting unit exceeds its fair value as determined by these assessments, goodwill is considered impaired, and the Step 2 test is performed to measure the amount of impairment loss. As part of the Step 2 test to determine the amount of goodwill impairment, if any, we allocate the fair value of the reporting unit to all of its assets and liabilities as if the reporting unit had been acquired in a business combination and the fair value of the reporting unit was the price paid to acquire the reporting unit. The excess of the fair value of the reporting unit over the amount assigned to its assets and liabilities is the implied fair value of goodwill. When impairment is deemed to have occurred, we will recognize an impairment charge to reduce the carrying amount of our goodwill to its implied fair value.

*Income Tax Assets and Liabilities* – We account for income taxes such that deferred tax assets and liabilities must be recognized using enacted tax rates for the effect of temporary differences between the book and tax accounting for assets and liabilities. Also, deferred tax assets are reduced by a valuation allowance to the extent that management cannot conclude that it is more likely than not that a portion of the deferred tax asset will be realized in the future. We evaluate the deferred tax assets on a continuous basis throughout the year to determine whether or not a valuation allowance is appropriate. Factors used in this determination include future expected income and the underlying asset or liability which generated the temporary tax difference. The income tax provision is primarily impacted by federal statutory rates, state and foreign income taxes and changes in the valuation allowance.

### ***Recent Accounting Pronouncements***

See Note 2 of our consolidated financial statements for a description of recent accounting pronouncements, including the respective dates of adoption and effects on our results of operations and financial condition.

### **Results of Operations**

#### **Total net revenues**

Our net revenues comprised the following (in thousands, except percentages):

	Fiscal Year			
	2018	2017		
Total product revenue	\$ 275,286	\$ 214,877	\$ 60,409	28.1 %
Service	49,237	43,744	5,493	12.6 %
Total net revenues	\$ 324,523	\$ 258,621	\$ 65,902	25.5 %

	Fiscal Year			
	2017	2016		
Total product revenue	\$ 214,877	\$ 185,066	\$ 29,811	16.1 %
Service	43,744	36,063	7,681	21.3 %
Total net revenues	\$ 258,621	\$ 221,129	\$ 37,492	17.0 %

In 2018, total net revenues increased by \$65.9 million from 2017. In 2018, the increase in product revenues was approximately \$60.4 million or 28.1% primarily due to significant increases in customer spending in memory, 3-D NAND, DRAM and also driven by new product adoptions by our customers. Service revenue increased by \$5.5 million or 12.6% in 2018 principally due to an increase in sales of spare parts and service contracts as a result our increasing installed base, and a modest increase in sales of refurbishment systems.

In 2017, total net revenues increased by \$37.5 million from 2016. Customer spending trends for 3D-NAND, DRAM and Foundry primarily contributed to such year over year revenue growth. The increase of \$29.8 million or 16.1% in product revenues was fueled by the increase in new product adoption and gains in market share. Service revenue increased by \$7.7 million in 2017 principally due to an increase in sales of spare parts and service contracts because of our increasing installed base.

With a significant portion of the world's semiconductor manufacturing capacity located in Asia, a substantial portion of our revenues continue to be generated in that region. Significant fab expansions and customers moving into next generation technologies mainly in China and Japan contributed to the higher revenues in 2017 and 2018.

### Gross margin

Our gross margin breakdown was as follows:

	Fiscal Year		
	2018	2017	2016
Products	58.9 %	52.9 %	53.1 %
Service	44.5 %	52.4 %	44.1 %

The calculation of product gross margin includes cost of products including related upgrades and amortization of intangibles. The gross margin on product revenue increased six percentage points from 52.9% in 2017 to 58.9% in 2018. The increase was due to a favorable product and customer mix, upgrade margins and lower warranty costs for our more established product lines. Inventory adjustments related to additional E&O reserves and the amortization of step up inventory valuation for 4D, negatively impacted product gross margins by 0.5 percent in 2018. The gross margin on our services business decreased to 44.5% in 2018 from 52.4% in 2017, reflecting a decrease of 7.9 percentage points. The decrease was due to lower labor utilization and higher fulfillment costs for service contracts resulting from a higher rate of field maintenance requests.

The gross margin on product revenue remained relatively flat in 2017 compared to 2016. However, the gross margin of our services business improved to 52.4% in 2017 from 44.1% in 2016, reflecting an increase of 8.3 percentage points. The increase in gross margin was due to increases in margin of service parts, a more favorable product mix and higher utilization of our service personnel.

### Operating expenses

Our operating expenses comprise the following categories (in thousands, except percentages):

	Fiscal Year		Change	
	2018	2017		
Research and development	\$ 48,188	\$ 36,716	\$ 11,472	31.2%
Selling	37,528	30,839	6,689	21.7%
General and administrative	31,795	26,340	5,455	20.7%
Amortization of intangible assets	96	-	96	NA
Total operating expenses	<u>\$ 117,607</u>	<u>\$ 93,895</u>	<u>\$ 23,712</u>	25.3%

	Fiscal Year		Change	
	2017	2016		
Research and development	\$ 36,716	\$ 31,443	\$ 5,273	16.8%
Selling	30,839	30,181	658	2.2%
General and administrative	26,340	23,381	2,959	12.7%
Amortization of intangible assets	-	24	(24)	NA
Total operating expenses	<u>\$ 93,895</u>	<u>\$ 85,029</u>	<u>\$ 8,866</u>	10.4%

### Research and development

Investments in research and development personnel and associated projects are part of our strategy to ensure our products remain competitive and meet customer's needs. In 2018, research and development costs increased by \$11.5 million or 31.2% compared to 2017 primarily due to additional headcount, higher variable compensation costs, consulting fees, new product development costs, incremental process improvement for customers and such costs associated with 4D since their acquisition date. We continue to invest in development of several new products to retain our competitive position and meet the advanced technology needs for our customers as they continue to improve the performance of their semiconductor devices.

In 2017, research and development costs increased by \$5.3 million or 16.8% compared to 2016 primarily due to additional headcount and higher material spending in program related expenses to support our research and development efforts.

### Selling

Selling expenses increased by \$6.7 million or 21.7% in 2018 compared to 2017 primarily due to additional headcount, higher variable compensation costs, higher sales commission expenses, and such costs associated with 4D since their acquisition date. Higher revenues of 25% resulted in higher sales commissions, and we also opened several new sales and service offices in Asia to better serve the needs of customer fab expansions at these locations.

Selling expenses increased slightly by \$0.7 million or 2.2% in 2017 compared to 2016. The slight increase was due to higher variable compensation, commission expense, and sales related costs, which was consistent with higher revenues in 2017 compared to 2016.

### General and administrative

General and administrative expenses increased by \$5.5 million or 20.7% in 2018 compared to 2017. The increase was primarily due to executive transition and search costs, higher variable compensation costs, higher professional service fees, and such costs associated with 4D since their acquisition date. Our revenues and profitability exceeded the growth of the wafer fab equipment market and company targets resulting in higher compensation costs, and additional professional service fees for business development and acquisition activities during 2018. Acquisition costs of \$0.9 million were incurred in 2018 primarily for accounting and legal services.

General and administrative expenses increased by \$3.0 million or 12.7% in 2017 compared to 2016. The increase was primarily due to higher variable compensation costs, recruiting costs associated with our CEO search and higher professional services fees.

### Amortization of intangible assets

Amortization of \$96,000 was recorded in 2018, representing one month of amortization of certain intangible assets acquired as a result of the 4D acquisition. We recorded no amortization of intangible assets in operating expenses in fiscal 2017 as prior intangible assets were fully amortized in 2016.

### Other income (expense), net

Our other income (expense), net, consisted of the following items (in thousands, except percentages):

	Fiscal Year		Change
	2018	2017	
Interest income	\$ 10	\$ 8	\$ 2
Interest expense	(331)	(92)	(239)
Interest income (expense), net	<u>\$ (321)</u>	<u>\$ (84)</u>	<u>\$ (237)</u>
Net gains on investments	1,379	1,311	68
Other gains (losses), net	(21)	(735)	714
Other income (loss), net	<u>\$ 1,358</u>	<u>\$ 576</u>	<u>\$ 782</u>
Total other income (expense), net	<u>\$ 1,037</u>	<u>\$ 492</u>	<u>\$ 545</u>
	Fiscal Year		Change
	2017	2016	
Interest income	\$ 8	\$ 35	\$ (27)
Interest expense	(92)	(285)	193
Interest income (expense), net	<u>\$ (84)</u>	<u>\$ (250)</u>	<u>\$ 166</u>
Net gains on investments	1,311	520	791
Other gains, net	(735)	(230)	(505)
Other income (loss), net	<u>576</u>	<u>290</u>	<u>286</u>
Total other income (expense), net	<u>\$ 492</u>	<u>\$ 40</u>	<u>\$ 452</u>

Total other income, net increased by \$0.5 million in 2018 compared to 2017. The increase was primarily due to gain of \$0.8 million on the sale of an asset, partially offset by unfavorable net revaluation of intercompany balances based on foreign currency fluctuations relative to the U.S. dollar, netted against hedging gains and losses and interest expense on factored receivables.

Total other income, net increased by \$0.5 million in 2017 compared to 2016, primarily due to higher net realized investment gains, which is in line with the higher cash and cash equivalents balance in 2017, partially offset by unfavorable net revaluation of intercompany balances based on foreign currency fluctuations relative to the U.S. dollar, netted against hedging gains and losses.

### **Provision for (benefit from) income taxes**

We recorded an income tax provision of \$9.9 million in 2018, an income tax provision of \$13.1 million in 2017, and an income tax benefit of \$14.9 million in 2016. The decrease in the provision for 2018 from 2017 was primarily related to the lower statutory federal tax rates enacted by the Tax Cuts and Jobs Act of 2017. The increase in the provision for 2017 from 2016 was primarily related to the decreased benefit of our U.S. deferred tax assets from the Tax Cuts and Jobs Act of 2017 and increased profitability for the year ended 2017, offset by the release of a valuation allowance against a significant portion of our U.S. deferred tax assets for the year ended 2016.

Our provision for income taxes for 2018 of \$9.9 million reflects an effective tax rate of 14.6%. This rate differs from the federal statutory rate of 21% primarily due to foreign income taxed at lower rates, tax credits generated in the current year, and tax benefits associated with the settlement of equity options/awards, offset by an increase in valuation allowances for our California and Switzerland deferred tax assets.

Our provision for income taxes for 2017 of \$13.1 million reflects an effective tax rate of 30.2%. This rate differed from the then Federal statutory rate of 35.0% primarily due to foreign income taxed at lower rates, and tax credits generated in the current year, tax benefits associated with the settlement of equity options/awards, and a one-time benefit related to an entity classification change, offset by an additional provision for the tax effects of the Tax Cuts and Job Act of 2017.

Our benefit for income taxes for 2016 of \$14.9 million reflects an effective tax rate of negative 51.1%. This rate differs from the then Federal statutory rate of 35.0% primarily due to the release of a valuation allowance against a significant portion of our U.S. deferred tax assets which represented a \$23.9 million benefit, as well as foreign income taxed at lower rates, and tax credits generated in the current year, offset by equity compensation expenses for which no current tax deduction is available.

We maintain valuation allowances when it is likely that all or a portion of a deferred tax asset will not be realized. Changes in valuation allowances from period to period are included in our income tax provision in the period of change. In determining whether a valuation allowance is warranted, we take into account such factors as prior earnings history, expected future earnings, unsettled circumstances that, if unfavorably resolved, would adversely affect utilization of a deferred tax asset, carry-back and carry-forward periods, and tax strategies that could potentially enhance the likelihood of realization of a deferred tax asset. We currently maintain a valuation allowance against our deferred tax assets in California and Switzerland.

In December 2017, the SEC staff issued Staff Accounting Bulletin No. 118, Income Tax Accounting Implications of the Tax Cuts and Jobs Act (SAB 118), which allowed us to record provisional amounts during a measurement period not to extend beyond one year of the enactment date. As of December 29, 2018, we had finalized all provisional amounts related to the Tax Act. Finalizing provisional adjustments related to the Tax Act did not have a material impact on our consolidated financial statements as of December 29, 2018. We expect further guidance may be forthcoming from the Financial Accounting Standards Board and the Securities and Exchange Commission, as well as regulations, interpretations and rulings from federal and state tax agencies, which could result in additional impacts.

The 2017 Tax Act creates a new requirement that global intangible low-taxed income (“GILTI”) earned by controlled foreign corporations (“CFCs”) must be included currently in the gross income of the CFCs’ U.S. shareholder. Under U.S. GAAP, we are allowed to make an accounting policy choice of either (1) treating taxes due on future U.S. inclusions in taxable income related to GILTI as a current-period expense when incurred (the “period cost method”) or (2) factoring such amounts into a company’s measurement of its deferred taxes (the “deferred method”). Our selection of an accounting policy for 2018 with respect to the GILTI tax rules was to treat GILTI tax as a current period expense under the period cost method.

### **Liquidity and Capital Resources**

Our principal sources of liquidity are cash and cash equivalents, marketable securities and cash flow generated from our operations. Our liquidity is affected by many factors, including those that relate to our specific operations and those that relate to the uncertainties of global and regional economies and the sectors of the semiconductor industry which we operate in. Although our cash requirements will fluctuate based on the timing and extent of these factors, we believe our existing cash,

cash equivalents and marketable securities, combined with cash currently projected to be generated from our operations, will be sufficient to meet our liquidity needs through at least the next twelve months.

The following table presents selected financial information and statistics as of and for the years ended December 29, 2018, December 30, 2017 and December 31, 2016 (in millions):

	December 29, 2018	December 30, 2017	December 31, 2016
Cash, cash equivalents and marketable securities	\$ 151.8	\$ 117.0	\$ 130.0
Working capital	\$ 211.1	\$ 196.0	\$ 174.4
Cash provided by operating activities	\$ 103.3	\$ 20.6	\$ 45.7
Cash used in investing activities	\$ (4.3)	\$ (6.7)	\$ (42.1)
Cash provided by (used in) financing activities	\$ (22.8)	\$ (25.6)	\$ 5.3

During 2018, the \$103.3 million cash provided by operating activities was a result of \$57.6 million of net income plus \$24.2 million net effect of non-cash adjustments to net income, plus \$21.5 million net change in operating assets and liabilities. The change in operating assets and liabilities is generally driven by the timing of our customer payments for accounts receivable and timing of our vendor payments for accounts payable, and additional inventory purchases related to the build of newer products. We expect that cash provided by operating activities may fluctuate due to several factors, including variations in our operating results, accounts receivable collections performance, inventory and supply chain management, vendor payment initiatives, tax benefits or charges from stock-based compensation, and the timing and amount of compensation and other payments. The \$82.7 million increase in cash provided from operating activities in 2018 compared to 2017 was primarily due to an increase in net income of \$27.4 million and an increase in cash from changes in assets and liabilities of \$55.3 million. The increase in net income of \$27.4 million was a result of a 25% increase in sales with a 4% increase in gross margins in 2018 compared to 2017, that was partially offset by additional investments in operating expenses especially in the development of new products. An increase in cash from working capital changes of \$56.3 million was primarily driven by significant improvement in days sales outstanding, relative improvement in inventory levels and inventory turns relative to the growth in volume, and favorable payment terms with our suppliers. Net cash used in investing activities of \$4.3 million during 2018 consisted primarily of cash used to acquire 4D of \$37.2 million and certain assets, property, plant and equipment of \$7.5 million, which was partially offset by cash provided from net sales and maturities of marketable securities of \$41.5 million. We sold a condominium, used to house travelling employees, for \$0.9 million. Cash used in investing activities was relatively unchanged in 2018 from 2017. Cash used in financing activities of \$22.8 million during 2018 consisted primarily of \$23.0 million of common stock repurchases and \$3.6 million of cash paid for taxes on net issuance of stock awards, partially offset by proceeds from issuance of common stock from the employee stock purchase program and the exercise of stock options of \$3.8 million. Cash used in financing activities were relatively unchanged in 2018 from 2017.

During 2017, the \$20.6 million cash provided by operating activities was a result of \$30.2 million of net income plus \$25.3 million net effect of non-cash adjustments to net income, offset by \$34.5 million net change in operating assets and liabilities. The change in operating assets and liabilities is generally driven by the timing of our customer payments for account receivable and timing of our vendor payments for accounts payable. The \$25.1 million decrease in cash from operating activities in fiscal 2017 compared to fiscal 2016 was primarily due to higher inventory levels at the end of the fiscal year and higher accounts receivable balance as a result of the record high revenue level in the fourth quarter of the 2017 fiscal year. Cash used in investing activities of \$6.7 million during 2017, consisted primarily of cash used to acquire certain assets and property, plant and equipment of \$7.2 million, as sales and maturities of marketable securities were almost entirely offset by purchases of marketable securities. Cash used in financing activities of \$25.6 million during 2017 consisted primarily of \$27.0 million of common stock repurchases and \$4.2 million of cash paid for taxes on net issuance of stock awards, partially offset by proceeds from issuance of common stock from the employee stock purchase program and the exercise of stock options of \$5.6 million.

During 2016, cash provided by operating activities was a result of \$44.0 million of net income plus the net effect of non-cash adjustments to net income and net change in operating assets and liabilities. The increase in cash from operating activities in fiscal 2016 compared to fiscal 2015 was primarily due to improved working capital, higher revenue levels and higher net income. Cash used in investing activities of \$42.1 million during 2016, consisted primarily of \$82.9 million net purchases of marketable securities and cash used to acquire \$4.0 million of property, plant and equipment, partially offset by cash provided by maturities of marketable securities of \$38.8 million and cash received from sales of marketable securities of \$6.0 million. Cash provided by financing activities of \$5.3 million during 2016 consisted primarily of \$8.4 million in proceeds from issuance of common stock from the employee stock purchase program and the exercise of stock options, partially offset by cash paid for taxes on net issuance of stock awards of \$1.8 million, \$1.0 million of excess tax benefit from equity awards and royalty payments to Zygo of \$0.3 million.

We have evaluated and will continue to evaluate the acquisitions of products, technologies or businesses that are complementary to our business. These activities may result in product and business investments, which may affect our cash position and working capital balances. Some of these activities might require significant cash outlays.

We earn a portion of our operating income outside the United States, which is deemed to be indefinitely reinvested in foreign jurisdictions. As a result, \$29.2 million of our cash is held by foreign subsidiaries, a portion of which, would have to be repatriated to the United States. We believe our existing balances of cash, cash equivalents and marketable securities will be sufficient to satisfy our working capital needs, capital asset purchases, outstanding commitments and other liquidity requirements associated with our existing operations over the next twelve months.

Should we require more capital in the United States than is generated by our domestic operations, for example to fund significant discretionary activities such as business acquisitions and share repurchases, we could elect to repatriate future earnings from foreign jurisdictions or raise capital in the United States through debt or equity issuances. These alternatives could result in higher effective tax rates, increased interest expense, or dilution of our earnings.

### Repurchases of Common Stock

On November 15, 2017 our Board of Directors authorized the repurchase of up to \$50.0 million of our common stock. This plan is referred to as the Stock Repurchase Plan.

During the three months ended March 31, 2018, the Stock Repurchase Plan was completed, after we repurchased 896,187 shares at an average purchase price of \$25.65 per share for a total of \$23.0 million, for a total repurchase against the approved plan of \$50.0 million. Accordingly, we did not repurchase any shares throughout the remainder of 2018.

Shares repurchased and retired in the fourth quarter of fiscal year 2017 and in the three months ended March 31, 2018 under the Stock Repurchase Plan, with the associated cost of repurchase and amount available for repurchase are as follows (in thousands, except number of shares and weighted average price per share):

	<u>2018</u>	<u>2017</u>
Number of shares of common stock repurchased	896,187	1,065,848
Weighted average price per share	\$ 25.65	\$ 25.33
Total cost of repurchase	\$ 22,987	\$ 26,999
Amount available for repurchase at end of period	\$ —	\$ 23,001

### Off-Balance Sheet Arrangements

We had no off-balance sheet arrangements or obligations as of December 29, 2018 and December 30, 2017.

### Contractual Obligations

The following table summarizes our contractual cash obligations as of December 29, 2018, and the effect of such obligations.

	<u>Total</u>	<u>Payments due by period</u>			
		<u>Less than 1 year</u>	<u>1-3 years</u>	<u>4-5 years</u>	<u>More than 5 years</u>
Purchase commitments - inventory <sup>(1)</sup>	\$ 42,807	\$ 40,838	\$ 1,969	\$ —	\$ —
Other long-term liabilities	219	1	32	13	173
Operating lease obligations	8,360	3,002	2,942	1,720	696
Total	<u>\$ 51,386</u>	<u>\$ 43,841</u>	<u>\$ 4,943</u>	<u>\$ 1,733</u>	<u>\$ 869</u>

<sup>(1)</sup> We maintain certain open inventory purchase agreements with our suppliers to ensure a smooth and continuous supply availability for key components. Our liability under these purchase commitments is generally restricted to a forecasted time-horizon as mutually agreed upon between the parties. This forecasted time-horizon can vary among different suppliers. We estimate our open inventory purchase commitment as of December 29, 2018, was approximately \$42.8 million. Actual expenditures will vary based upon the volume of the transactions and length of contractual service provided. In addition, the amounts paid under these arrangements may be less if the arrangements are renegotiated or cancelled.

Excluded from the contractual obligation table above are \$4.6 million of future payments related to uncertain tax positions because we cannot reliably estimate the timing of the settlements with the respective tax authorities.

## ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

### Foreign Currency Risk

A substantial part of our business consists of sales made to customers outside the United States: 91%, 87%, and 86% of sales in 2018, 2017, and 2016, respectively. 25%, 22%, and 18% of net revenues in 2018, 2017, and 2016, respectively, were denominated in currencies other than the U.S. dollar. Additionally, portions of our costs of net revenues and our operating expenses are incurred by our international operations and denominated in local currencies.

Our exposure to foreign currency exchange rate fluctuations arises in part from intercompany balances in which costs are charged between our U.S. headquarters and our foreign subsidiaries. On our consolidated balance sheet these intercompany balances are eliminated and thus no consolidated balances are associated with these intercompany balances; however, since each foreign entity's functional currency is generally its respective local currency, there is exposure to foreign exchange risk on a consolidated basis. Intercompany balances are denominated primarily in U.S. dollars and, to a lesser extent, other local currencies. The net intercompany balance, exposed to foreign currency risk, at December 29, 2018 was approximately \$7.3 million. A hypothetical change of 10% in the relative value of the US dollar versus local functional currencies could result in an increase or decrease of approximately \$730,000 in transaction gains or losses which would be included in our statement of operations. The net intercompany balance, exposed to foreign currency risk, at December 30, 2017, was approximately \$0.8 million. A hypothetical change of 10% in the relative value of the US dollar versus local functional currencies could result in an increase or decrease of approximately \$75,000 in transaction gains or losses which would be included in our statement of operations. The increase in exposure to foreign currencies was mainly due to increased business in Japan and higher cross charges from Taiwan and Korea for services performed.

To manage the level of exposure to the risk of foreign currency exchange rate fluctuations, we enter into foreign currency forward exchange contracts to protect against currency exchange risks associated with existing assets and liabilities. A foreign currency forward exchange contract acts as a hedge by increasing in value when underlying assets decrease in value or underlying liabilities increase in value due to changes in foreign exchange rates. Conversely, a foreign currency forward exchange contract decreases in value when underlying assets increase in value or underlying liabilities decrease in value due to changes in foreign exchange rates. These forward contracts are not designated as accounting hedges, so the unrealized gains and losses are recognized in other income, net, in advance of the actual foreign currency cash flows with the fair value of these forward contracts being recorded as accrued liabilities or other current assets.

We do not use forward contracts for trading purposes. Our forward contracts generally have maturities of 30 days or less. We enter into foreign currency forward exchange contracts based on estimated future asset and liability exposures, and the effectiveness of our hedging program depends on our ability to estimate these future asset and liability exposures. Recognized gains and losses with respect to our current hedging activities will ultimately depend on how accurately we are able to match the amount of foreign currency forward exchange contracts with actual underlying asset and liability exposures. The notional amount of the hedges we entered into was \$47.7 million as of December 29, 2018 and \$44.3 million as of December 30, 2017. The amounts are set forth in Note 4, of the Notes to the Consolidated Financial Statements, which information is incorporated herein by reference.

On June 23, 2016, the U.K. held a referendum in which British citizens approved an exit from the European Union (EU), commonly referred to as "Brexit." As a result of the referendum, there has been volatility in exchange rates versus the U.S. dollar which may continue as the U.K. negotiates its exit from the EU. The British pound is the functional currency for an insignificant percentage of our sales. In addition, for any contracts that are not denominated in the same currency as the functional currency (for example, contracts denominated in British pounds where the functional currency is the U.S. dollar), we enter into foreign currency forward contracts to hedge our risk related to foreign currency exchange rate fluctuations. As a result, we currently do not expect the U.K.'s exit from the EU to have a material impact on our financial position, results of operations or liquidity.

For 2018, 2017 and 2016, foreign currency transactions resulted in losses of \$1.1 million, \$0.6 million, and \$0.4 million, respectively.

We actively monitor our foreign currency risks, but there is no guarantee that our foreign currency hedging activities will substantially offset the impact of fluctuations in currency exchange rates on our results of operations, cash flows and financial position. See "Note 4, Fair Value Measurement and Disclosures" in the Notes to Consolidated Financial Statements for more information regarding our derivatives and hedging activities.

**Interest Rate Risk**

Our exposure to market risk resulting from changes in interest rates relates primarily to our investment portfolio. At December 29, 2018, and December 30, 2017, we held \$40.8 million and \$82.1 million, respectively, in marketable securities. The fair value of our marketable securities could be adversely impacted due to a rise in interest rates. A hypothetical immediate and consistent increase in interest rates by 100 basis points from levels as of December 29, 2018, the fair value of our marketable securities would have declined by \$0.2 million. Securities with longer maturities are subject to a greater interest rate risk than those with shorter maturities and as of December 29, 2018 and December 30, 2017, the average duration of our portfolio was less than nine months. We do not hold securities for trading purposes.

**ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA**

The information required by Item 8 of Form 10-K is presented here in the following order:

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## **Report of Independent Registered Public Accounting Firm**

To the Board of Directors and Stockholders of Nanometrics Incorporated

### ***Opinions on the Financial Statements and Internal Control over Financial Reporting***

We have audited the accompanying consolidated balance sheets of Nanometrics Incorporated and its subsidiaries (the “Company”) as of December 29, 2018 and December 30, 2017, and the related consolidated statements of operations, comprehensive income, stockholders’ equity, and cash flows for each of the three years in the period ended December 29, 2018, including the related notes and schedule of valuation and qualifying accounts for each of the three years in the period ended December 29, 2018 appearing under Item 15(a)(2) (collectively referred to as the “consolidated financial statements”). We also have audited the Company's internal control over financial reporting as of December 29, 2018, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 29, 2018 and December 30, 2017, and the results of its operations and its cash flows for each of the three years in the period ended December 29, 2018 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 29, 2018, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the COSO.

### ***Change in Accounting Principle***

As discussed in Note 2 to the consolidated financial statements, the Company changed the manner in which it accounts for revenues from contracts with customers in 2018.

### ***Basis for Opinions***

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in the Report of Management on Internal Control over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

As described in the Report of Management on Internal Control over Financial Reporting, management has excluded 4D Technology, Inc. (“4D”) from its assessment of internal control over financial reporting as of December 29, 2018, because it was acquired by the Company in a purchase business combination during 2018. We have also excluded 4D from our audit of internal control over financial reporting. 4D is a wholly-owned subsidiary whose total assets and total revenues excluded from management’s assessment and our audit of internal control over financial reporting represent 3% and less than 1%, respectively, of the related consolidated financial statement amounts as of and for the year ended December 29, 2018.

***Definition and Limitations of Internal Control over Financial Reporting***

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

**/s/PricewaterhouseCoopers LLP**  
**San Jose, California**  
**February 25, 2019**

We have served as the Company's auditor since 2010.

**NANOMETRICS INCORPORATED**  
**CONSOLIDATED BALANCE SHEETS**  
(In thousands except share and per share amounts)

	As of	
	December 29, 2018	December 30, 2017
<b>ASSETS</b>		
Current assets:		
Cash and cash equivalents	\$ 110,951	\$ 34,899
Marketable securities	40,841	82,130
Accounts receivable, net of allowances of \$170 and \$126, respectively	50,854	62,457
Inventories	61,915	52,860
Inventories-delivered systems	180	1,534
Prepaid expenses and other	6,140	6,234
Total current assets	270,881	240,114
Property, plant and equipment, net	47,900	44,810
Goodwill	26,372	10,232
Intangible assets, net	27,326	2,206
Deferred income tax assets	2,569	11,924
Other assets	582	413
Total assets	\$ 375,630	\$ 309,699
<b>LIABILITIES AND STOCKHOLDERS' EQUITY</b>		
Current liabilities:		
Accounts payable	\$ 16,540	\$ 13,857
Accrued payroll and related expenses	21,658	12,901
Deferred revenue	8,990	7,408
Other current liabilities	9,421	7,249
Income taxes payable	3,164	2,680
Total current liabilities	59,773	44,095
Deferred revenue	1,753	1,661
Income taxes payable	871	860
Deferred tax liability	162	179
Other long-term liabilities	219	521
Total liabilities	62,778	47,316
Commitments and contingencies (Note 10)		
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: 24,372,193 and 24,628,722, respectively, issued and outstanding	24	26
Additional paid-in capital	247,983	255,368
Retained Earnings	67,402	9,113
Accumulated other comprehensive income	(2,557)	(2,124)
Total stockholders' equity	312,852	262,383
Total liabilities and stockholders' equity	\$ 375,630	\$ 309,699

See Notes to Consolidated Financial Statements

**NANOMETRICS INCORPORATED**  
**CONSOLIDATED STATEMENTS OF OPERATIONS**  
(In thousands except per share amounts)

	Fiscal Years Ended		
	December 29, 2018	December 30, 2017	December 31, 2016
Net revenues:			
Products	\$ 275,286	\$ 214,877	\$ 185,066
Service	49,237	43,744	36,063
Total net revenues	<u>324,523</u>	<u>258,621</u>	<u>221,129</u>
Costs of net revenues:			
Cost of products	112,834	100,910	85,391
Cost of service	27,311	20,804	20,160
Amortization of intangible assets	284	206	1,454
Total costs of net revenues	<u>140,429</u>	<u>121,920</u>	<u>107,005</u>
Gross profit	<u>184,094</u>	<u>136,701</u>	<u>114,124</u>
Operating expenses:			
Research and development	48,188	36,716	31,443
Selling	37,528	30,839	30,181
General and administrative	31,795	26,340	23,381
Amortization of intangible assets	96	—	24
Total operating expenses	<u>117,607</u>	<u>93,895</u>	<u>85,029</u>
Income from operations	<u>66,487</u>	<u>42,806</u>	<u>29,095</u>
Other income (expense):			
Interest income	10	8	35
Interest expense	(331)	(92)	(285)
Other income, net	1,358	576	290
Total other income, net	<u>1,037</u>	<u>492</u>	<u>40</u>
Income before income taxes	<u>67,524</u>	<u>43,298</u>	<u>29,135</u>
Provision for (benefit from) income taxes	9,876	13,096	(14,900)
Net income	<u>\$ 57,648</u>	<u>\$ 30,202</u>	<u>\$ 44,035</u>
Net income per share:			
Basic	<u>\$ 2.39</u>	<u>\$ 1.19</u>	<u>\$ 1.79</u>
Diluted	<u>\$ 2.34</u>	<u>\$ 1.17</u>	<u>\$ 1.75</u>
Weighted average shares used in per share calculation:			
Basic	<u>24,120</u>	<u>25,334</u>	<u>24,655</u>
Diluted	<u>24,600</u>	<u>25,919</u>	<u>25,153</u>

See Notes to Consolidated Financial Statements

**NANOMETRICS INCORPORATED**  
**CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME**  
(In thousands)

	<b>Fiscal Year Ended</b>		
	<b>December 29, 2018</b>	<b>December 30, 2017</b>	<b>December 31, 2016</b>
Net income (loss)	\$ 57,648	\$ 30,202	\$ 44,035
Other comprehensive income (loss):			
Change in foreign currency translation adjustment	(482)	4,170	(869)
Employee benefit plan adjustment	(259)	(160)	(17)
Net change on unrealized gains (losses) on available-for-sale investments	308	(88)	42
Other comprehensive income (loss):	(433)	3,922	(844)
Comprehensive income (loss)	<u>\$ 57,215</u>	<u>\$ 34,124</u>	<u>\$ 43,191</u>

See Notes to Consolidated Financial Statements

**NANOMETRICS INCORPORATED**  
**CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY**  
(In thousands, except share amounts)

	Common Stock		Additional Paid-In Capital	Retained Earnings / (Accumulated Deficit)	Accumulated Other Comprehensive Income	Total Stockholders' Equity
	Shares	Amount				
Balance as of December 26, 2015	24,224,286	\$ 24	\$ 258,715	\$ (66,209)	\$ (5,202)	\$ 187,328
Net income	-	-	-	44,035	-	44,035
Employee benefit plan adjustment	-	-	-	-	(17)	(17)
Foreign currency translation adjustments	-	-	-	-	(869)	(869)
Unrealized gain on investments, net of tax	-	-	-	-	42	42
Issuance of common stock under stock-based compensation plans	846,603	1	6,624	-	-	6,625
Stock-based compensation expense	-	-	7,666	-	-	7,666
Excess tax benefit related to stock options	-	-	(1,036)	-	-	(1,036)
Balance as of December 31, 2016	25,070,889	25	271,969	(22,174)	(6,046)	243,774
Net income	-	-	-	30,202	-	30,202
Adjustment due to adoption of ASU 2016-09 <i>Improvements to Employee Share-Based Payment Accounting</i>	-	-	139	1,085	-	1,224
Employee benefit plan adjustment	-	-	-	-	(160)	(160)
Foreign currency translation adjustments	-	-	-	-	4,170	4,170
Unrealized gain/(loss) on investments, net of tax	-	-	-	-	(88)	(88)
Issuance of common stock under stock-based compensation plans	623,681	1	1,440	-	-	1,441
Stock-based compensation expense	-	-	8,819	-	-	8,819
Repurchases and retirement of common stock under share repurchase plans	(1,065,848)	-	(26,999)	-	-	(26,999)
Balance as of December 30, 2017	24,628,722	26	255,368	9,113	(2,124)	262,383
Net income	-	-	-	57,648	-	57,648
Adjustment due to adoption of ASU 2014-09 <i>Revenue from Contracts with Customers</i> , net of tax	-	-	-	725	-	725
Employee benefit plan adjustment	-	-	-	-	(259)	(259)
Foreign currency translation adjustments	-	-	-	-	(482)	(482)
Unrealized gain/(loss) on investments, net of tax	-	-	-	-	308	308
Restructuring of foreign subsidiaries	-	-	-	(84)	-	(84)
Issuance of common stock under stock-based compensation plans	514,541	-	218	-	-	218
Stock-based compensation expense	-	-	11,382	-	-	11,382
Stock issued to acquire 4D Technology	125,117	-	4,000	-	-	4,000
Repurchases and retirement of common stock under share repurchase plans	(896,187)	(2)	(22,985)	-	-	(22,987)
Balance as of December 29, 2018	24,372,193	\$ 24	\$ 247,983	\$ 67,402	\$ (2,557)	\$ 312,852

See Notes to Consolidated Financial Statements

**NANOMETRICS INCORPORATED**  
**CONSOLIDATED STATEMENTS OF CASH FLOWS**  
(In thousands)

	Fiscal Years Ended		
	December 29, 2018	December 30, 2017	December 31, 2016
Cash flows from operating activities:			
Net income	\$ 57,648	\$ 30,202	\$ 44,035
Reconciliation of net income to net cash provided by operating activities:			
Depreciation and amortization	6,846	6,920	8,295
Stock-based compensation	11,382	8,819	7,666
Excess tax benefit from equity awards	1	—	1,036
(Gain) loss on disposal of fixed assets	(759)	631	478
Inventory write-down	3,012	2,020	2,110
Deferred income taxes	3,732	6,858	(16,783)
Changes in fair value of contingent payments to Zygo Corporation	—	—	(1,175)
Changes in assets and liabilities:			
Accounts receivable	15,156	(19,523)	(2,707)
Inventories	(8,962)	(18,037)	4,526
Inventories-delivered systems	1,354	923	399
Prepaid expenses and other	(407)	(230)	905
Accounts payable, accrued and other liabilities	11,438	1,049	2,462
Deferred revenue	2,399	(915)	(3,634)
Income taxes payable	496	1,886	(1,928)
Net cash provided by operating activities	<u>103,336</u>	<u>20,603</u>	<u>45,685</u>
Cash flows from investing activities:			
Payment for acquisition of certain assets	(2,000)	(2,000)	—
Payments to acquire 4D Technology, net of cash acquired	(37,163)	—	—
Sales of marketable securities	56,279	53,030	5,955
Maturities of marketable securities	38,700	77,250	38,775
Purchases of marketable securities	(53,523)	(129,766)	(82,864)
Purchases of property, plant and equipment	(7,486)	(5,204)	(3,999)
Proceeds from sale of property, plant and equipment	942	—	—
Net cash used in investing activities	<u>(4,251)</u>	<u>(6,690)</u>	<u>(42,133)</u>
Cash flows from financing activities:			
Payments to Zygo Corporation related to acquisition	—	—	(315)
Proceeds from sale of shares under employee stock option plans and purchase plan	3,826	5,576	8,447
Excess tax benefit from equity awards	—	—	(1,036)
Taxes paid on net issuance of stock awards	(3,609)	(4,135)	(1,822)
Repurchases of common stock under share repurchase plans	(22,987)	(26,999)	—
Net cash provided by (used in) financing activities	<u>(22,770)</u>	<u>(25,558)</u>	<u>5,274</u>
Effect of exchange rate changes on cash and cash equivalents	(263)	(518)	82
Net increase (decrease) in cash and cash equivalents	76,052	(12,163)	8,908
Cash and cash equivalents, beginning of period	34,899	47,062	38,154
Cash and cash equivalents, end of period	<u>\$ 110,951</u>	<u>\$ 34,899</u>	<u>\$ 47,062</u>
Supplemental disclosure of cash flow information:			
Cash paid for income taxes, net	\$ 5,561	\$ 3,040	\$ 3,767
Supplemental disclosure of non-cash investing activities:			
Transfers between inventory and property, plant and equipment, net	\$ 1,147	\$ 2,451	\$ 2,345
Unpaid property, plant and equipment at year end	\$ 531	\$ 957	\$ 683

See Notes to Consolidated Financial Statements

**NANOMETRICS INCORPORATED**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**Note 1. Nature of Business, Basis of Presentation and Significant Accounting Policies**

*Description of Business* – Nanometrics Incorporated (“Nanometrics” or the “Company”) and its wholly-owned subsidiaries provide advanced, high-performance process control metrology and inspection systems used primarily in the fabrication of semiconductors and other solid-state devices as well as industrial and scientific applications. Nanometrics' metrology systems precisely measure a wide range of film types deposited on substrates during manufacturing to control manufacturing processes and increase production yields in the fabrication of integrated circuits. The Company's OCD technology is a patented critical dimension measurement technology that is used to precisely determine the dimensions on the semiconductor wafer that directly control the resulting performance of the integrated circuit devices. The thin film metrology systems use a broad spectrum of wavelengths, high-sensitivity optics, proprietary software, and patented technology to measure the thickness and uniformity of films deposited on silicon and other substrates as well as their chemical composition. The overlay metrology systems are used to measure the overlay accuracy of successive layers of semiconductor patterns on wafers in the photolithography process. Nanometrics' inspection systems are used to find defects on patterned and unpatterned wafers at nearly every stage of the semiconductor production flow. The corporate headquarters of Nanometrics is in Milpitas, California.

*Basis of Presentation* – The consolidated financial statements include Nanometrics Incorporated and its wholly-owned subsidiaries. All significant intercompany accounts and transactions have been eliminated in consolidation.

*Fiscal Year* – The Company utilizes a 52/53 week fiscal year ending on the last Saturday of the calendar year. For the fiscal years ended December 29, 2018, December 30, 2017, and December 31, 2016, the period presented consisted of a 52-week year, 52-week year and 53-week year, respectively.

*Use of Estimates* – The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America (“U.S. GAAP”) requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reported period. Actual results could differ materially from those estimates. Estimates are used for, but not limited to, revenue recognition, the provision for doubtful accounts, the provision for excess, obsolete, or slow-moving inventories, valuation of intangible and long-lived assets, warranty accruals, income taxes, valuation of stock-based compensation, and contingencies.

*Foreign Currency Translation* – The assets and liabilities of foreign subsidiaries are translated from their respective local functional currencies at exchange rates in effect at the balance sheet date and income and expense accounts are translated at average exchange rates during the reporting period. Resulting translation adjustments are reflected in “Accumulated other comprehensive income,” a component of stockholders' equity. Foreign currency transaction gains and losses, as well as remeasurement of assets and liabilities denominated in a currency other than the functional currency are reflected in “Other income (expense)” in the consolidated statements of operations in the period incurred, and consist of losses of \$1.1 million, \$0.6 million, and \$0.4 million for the years ended December 29, 2018, December 30, 2017, and December 31, 2016, respectively.

*Revenue Recognition* – The Company derives revenue from the sale of process control metrology and inspection systems and related upgrades (“product revenue”) as well as spare part sales, billable service and service contracts (together “service revenue”). Upgrades are system software and hardware performance upgrades that extend the features and functionality of a product. Upgrades are included in product revenue, which consists of sales of complete, advanced process control metrology and inspection systems (the “system(s)”). Nanometrics' systems consist of hardware and software components that function together to deliver the essential functionality of the system. Arrangements for sales of systems and upgrades often include defined customer-specified acceptance criteria.

The Company recognizes revenue when control of a good or service has transferred to a customer. The amount of revenue recognized reflects the amount which Nanometrics expects to be entitled to in exchange for the transfer of the goods or services in a contract with a customer. Revenue excludes amounts collected on behalf of third parties including taxes assessed by governmental authorities that are both imposed on and concurrent with a specific revenue producing transaction. Shipping and handling costs associated with outbound freight both before and after control over a product has transferred to a customer are accounted for as a fulfillment cost and are included in cost of revenues. Nanometrics records revenue on a gross basis, rather than net, as it acts as the principal in all its contractual arrangements and not as an agent.

Nanometrics follows a 5-Step process to evaluate its contracts with customers to determine the amount and timing of revenue recognition.

**NANOMETRICS INCORPORATED**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (Continued)**

Nanometrics first identifies whether a legally enforceable contract with a customer exists. A legally enforceable contract creates enforceable rights and obligations on both parties. Nanometrics evaluates the following criteria in its evaluation and if all criteria are not met, a contract does not exist and any revenue that otherwise would be recorded because a good or service had been transferred to a customer is deferred until such time that a contract exists: (1) both Nanometrics and the customer have approved the contract and are committed to perform, (2) Nanometrics can identify each party's rights regarding the goods or services to be transferred, (3) Nanometrics can identify the payment terms for the goods or services to be delivered, (4) the contract has commercial substance, and (5) it is probable that Nanometrics will collect substantially all of the consideration to which it will be entitled in exchange for the goods or services that will be transferred to the customer. Historically, the Company has not experienced Customer payment defaults that would lead it to conclude that it does not have a contract under the new standard. Nanometrics evidences all its contracts in writing and the identification of the contract may include (1) reference to a master agreement that governs for multiple years, (2) a Volume Purchase Agreement that generally governs for 12 months and is negotiated with the larger customers to establish pricing for a committed volume of business, or (3) purchase orders which often govern the purchase of a single system or service item.

Once the contract has been identified, Nanometrics evaluates the promises in the contract to identify performance obligations. Many of the contracts include more than one performance obligation – for example the delivery of a system generally includes the promise to install the system in the customer's facility. Additionally, a contract could include the purchase of multiple systems or the purchase of a system and an upgrade. Promises in contracts which do not result in the transfer of a good or service are not performance obligations, as well as those promises that are administrative in nature, or are immaterial in the context of the contract. Generally, Nanometrics performance obligations can be categorized as (1) systems – including refurbished systems, (2) installation obligations, (3) hardware upgrades, (4) non-operating system software options / upgrades, (5) spare parts, (6) service contracts, (7) billable services and (8) other miscellaneous service items.

Once the performance obligations in the contract have been identified, Nanometrics estimates the transaction price of the contract. The estimate includes amounts that are fixed as well as those that can vary based on contractual terms (e.g., performance bonuses/penalties, amounts payable to customers, rebates, prompt payment discounts, etc.) These variable consideration items are rare as most Nanometrics contracts include only fixed amounts. It is expected that estimates of variable consideration will be immaterial for Nanometrics and would occur if customers did not meet their contractual purchase commitments and Nanometrics is entitled to recover additional contract consideration.

Once the transaction price of the contract has been identified, Nanometrics allocates the transaction price to the identified performance obligations. This is done on a relative selling price basis using standalone selling prices ("SSP"). For most performance obligations, Nanometrics does not have observable SSP's as they are not regularly sold on a standalone basis however if a performance obligation does have an observable SSP it is used for allocation purposes (e.g. spares parts are sold using a standard price list and often sold separately). Without observable SSP's, Nanometrics estimates the SSP using a methodology which maximizes the use of observable inputs – namely a cost-plus gross margin approach.

Lastly, Nanometrics records the amount allocated to each performance obligation as revenue when control of that good or service has transferred to the customer. Nanometrics first evaluates whether a good or service is transferred over time, and if it is not, then it is recorded at a point in time. For service contracts, Nanometrics records revenue based on its measurement of progress, and the best method to determine this is the percentage of the stand-ready obligation that is completed to date as this best reflects the value of the service transferred to the customer. All other items at Nanometrics are recorded at a point in time other than the service contracts with customers. The timing of satisfaction of the performance obligation to payment is dependent upon the negotiated payment terms but generally occurs within 30 to 60 days. Nanometrics evaluates the following indicators to determine the point in time at which control transfers to the Customer, and may apply judgment in this evaluation: (1) whether Nanometrics has a present right to payment, (2) whether the customer has legal title, (3) whether the customer has physical possession, (4) whether the customer has significant risks and rewards of ownership, and (5) whether customer acceptance is a formality (i.e., whether customer acceptance of the tool is reasonably assured). Typically, for new product introductions, Nanometrics defers revenue recognition until formal customer acceptance is received from the customer. In almost all other situations, there is little, or no significant judgment applied by Nanometrics in determining if control of a good or service has transferred to a customer. Additionally, for system shipments to Japan, revenue is deferred because typical contractual terms indicate that payment is not due, and title does not transfer until customer acceptance occurs.

The Company warrants its products against defects in manufacturing. Upon recognition of product revenue, this assurance-type warranty is recorded as a liability for anticipated warranty costs. On occasion, customers request a warranty period longer than the Company's standard warranty. In those instances, in which extended warranty services are separately quoted to the customer or if the warranty includes services beyond just an assurance that the product will work as intended, an additional performance obligation is created, and the associated revenue is deferred and recognized as service revenue ratably over the

term of the extended warranty period. The portion of service contracts and extended warranty services agreements that are uncompleted at the end of any reporting period are included in deferred revenue.

Frequently, the Company delivers products and various services in a single transaction. The Company's deliverables consist of tools, installation, upgrades, billable services, spare parts, and service contracts. The Company's typical multi-element arrangements include a sale of one or multiple tools that include installation and standard warranty. Other arrangements consist of a sale of tools bundled with service elements or delivery of different types of services. The Company's tools, upgrades, and spare parts are generally delivered to customers within a period of up to six months from order date. Installation is usually performed soon after delivery of the tool. The portion of revenue associated with installation is deferred based on relative selling price and that revenue is recognized upon completion of the installation and receipt of final acceptance. Billable services are billed on a time and materials basis and performed as requested by customers. Under service contract arrangements, services are provided as needed over the fixed arrangement term, with terms normally up to twelve months. The Company does not grant its customers a general right of return or any refund terms and may impose a penalty on orders cancelled prior to the scheduled shipment date. Consideration received from customers for cancelled orders is rare as orders are typically not cancelled once placed.

When performance obligations are not transferred to a customer at the end of a reporting period, the amount allocated to those performance obligations is deferred until control of these performance obligations is transferred to the customer. If performance obligations cannot be accounted for as separate units of accounting, the entire arrangement is accounted for as a single unit of accounting and revenue is deferred until all elements are delivered and all revenue recognition requirements are met. These liabilities arising from contracts with customers are reported as Deferred Revenue in the consolidated balance sheet. The amount of revenue recognized in the twelve months ended December 29, 2018 that was included in the contract liability balance as of the beginning of the year was \$5.2 million. Generally, all contracts have expected durations of one year or less. Accordingly, Nanometrics applies the practical expedient allowed for in U.S. GAAP and does not disclose information about remaining performance obligations that have original expected durations of one year or less.

Nanometrics incurs costs related to the acquisition of its contract with customers in the form of sales commissions. Sales commissions are paid to the internal direct sales team as well as to third-party representatives, and distributors. Contractual agreements, with each of these parties, outline commissions structures and rates to be paid. Generally, the contracts are all individual procurement decisions by the customers and are not for significant periods of time, nor do they include renewal provisions. As such, most of the contracts have an economic life of significantly less than a year, although some volume purchase agreements might extend beyond 12 months (the capitalization and amortization of commission costs for contracts that extend beyond one year is immaterial for Nanometrics). Accordingly, the Company expenses these contract acquisition costs in accordance with the practical expedient outlined in U.S. GAAP when the underlying contract asset is less than one year.

Nanometrics does not incur any costs to fulfill the contracts with customers that is not already reported in compliance with another applicable standard (for example, inventory or plant, property and equipment). Given the nature of the systems, the Company does not have costs which are separately identifiable to just a particular contract (for example, dedicated labs).

Nanometrics records accounts receivable when revenue has been recorded and the amount due from the customer is reasonably assured and unconditionally due. In certain situations, Nanometrics may record revenue because goods or services have been transferred to the customer, but the amount is not unconditionally due. In these situations, a contract asset is reflected in the consolidated balance sheet (Unbilled A/R). This amount is subsequently reported as accounts receivable when the condition that made the amount conditional is resolved (for example, when the final installation obligation is completed, and Nanometrics has recorded revenue for the delivery of the system in an amount larger than what has been invoiced). The balance of contract assets included in Accounts Receivable upon adoption of ASC 606 at December 30, 2017 and at December 29, 2018 was \$4.3 million and \$2.2 million respectively. The decrease was primarily driven by changes in customer mix and timing of customer acceptance.

**NANOMETRICS INCORPORATED**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (Continued)**

The following tables summarize the impacts of Topic 606 adoption on the Company’s financial statements for the twelve months ended December 29, 2018 (in thousands, except per share data):

	Twelve Months Ended December 29, 2018		
	As Reported	Balances Without Adoption of ASC 606	Effect of Change Higher/(Lower)
Net Revenue	\$ 324,523	\$ 320,968	\$ 3,555
Net Income	\$ 57,648	\$ 55,413	\$ 2,235
Net income per share:			
Basic	\$ 2.39	\$ 2.30	\$ 0.09
Diluted	\$ 2.34	\$ 2.25	\$ 0.09

*Cash, Cash Equivalents and Marketable Securities* – The Company considers all highly liquid investments with original maturities of three months or less, when purchased, to be cash equivalents. Marketable securities are classified as “available-for-sale” and are reported at fair value with unrealized gains and losses reported in stockholders' equity as a component of other comprehensive income. The cost of securities sold is based on the specific identification method. The Company classifies its investments as current based on the nature of the investment and their availability for use in current operations. The Company reviews its investment portfolio quarterly to determine if any securities may be other-than-temporarily impaired due to increased credit risk, changes in industry or sector of a certain instrument or ratings downgrades.

*Fair Value of Financial Instruments* – Financial instruments include cash and cash equivalents, accounts receivable and accounts payable. Cash equivalents are stated at fair market value based on quoted market prices. The carrying values of accounts receivable and accounts payable approximate their fair values because of the short-term maturity of these financial instruments.

*Derivatives* – The Company enters into foreign currency forward exchange contracts to protect against currency exchange risks associated with existing assets and liabilities. A foreign currency forward exchange contract acts as a hedge by increasing in value when underlying assets decrease in value or underlying liabilities increase in value due to changes in foreign exchange rates. Conversely, a foreign currency forward exchange contract decreases in value when underlying assets increase in value or underlying liabilities decrease in value due to changes in foreign exchange rates. These forward contracts are not designated as accounting hedges, so the unrealized gains and losses are recognized in other income, net, in advance of the actual foreign currency cash flows with the fair value of these forward contracts being recorded as accrued liabilities or other current assets. The Company does not use forward contracts for trading purposes.

*Allowance for Doubtful Accounts* – The Company maintains allowances for estimated losses resulting from the inability of its customers to make required payments. Credit limits are established through a process of reviewing the financial history and stability of its customers. Where appropriate and available, the Company obtains credit rating reports and financial statements of customers when determining or modifying their credit limits. The Company regularly evaluates the collectability of its trade receivable balances based on a combination of factors such as the length of time the receivables are past due, customary payment practices in the respective geographies and historical collection experience with customers. The Company believes that its allowance for doubtful accounts adequately reflects the risk associated with its receivables. If the financial conditions of a customer were to deteriorate, resulting in their inability to make payments, the Company may need to record additional allowances, which would result in additional general and administrative expenses being recorded for the period in which such determination was made.

*Inventories* – Inventories are valued at standard costs, which approximates actual cost calculated on a first-in, first-out basis, not in excess of net realizable value. The Company applies judgment in determining standard rates for material burden, direct labor and overhead used in valuing inventory, and periodically reviews such rates to ensure that the rates result in an inventory valuation not in excess of net realizable value. The Company is exposed to a number of economic and industry factors that could result in portions of inventory becoming either obsolete or in excess of anticipated usage, or saleable only for amounts that are less than their carrying amounts. These factors include, but are not limited to, technological changes in the market, the Company’s ability to meet changing customer requirements, competitive pressures in products and prices, and the availability of key components from suppliers. The Company has established inventory reserves when conditions exist that suggest that inventory may be in excess of anticipated demand or is obsolete based upon assumptions about future demand for the Company’s products and market conditions. Once a reserve has been established, it is maintained until the part to which it relates is sold or is otherwise disposed of. The Company regularly evaluates its ability to realize the value of inventory based on a combination of factors including the following: historical usage rates, forecasted sales of usage, product end-of-life dates, estimated current and future market values and new product introductions. For demonstration inventory, the Company also

considers the age of the inventory and potential cost to refurbish the inventory prior to sale. Demonstration inventory is amortized over its useful life and the amortization expense is included in total inventory write down on the statements of cash flows. When recorded, reserves are intended to reduce the carrying value of the Company's inventory to its net realizable value. If actual demand for the Company's products deteriorates, or market conditions are less favorable than those that the Company projects, additional reserves may be required.

*Inventories – delivered systems* – The Company reflects the cost of systems that were invoiced upon shipment but deferred for revenue recognition purposes separate from its inventory held for sale as “Inventories – delivered systems.”

*Property, Plant and Equipment* – Property, plant and equipment are stated at cost. Depreciation and amortization is computed using the straight-line method over the following estimated useful lives of the assets:

Building and Improvements	5-40 years
Machinery and equipment	3-10 years
Furniture and fixtures	3-10 years
Software	3-7 years

*Business combinations* - We account for business combinations under the acquisition method of accounting, which requires us to recognize separately from goodwill the assets acquired and the liabilities assumed at their acquisition date fair values. While we use our best estimates and assumptions to accurately value assets acquired and liabilities assumed at the acquisition date as well as contingent consideration, where applicable, our estimates are inherently uncertain and subject to refinement. As a result, during the measurement period, which may be up to one year from the acquisition date, we record adjustments to the assets acquired and liabilities assumed with the corresponding offset to goodwill. Upon the conclusion of the measurement period or final determination of the values of assets acquired or liabilities assumed, whichever comes first, any subsequent adjustments are recognized in our consolidated statements of operations. Accounting for business combinations requires our management to make significant estimates and assumptions, especially at the acquisition date including our estimates for intangible assets, contractual obligations assumed, restructuring liabilities, pre-acquisition contingencies, and contingent consideration, where applicable. Although we believe the assumptions and estimates we have made in the past have been reasonable and appropriate, they are based, in part, on historical experience and information obtained from the management of the acquired companies and are inherently uncertain. Critical estimates in valuing certain acquired intangible assets under the income approach include growth in future expected cash flows from product sales, customer contracts and acquired technologies, technology obsolescence rates, expected costs to develop in-process research and development, or IPR&D, into commercially viable products, estimated cash flows from the projects when completed and discount rates. Specific events and circumstances may occur thus affecting the accuracy or validity of such assumptions, estimates or actual results.

*Goodwill and Intangible Assets* – Goodwill is initially recorded when the purchase price paid for an acquisition exceeds the estimated fair value of the net identified tangible and intangible assets acquired. Intangible assets with finite lives are amortized over their respective useful lives on a straight-line basis and are also evaluated annually for impairment or whenever events or circumstances occur which indicate that those assets might be impaired. Goodwill and indefinite lived assets are not amortized but tested annually for impairment. The Company's impairment review process is completed during the fourth quarter of each year or whenever events, or circumstances occur which indicate that an impairment may have occurred. The Company assesses qualitative factors to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying value. If, after assessing the qualitative factors, the Company determines that it is not likely that the fair value of a reporting unit is less than its carrying value, then performing the two-step impairment test is unnecessary. However, if the Company concludes otherwise, then it is required to perform the first step of the two-step goodwill impairment test. The first step requires a comparison of the fair value of Nanometrics' reporting unit to its net book value. If the fair value of the reporting unit is greater than its carrying value, then no impairment is deemed to have occurred. If the fair value is less, then the second step must be performed to determine the amount, if any, of actual impairment. Amortization of intangible assets with finite lives is computed using the straight-line method over the following estimated useful lives of the assets:

Developed technology	9-10 years
Customer relationships	9 years
Trade name	15 years
Backlog	< 1 year

*Long-Lived Assets* – The Company evaluates its long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. When the sum of the undiscounted future net cash flows

**NANOMETRICS INCORPORATED**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (Continued)**

expected to result from the use of the asset and its eventual disposition is less than its carrying amount, impairment may exist. To determine the amount of impairment, the Company compares the fair value of the asset to its carrying value. If the carrying value of the asset exceeds its fair value, an impairment loss equal to the difference is recognized. See Note 8, "Goodwill and Intangible Assets" for further details.

*Income Tax Assets and Liabilities* – The Company accounts for income taxes such that deferred tax assets and liabilities must be recognized using enacted tax rates for the effect of temporary differences between the book and tax accounting for assets and liabilities. Also, deferred tax assets are reduced by a valuation allowance to the extent that management cannot conclude that it is more likely than not that a portion of the deferred tax asset will be realized in the future. The Company evaluates the deferred tax assets on a continuous basis throughout the year to determine whether or not a valuation allowance is appropriate. Factors used in this determination include future expected income and the underlying asset or liability which generated the temporary tax difference. The income tax provision is primarily impacted by federal statutory rates, state and foreign income taxes and changes in the valuation allowance.

*Product Warranties* – The Company sells most of its products with a twelve-month repair or replacement warranty from the date of acceptance, which generally represents the date of shipment. The Company provides an accrual for estimated future warranty costs based upon the historical relationship of warranty costs to the cost of products sold. The estimated future warranty obligations related to product sales are reported in the period in which the related revenue is recognized. The estimated future warranty obligations are affected by the warranty periods, sales volumes, product failure rates, material usage and labor and replacement costs incurred in correcting a product failure. If actual product failure rates, material usage, labor or replacement costs differ from the Company's estimates, revisions to the estimated warranty obligations would be required. For new product introductions where limited or no historical information exists, the Company may use warranty information from other previous product introductions to guide it in estimating the warranty accrual. The warranty accrual represents the best estimate of the amount necessary to settle future and existing claims on products sold as of the balance sheet date. The Company periodically assesses the adequacy of its recorded warranty reserve and adjusts the amounts in accordance with changes in these factors.

*Defined Employee Benefit Plans* – The Company maintains a defined benefit pension plan in Taiwan for which current service costs are charged to operations as they accrue based on services rendered by employees during the year. Pension benefit obligations are determined by using management's actuarial assumptions, including discount rates, assumed asset rates of return, compensation increases and employee turnover rates.

*Net Income Per Share* - Basic net income per share excludes dilution and is computed by dividing net income by the number of weighted average common shares outstanding for the period. Diluted net income per share reflects the potential dilution from outstanding dilutive stock options (using the treasury stock method), restricted stock units subject to vesting and shares issuable under the employee stock purchase plan. In applying the treasury stock method 0.5 million, 0.6 million and 0.5 million stock option shares for fiscal year 2018, 2017 and 2016, respectively, were included in the calculation of diluted shares.

*Certain Significant Risks and Uncertainties* – Financial instruments that potentially subject us to a concentration of credit risk consist of cash, cash equivalents, marketable securities, and accounts receivable. The Company's cash and cash equivalents are primarily invested in deposit accounts and money market accounts with large financial institutions. At times, these deposits and securities may exceed federally insured limits; however, the Company has not experienced any losses on such accounts. The Company invests its cash not required for use in operations in high credit quality securities based on the Company's investment policy. The Company's investment policy provides guidelines and limits regarding credit quality, investment concentration, investment type, and maturity that the Company believes will provide liquidity while reducing risk of loss of capital. Investments are of a short-term nature and include investments in commercial paper, corporate debt securities, asset-backed securities, U.S. Treasury, U.S. Government, and U.S. Agency debt.

The Company sells its products primarily to end users in the United States, Asia and Europe and, generally, does not require its customers to provide collateral or other security to support accounts receivable. Management performs ongoing credit evaluations of its customers' financial condition and maintains an allowance for estimated potential bad debt losses. The Company's customer base is highly concentrated and historically, a relatively small number of customers have accounted for a significant portion of its revenues. Aggregate revenue from the Company's top five largest customers in 2018, 2017 and 2016 consisted of 70%, 73% and 73%, respectively, of its total net revenues. The Company participates in a dynamic high technology industry and believes that changes in any of the following areas could have a material adverse effect on its future financial position, results of operations or cash flows: advances and trends in new technologies and industry standards; competitive pressures in the form of new products or price reductions on current products; changes in product mix; changes in the overall demand for products offered; changes in third-party manufacturers; changes in key suppliers; changes in certain strategic relationships or customer relationships; litigation or claims against the Company based on intellectual property,

patent, product, regulatory or other factors; fluctuations in foreign currency exchange rates; risk associated with changes in domestic and international economic and/or political regulations; availability of necessary components or sub-assemblies; disruption of manufacturing facilities; and its ability to attract and retain employees necessary to support its growth.

Certain components and sub-assemblies used in the Company's products are purchased from a sole supplier or a limited group of suppliers. The Company currently purchases its spectroscopic ellipsometer and robotics used in its advanced measurement systems from a sole supplier or a limited group of suppliers located in the United States. Any shortage or interruption in the supply of any of the components or sub-assemblies used in its products or its inability to procure these components or sub-assemblies from alternate sources on acceptable terms could have a material adverse effect on its business, financial condition and results of operations.

## **Note 2. Recent Accounting Pronouncements**

### *Recently Adopted Accounting Standards*

In October 2016, the Financial Accounting Standards Board ("FASB") issued an accounting standard update which requires the recognition of the income tax consequences of an intra-entity transfer of an asset, other than inventory, when the transfer occurs. The Company adopted this standard in the first quarter of 2018 using a modified retrospective approach. The adoption did not have a material impact on the financial statements.

In August 2016, the FASB issued an accounting standard which addresses eight specific cash flow classification issues. This update is effective for public companies for fiscal years beginning after December 15, 2017 and interim periods within those fiscal years. Early adoption is permitted, including in an interim period. The standard is to be applied through a retrospective transition method to each period presented. If it is impracticable to apply retrospectively for some of the issues, the amendments for those issues would be applied prospectively as of the earliest date practicable. The adoption of this guidance did not have a significant impact on the Company's consolidated statement of cash flows.

In May 2014, the FASB issued an accounting standard update which requires an entity to recognize the amount of revenue to which it expects to be entitled to for transferring promised goods or services to customers. The Company applied Topic 606 using the modified retrospective method by recognizing the cumulative effect of initially applying Topic 606 as an adjustment that increased the opening balance of equity at December 31, 2017 by \$0.9 million, which resulted from a decrease of \$1.6 million to the opening balance of current deferred revenue, partially offset by a decrease of \$0.7 million to the opening balance of inventories – delivered systems. This modified retrospective method was chosen due to the Company's inability to review all necessary contract information to adopt the standard using the full retrospective method. Both methods are allowed per U.S. GAAP. Therefore, the comparative information has not been adjusted and continues to be reported under Topic 605.

### *Recently Issued Accounting Standards*

In August 2018, the FASB issued an accounting standard update to provide additional guidance on the accounting for costs of implementation activities performed in a cloud computing arrangement. The amendments in this update align the requirements for capitalizing implementation costs incurred in a hosting arrangement that is a service contract with the requirements for capitalizing implementation costs incurred to develop or obtain internal-use software and hosting arrangements that include an internal-use software license. The accounting for the service element of a hosting arrangement that is a service contract is not affected by the amendments in this update. The amendments in this update are effective for public business entities for fiscal years beginning after December 15, 2019, and interim periods within those fiscal years. Early adoption is permitted. The amendments in this update should be applied retrospectively or prospectively to all implementation costs incurred after the date of adoption. The Company is currently evaluating the effect of this update on its consolidated financial condition and results of operations.

In August 2018, the FASB issued an accounting standard update which improves the effectiveness of fair value measurement disclosures in the notes to the financial statements. The update is effective for fiscal years beginning after December 15, 2019, including interim periods within those fiscal years. Certain amendments within the update should be applied prospectively for only the most recent interim or annual period presented in the initial fiscal year of adoption. All other amendments should be applied retrospectively to all periods presented upon their effective date. Early adoption is permitted. Entities are permitted to early adopt any removed or modified disclosures upon issuance of this update and delay adoption of the additional disclosures until their effective date. The adoption of this guidance is not expected to have a significant impact on the Company's consolidated results of operations or consolidated statement of cash flows.

In June 2018, the FASB issued an accounting standard update which simplifies the accounting for nonemployee share-based payment transactions. The accounting for share-based payments to nonemployees and employees will be substantially aligned because of this update. The standard is effective for public companies for fiscal years beginning after December 15, 2018, including interim periods within that fiscal year. Early adoption is permitted, but no earlier than an entity's adoption date of

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**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (Continued)**

Topic 606. The adoption of this guidance is not expected to have a significant impact on the Company's consolidated results of operations or consolidated statement of cash flows.

In January 2017, the Financial Accounting Standards Board (the "FASB") issued an accounting standard update which simplifies the subsequent measurement of goodwill and removes step 2 from the goodwill impairment test. Instead, an entity should record an impairment charge based on excess of a reporting unit's carrying amount over its fair value. The standard is effective for public companies for fiscal years beginning after December 15, 2019. Early adoption is permitted for interim or annual goodwill impairment tests performed on testing dates after January 1, 2017. The adoption of this guidance is not expected to have a significant impact on the Company's consolidated financial condition and results of operations.

In June 2016, the FASB issued an accounting standard which requires measurement and timely recognition of expected credit losses for financial assets. The update is effective for fiscal years beginning after December 15, 2019, including interim periods within those fiscal years. Early adoption is permitted as of the fiscal years beginning after December 15, 2018, including interim periods within those fiscal years. The standard is to be applied through a cumulative-effect adjustment to retained earnings as of the beginning of the first reporting period in which the guidance is effective. The Company is currently evaluating the effect of this update on its consolidated financial condition and results of operations.

In February 2016, the FASB issued an accounting standard update which requires lessees to record a right-of-use asset and a corresponding lease liability on the balance sheet (with the exception of short-term leases). For lessees, leases will continue to be classified as either operating or financing in the income statement. The standard is effective for public companies for annual reporting periods beginning after December 15, 2018, including interim periods within those fiscal years. Early adoption is permitted. The Company generally does not finance purchases of equipment or other capital assets but does lease some equipment and facilities. The Company established a cross-functional implementation team to evaluate and identify the impact of this update on its financial position, results of operations and cash flows. The Company has determined that it will elect all practical expedients permitted within the new standard which will allow it to not reassess whether any expired or existing contracts are or contain leases, not reassess the lease classification for any expired or existing lease, apply hindsight in determining the lease term, chose to treat separate lease components and nonlease components associated with the lease component as a single lease component, and to not reassess the initial direct costs for any existing lease. Also, the Company expects to make an accounting policy election to not recognize a lease liability or right-to-use asset for leases with a term of twelve months or less and recognize such lease payments in its Consolidated Statement of Operations as incurred. Additionally, the Company has determined that it will adopt the optional transition practical expedient thus allowing it to initially apply the new standard at the adoption date, which for the Company will be December 30, 2018. The Company anticipates recording lease liabilities and assets between \$10.5 million and \$12.5 million on its Consolidated Balance Sheet with no material impact to its Consolidated Statements of Operations. The Company does not anticipate any material impact to its cash flow, although the new standard does require that lease payments now be reported as a financing activity on its Consolidated Statement of Cash Flows instead of as an operating activity.

**Note 3. Acquisition**

On November 15, 2018, the Company acquired 4D Technology Corporation ("4D"), a supplier of high-performance interferometric measurement inspection systems. Pursuant to the Stock Purchase Agreement ("SPA") entered into between 4D, each of 4D's stockholders and the Company, the Company acquired all the outstanding stock of 4D for total consideration of (a) cash of \$38.7 million (\$37.2 million net of cash acquired); (b) 125,117 shares of the Company's common stock, par value \$0.001 per share, valued at approximately \$4 million, subject to adjustment based on the amount of cash, working capital, indebtedness, and transaction expenses of 4D (collectively, the "Purchase Price").

4D's Dynamic Interferometry® solutions are used in a variety of industries to provide accurate shape and surface measurement data, which provides feedback to customers of optical quality, machine finish, and surface defectivity, to improve manufacturing yield and performance. The addition of 4D's technology will add unique technology to the Company's portfolio, expanding its served markets with new applications in the scientific research, aerospace, industrial and optics manufacturing markets.

The following table summarizes the allocation of the total purchase consideration to the initial estimated fair values of the assets acquired and liabilities assumed at the acquisition date (in thousands):

	<u>November 15, 2018</u>
Cash and cash equivalents	\$ 1,414
Accounts receivable, net	4,156
Inventories	4,563
Prepaid and other current assets	104
Property and equipment	145
Accounts payable	(702)
Accrued liabilities	(760)
Deferred revenue	(197)
Deferred tax liabilities	(5,408)
<b>Total assets acquired/liabilities assumed</b>	<u>3,315</u>
Developed technology	15,500
In-process research and development	1,400
Customer relationships	4,600
Order backlog	500
Trade name	1,500
<b>Total identified intangible assets</b>	<u>23,500</u>
<b>Total identifiable net assets</b>	<u>26,815</u>
Goodwill	15,762
<b>Total purchase consideration</b>	<u>\$ 42,577</u>

The fair value of accounts receivable, net, consisted of gross contractual accounts receivable reduced by approximately \$161 thousand for receivables not expected to be collected as of the acquisition date. The inventory acquired consisted primarily of work in process, for which fair value was measured based on determining its net realizable value as such value represents an exit price in an orderly transaction between market participants. Factors that required a significant amount of judgment in determining the net realizable value for the inventory included determining estimated selling prices, cost to complete, costs to dispose, operating profit, and discount rates, among others.

Goodwill represents the excess of the consideration transferred over the preliminary estimated fair values of the assets acquired and liabilities assumed and is primarily attributable to intangible assets which are not separately recognizable, such as an assembled workforce, and anticipated synergies such as certain costs savings, operating efficiencies, and other strategic benefits projected to be achieved as a result of the 4D acquisition. Goodwill is not deductible for tax purposes.

Developed technology relates to 4D's product family and was valued using the multi-period excess earnings method under the income approach. This method reflects the present value of the projected cash flows that are expected to be generated by the developed technology less charges representing the contribution of other assets to those cash flows. The average estimated useful life of developed technologies was determined to be 9 years and was based on the technology cycle related to each developed technology, as well as the cash flows over the respective forecast period.

The fair value of the in-process research and development ("IPRD") was determined using the multi-period excess earnings method under the income approach. Such method reflects the present value of the projected cash flows that are expected to be generated by the IPRD, less costs to complete the development and charges representing the contribution of other assets to those cash flows.

Customer relationships represent the fair value of future projected revenue that will be derived from sales of products to new and existing customers and was valued using the incremental cash flow method. This method reflects the present value of projected revenues to be derived from such customers less charges representing the contribution of other assets to those cash flows. The estimated useful life of the customer relationships was determined to be 9 years and was based on historical customer turnover rates.

Order backlog represents the fair value of future projected revenue that will be derived from outstanding orders from customers that have not yet been shipped and was valued using the incremental cash flow method, which reflects the present value of such outstanding orders less charges representing the contribution of other assets to those cash flows. The estimated useful life of the order backlog was determined to be less than one year and was based on historical order fulfilment rates.

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Trade name relates to the “4D Technology” trade name and was fair valued by applying the relief-from-royalty method under the income approach. This method is based on the application of a royalty rate to forecasted revenue under the trade name. The estimated useful life of the tradename was determined to be 15 years and was based on the expected life of the trade name and the cash flows anticipated over the forecast period.

Factors that required a significant amount of judgment in determining the fair value for the acquired intangible assets included estimating future cash flows, revenue and gross margin assumptions, technology lives, future operating expenses, and discount rates, among others.

Finite-lived intangible assets totaled \$22.1 million and have a weighted average estimated useful life of 9.25 years. The Company has determined that the estimated useful life of the acquired in-process research and development is currently indeterminant; thus, it has been categorized as indefinite and will be reviewed annually for impairment, along with the Company’s other long-lived assets with indefinite lives, unless its estimated useful life is known.

The Company believes the amounts of purchased intangible assets recorded above represent the fair values of and approximate the amounts a market participant would pay for such assets as of the 4D acquisition date.

The results of operations of 4D are reported in the Company’s consolidated financial statements from the date of acquisition and include \$2.1 million of total net sales and \$0.4 million of operating loss for the year ended December 29, 2018.

The following unaudited pro forma financial information presents the combined results of operations as if the 4D acquisition had occurred at the beginning of fiscal year 2017 and is presented for informational purposes only. These results may not necessarily reflect the actual results of operations that would have been achieved, nor are they necessarily reflective of future results of operations (in thousands, except per share data).

	(Unaudited)	
	Years Ended	
	December 29, 2018	December 30, 2017
Pro forma net revenue	\$ 338,919	\$ 271,966
Pro forma net income	57,672	29,302
Pro forma net income per share - basic	\$ 2.39	\$ 1.16
Pro forma net income per share - diluted	2.34	1.13

The pro forma results include adjustments for depreciation and amortization, income taxes, and the incremental shares issued in connection with the acquisition. For the years ended December 29, 2018 and December 30, 2017, the pro forma results also include material nonrecurring adjustments of \$3.5 million and \$1.7 million, respectively, in net revenue and net income, related to sales to the Company and costs associated with those sales. The Company incurred \$0.9 million of acquisition-related costs that were expensed as incurred during fiscal 2018.

**Note 4. Fair Value Measurements and Disclosures**

The Company determines the fair values of its financial instruments based on the fair value hierarchy established in FASB Accounting Standards Codification ("ASC") 820, *Fair Value Measurement*, which requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. The classification of a financial asset or liability within the hierarchy is based upon the lowest level input that is significant to the fair value measurement. The fair value hierarchy prioritizes the inputs into the following three levels that may be used to measure fair value:

*Level 1* — Quoted prices in active markets for identical assets or liabilities.

*Level 2* — Inputs other than Level 1 that are observable, either directly or indirectly, such as quoted prices for similar assets and liabilities in active markets or inputs that are observable for the asset or liability, either directly or indirectly through market corroboration, for substantially the full term of the financial instrument.

*Level 3* — Unobservable inputs that are supported by little or no market activity and are significant to the fair value of the assets or liabilities. Such unobservable inputs include an estimated discount rate used in the Company's discounted present value analysis of future cash flows, which reflects the Company's estimate of debt with similar terms in the current credit markets. As there is currently minimal activity in such markets, the actual rate could be materially different.

Fair value is defined as the price that would be received upon the sale of an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The standard assumes that the transaction to sell the asset or transfer the liability occurs in the principal or most advantageous market for the asset or liability and establishes that the fair value of an asset or liability shall be determined based on the assumptions that market participants would use in pricing the asset or liability.

The following tables present the Company's assets and liabilities measured at estimated fair value on a recurring basis, excluding accrued interest components, categorized in accordance with the fair value hierarchy (in thousands), as of the following dates:

	December 29, 2018				December 30, 2017			
	Fair Value Measurements Using Input Types				Fair Value Measurements Using Input Types			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
<b>Assets:</b>								
<b>Cash equivalents:</b>								
Money market funds	\$ 113	\$ —	\$ —	\$ 113	\$ 256	\$ —	\$ —	\$ 256
Commercial paper	—	1,993	—	1,993	—	—	—	—
Total cash equivalents	113	1,993	—	2,106	256	—	—	256
<b>Marketable securities:</b>								
U.S. Government agency debt securities	—	—	—	—	—	1,495	—	1,495
Certificate of deposits	—	9,497	—	9,497	—	14,497	—	14,497
Commercial paper	—	7,932	—	7,932	—	7,949	—	7,949
Corporate debt securities	—	15,730	—	15,730	—	47,968	—	47,968
Asset backed securities	—	7,682	—	7,682	—	10,221	—	10,221
Total marketable securities	—	40,841	—	40,841	—	82,130	—	82,130
Total <sup>(1)</sup>	\$ 113	\$42,834	\$ —	\$42,947	\$ 256	\$82,130	\$ —	\$82,386

<sup>(1)</sup> Excludes \$108.8 million and \$34.6 million held in operating accounts as of December 29, 2018, and December 30, 2017, respectively.

The fair values of the marketable securities that are classified as Level 1 in the table above were derived from quoted market prices for identical assets or liabilities in active markets that the Company can access. The fair value of marketable securities that are classified as Level 2 in the table above were derived from non-binding market consensus prices that were corroborated by observable market data, quoted market prices for similar instruments, or pricing models, such as discounted cash flow techniques with all significant inputs derived from or corroborated by observable market data. There were no transfers of instruments between Level 1, Level 2 and Level 3 during the financial periods presented.

#### Derivatives

The Company uses foreign currency forward contracts to mitigate variability in gains and losses generated from the re-measurement of certain monetary assets and liabilities denominated in foreign currencies. These derivatives are carried at fair value with changes recorded in other income, net in the consolidated statements of operations. Changes in the fair value of these derivatives are largely offset by re-measurement of the underlying assets and liabilities. The derivatives have maturities of approximately 30 days.

The settlement result of forward foreign currency contracts included in the fiscal year ended December 29, 2018, and December 30, 2017 was a loss of \$2.5 million and a gain of \$1.4 million, respectively, and these balances are included in other income, net, in the consolidated statements of operations.

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The following table summarizes the Company's outstanding derivative instruments on a gross basis:

	December 29, 2018			December 30, 2017		
	Notional Amount	Fair Value		Notional Amount	Fair Value	
	(in millions)	Asset	Liability	(in millions)	Asset	Liability
Undesignated Hedges:						
Forward Foreign Currency Contracts						
Purchase	\$ 25.9	—	—	\$ 27.5	—	\$ 0.1
Sell	\$ 21.8	—	\$ 0.2	\$ 16.8	\$ 0.1	—

**Note 5. Cash and Investments**

The following table presents cash, cash equivalents, and available-for-sale investments as of the following dates (in thousands):

	December 29, 2018			
	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Estimated Fair Market Value
Cash	\$ 108,845	\$ —	\$ —	\$ 108,845
Cash equivalents:				
Money market funds	113	—	—	113
Commercial paper	1,993	—	—	1,993
Marketable securities:				
Certificates of deposits	9,500	—	(3)	9,497
Commercial paper	7,933	—	(1)	7,932
Corporate debt securities	15,788	—	(58)	15,730
Asset-backed securities	7,706	—	(24)	7,682
Total cash, cash equivalents, and marketable securities	<u>\$ 151,878</u>	<u>\$ —</u>	<u>\$ (86)</u>	<u>\$ 151,792</u>
	December 30, 2017			
	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Estimated Fair Market Value
Cash	\$ 34,643	\$ —	\$ —	\$ 34,643
Cash equivalents:				
Money market funds	256	—	—	256
Marketable securities:				
U.S. Government agency securities	1,500	—	(5)	1,495
Certificates of deposits	14,498	—	(1)	14,497
Commercial paper	7,952	—	(3)	7,949
Corporate debt securities	48,073	—	(105)	47,968
Asset-backed securities	10,240	—	(19)	10,221
Total cash, cash equivalents, and marketable securities	<u>\$ 117,162</u>	<u>\$ —</u>	<u>\$ (133)</u>	<u>\$ 117,029</u>

Available-for-sale marketable securities, readily convertible to cash, with maturity dates of 90 days or less are classified as cash equivalents, while those with maturity dates greater than 90 days are classified as marketable securities within short-term assets. All marketable securities as of December 29, 2018 and December 30, 2017, were available-for-sale and reported at fair value based on the estimated or quoted market prices as of the balance sheet date. Gross realized gains and losses on sale of securities are recorded in other income, net, in the Company's statement of operations. Net realized gains for fiscal 2018, 2017, and 2016 was \$1.4 million, \$1.3 million and \$0.5 million, respectively.

Unrealized gains or losses, net of tax effect, are recorded in accumulated other comprehensive income (loss) within stockholders' equity. Both the gross unrealized gains and gross unrealized losses for the fiscal years ended December 29, 2018, and December 30, 2017 were insignificant and no marketable securities had other than temporary impairment. All marketable securities as of December 29, 2018 and December 30, 2017, had effective maturity dates of less than three years.

#### Note 6. Accounts Receivable

The Company maintains arrangements under which eligible accounts receivable in Japan are sold without recourse to unrelated third-party financial institutions. These receivables were not included in the consolidated balance sheets as the criteria for sale treatment had been met. After a transfer of financial assets, an entity stops recognizing the financial assets when control has been surrendered. The agreement met the criteria of a true sale of these assets since the acquiring party retained the title to these receivables and had assumed the risk that the receivables will be collectible. The Company pays administrative fees as well as interest ranging from 0.62% to 1.48% based on the anticipated length of time between the date the sale is consummated, and the expected collection date of the receivables sold. The Company sold \$64.3 million and \$18.6 million of receivables during fiscal years ended December 29, 2018 and December 30, 2017, respectively. There were no material gains or losses on the sale of such receivables. There were no amounts due from such third-party financial institutions at December 29, 2018 and December 30, 2017.

#### Note 7. Financial Statement Components

The following tables provide details of selected financial statement components as of the following dates (in thousands):

	At	
	December 29, 2018	December 30, 2017
Inventories:		
Raw materials and sub-assemblies	\$ 31,434	\$ 32,187
Work in process	22,383	13,498
Finished goods	8,098	7,175
Inventories	<u>61,915</u>	<u>52,860</u>
Inventories-delivered systems	180	1,534
Total inventories	<u>\$ 62,095</u>	<u>\$ 54,394</u>
Property, plant and equipment, net: <sup>(1)</sup>		
Land	\$ 15,571	\$ 15,573
Building and improvements	21,354	20,880
Machinery and equipment	39,898	36,380
Furniture and fixtures	2,551	2,420
Software	10,116	9,558
Capital in progress	6,027	4,418
Total property, plant and equipment, gross	<u>95,517</u>	<u>89,229</u>
Accumulated depreciation and amortization	<u>(47,617)</u>	<u>(44,419)</u>
Total property, plant and equipment, net	<u>\$ 47,900</u>	<u>\$ 44,810</u>
Other Current Liabilities:		
Accrued warranty	\$ 4,379	\$ 4,863
Accrued taxes	1,738	813
Customer deposits	293	—
Accrued professional services	448	534
Third party commissions	1,382	76
Other	1,181	963
Total other current liabilities	<u>\$ 9,421</u>	<u>\$ 7,249</u>

<sup>(1)</sup> Total depreciation and amortization expense for the years ended December 29, 2018, December 30, 2017 and December 31, 2016 was \$6.5 million, \$6.7 million, and \$6.8 million, respectively.

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**Components of Accumulated Other Comprehensive Income (Loss)**

	Years Ended			Accumulated Other Comprehensive Income
	Foreign Currency Translations	Defined Benefit Pension Plans	Unrealized Income (Loss) on Investment	
Balance as of December 31, 2016	\$ (5,817)	\$ (227)	\$ (2)	\$ (6,046)
Current period change	4,170	(160)	(88)	3,922
Balance as of December 30, 2017	(1,647)	(387)	(90)	(2,124)
Current period change	(482)	(259)	308	(433)
Balance as of December 30, 2018	<u>\$ (2,129)</u>	<u>\$ (646)</u>	<u>\$ 218</u>	<u>\$ (2,557)</u>

The items above, except for unrealized income (loss) on investment, did not impact the Company's income tax provision. The amounts reclassified from each component of accumulated other comprehensive income into income statement line items were insignificant.

**Note 8. Goodwill and Intangible Assets**

The following table summarizes the activity in the Company's goodwill during the years ended December 29, 2018 and December 30, 2017, respectively (in thousands):

	Amounts
Balance as of December 31, 2016	\$ 8,940
Foreign currency movements	1,292
Balance as of December 30, 2017	10,232
Foreign currency movements	378
4D acquisition	15,762
Balance as of December 29, 2018	<u>\$ 26,372</u>

There were no business acquisitions made by the Company during fiscal years 2017 and 2016.

*Impairment - Goodwill and Long-lived Assets*

The Company's impairment review process is completed during the fourth quarter of each year, or whenever events or circumstances occur that indicate that an impairment may have occurred. The goodwill impairment assessment involves three tests, Step 0, Step 1 and Step 2. The Company performs a Step 0 test, which involves an initial qualitative assessment to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying value. If, after assessing the qualitative factors, the Company determines that it is more likely than not that the fair value of a reporting unit is less than its carrying value, then performing the two-step impairment test is necessary. Otherwise, no further testing is necessary.

The Company completed its annual goodwill impairment assessment during the fourth quarter of 2018 by first performing a Step 0 qualitative assessment. As part of this assessment, the Company considered the trading value of the Company's stock, the industry trends, and the Company's sales forecast and products plans. The Company concluded that it was more likely than not that the fair value was more than the carrying values of the Company's reporting unit and therefore did not proceed to the Step 1 goodwill impairment test.

The process of evaluating the potential impairment of long-lived assets is highly subjective and requires significant judgment. In estimating the fair value of these assets, the Company made estimates and judgments about future revenues and cash flows. The Company's forecasts were based on assumptions that are consistent with the plans and estimates the Company is using to manage its business. Changes in these estimates could change the Company's conclusion regarding impairment of the long-lived assets and potentially result in future impairment charges for all or a portion of their balance at December 29, 2018. The Company did not record any impairment charges related to goodwill in fiscal year 2018.

The Company assesses if there have been triggers that may require it to evaluate the reasonableness of the remaining estimated useful lives of its intangible assets. No such triggers were identified during fiscal year 2018.

Intangible assets are recorded at cost, less accumulated amortization. The Company recorded \$23.5 million of intangible assets in conjunction with its acquisition of 4D in 2018 (See Note 3 – Acquisition). Intangible assets as of December 29, 2018 and December 30, 2017 consisted of the following (in thousands):

	<b>December 29, 2018</b>		
	<u>Adjusted cost</u>	<u>Accumulated amortization</u>	<u>Net carrying amount</u>
Developed technology	\$ 35,954	\$ (16,532)	\$ 19,422
Customer relationships	6,531	(1,519)	5,012
In-Process research and development	1,400	—	1,400
Trade name	1,500	(8)	1,492
<b>Total</b>	<u>\$ 45,385</u>	<u>\$ (18,059)</u>	<u>\$ 27,326</u>

	<b>December 30, 2017</b>		
	<u>Adjusted cost</u>	<u>Accumulated amortization</u>	<u>Net carrying amount</u>
Developed technology	\$ 18,887	\$ (16,681)	\$ 2,206
Customer relationships	9,438	(9,438)	—
Brand names	1,927	(1,927)	—
Patented technology	2,252	(2,252)	—
Trade name	80	(80)	—
<b>Total</b>	<u>\$ 32,584</u>	<u>\$ (30,378)</u>	<u>\$ 2,206</u>

The amortization of finite-lived intangibles is computed using the straight-line method. Estimated lives of finite-lived intangibles range from two to fifteen years. Total amortization expense for the fiscal years ended December 29, 2018, December 30, 2017 and December 31, 2016, was \$0.4 million, \$0.2 million and \$1.5 million, respectively.

There were no impairment charges related to intangible assets recorded during either the year ended December 29, 2018 or December 30, 2017. During 2018, the Company retired \$16.1 million of intangible assets that had been fully amortized for both book and tax purposes that were deemed to have no future utility to the Company.

The estimated future amortization expense of finite intangible assets as of December 29, 2018, is as follows (in thousands):

<u>Fiscal Years</u>	<u>Amounts</u>
2019	2,997
2020	2,905
2021	2,905
2022	2,905
2023	2,905
Thereafter	11,309
<b>Total future amortization expense</b>	<u>25,926</u>

In-Process research and development of \$1.4 million acquired in the 4D acquisition has been omitted from the above table as its estimated useful life is indeterminant at December 29, 2018. It will be tested for impairment, along with Goodwill, until its estimated useful life becomes finite.

#### **Note 9. Warranties**

*Product Warranty* – The Company sells the majority of its products with a 12 months repair or replacement warranty from the date of acceptance or shipment date. The Company provides an accrual for estimated future warranty costs based upon the historical relationship of warranty costs to the cost of products sold. The estimated future warranty obligations related to product sales are recorded in the period in which the related revenue is recognized. The estimated future warranty obligations are affected by the warranty periods, sales volumes, product failure rates, material usage, and labor and replacement costs incurred in correcting a product failure. If actual product failure rates, material usage, labor or replacement costs were to differ from the Company’s estimates, revisions to the estimated warranty obligations would be required. For new product introductions where limited or no historical information exists, the Company may use warranty information from other previous product introductions to guide it in estimating its warranty accrual. The warranty accrual represents the best estimate of the amount necessary to settle future and existing claims on products sold as of the balance sheet date. The Company

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periodically assesses the adequacy of its reported warranty reserve and adjusts such amounts in accordance with changes in these factors.

Components of the warranty accrual, which were included in the accompanying consolidated balance sheets with other current liabilities, were as follows (in thousands):

	Years Ended	
	December 29, 2018	December 30, 2017
Balance as of beginning of period	\$ 4,863	\$ 3,838
Accruals for warranties issued during period	4,914	5,247
Settlements during the period	(5,871)	(4,222)
Addition of 4-D Warranty reserves	473	-
Balance as of end of period	<u>\$ 4,379</u>	<u>\$ 4,863</u>

**Note 10. Commitments and Contingencies**

*Intellectual Property Indemnification Obligations* – The Company will, from time to time, in the normal course of business, agree to indemnify certain customers, vendors or others against third party claims that Nanometrics’ products, when used for their intended purpose(s), or the Company’s intellectual property, infringe the intellectual property rights of such third parties or other claims made against parties with whom it enters into contractual relationships. It is not possible to determine the maximum potential amount of liability under these indemnification obligations due to the limited history of prior indemnification claims and the unique facts and circumstances that are likely to be involved in each particular claim. Historically, the Company has not made payments under these obligations and believes that the estimated fair value of these agreements is immaterial. Accordingly, no liabilities have been recorded for these obligations in the accompanying consolidated balance sheets as of December 29, 2018 and December 30, 2017.

*Contractual Obligations* – The Company maintains certain open inventory purchase agreements with its suppliers to ensure a smooth and continuous supply availability for key components. The Company’s liability under these purchase commitments is generally restricted to a forecasted time-horizon as mutually agreed upon between the parties. This forecasted time-horizon can vary among different suppliers. The Company estimates its open inventory purchase commitment as of December 29, 2018 was approximately \$42.8 million. Actual expenditures will vary based upon the volume of the transactions and length of contractual service provided. In addition, the amounts paid under these arrangements may be less in the event that the arrangements are renegotiated or cancelled.

The Company leases facilities and certain equipment under non-cancelable operating leases. Rent expense, which is recorded on a straight-line basis over the term of the respective lease, for 2018, 2017 and 2016 was approximately \$2.1 million, \$1.8 million and \$1.8 million, respectively. Future minimum lease payments under its operating leases are as follows (in thousands):

	Operating Leases
2019	3,002
2020	1,891
2021	1,051
2022	970
2023	750
Thereafter	696
Total	<u>\$ 8,360</u>

*Legal Proceedings* – From time to time, the Company is subject to various legal proceedings or claims arising in the ordinary course of business.

On August 2, 2017, the Company was named as defendant in a complaint filed in New Hampshire Superior Court (“Complaint”). The Complaint, brought by Optical Solutions, Inc. (“OSI”), alleges claims arising from a purported exclusive purchase contract between OSI and the Company pertaining to certain product. On September 18, 2017, the Company removed the action to the United States District Court for the District of New Hampshire. On September 25, 2017, the Company moved to transfer the Complaint to the District Court for the Northern District of California. On December 20, 2017, the Company filed its complaint against OSI in the California Superior Court for the County of Santa Clara alleging claims arising from OSI’s breach of certain purchase orders. The Company’s complaint was later removed by OSI to the Northern District of

California. On May 29, 2018, the District Court of New Hampshire issued an order granting the Company's motion to transfer OSI's Complaint to the Northern District of California and denying the Company's motion to dismiss the Complaint without prejudice. On June 14, 2018, OSI's Complaint was consolidated with the Company's complaint against OSI. On August 9, 2018, OSI filed an Amended Complaint. On September 19, 2018, the Company filed a motion to dismiss OSI's Amended Complaint for failure to state a claim. The Company's motion to dismiss is set to be heard on February 28, 2019. Trial has been set for May 16, 2022.

The Company records a provision for a loss when it believes that it is both probable that a loss has been incurred and the amount can be reasonably estimated. Based on current information, the Company believes it does not have any probable and reasonably estimable losses related to any current legal proceedings and claims. Although it is difficult to predict the outcome of legal proceedings, the Company believes that any liability that may ultimately arise from the resolution of these ordinary course matters will not have a material adverse effect on the business, financial condition and results of operations.

#### **Note 11. Net Income Per Share**

The Company presents both basic and diluted net income per share on the face of its consolidated statements of operations. Basic net income per share excludes the effect of potentially dilutive shares and is computed by dividing net income by the weighted-average number of shares of common stock outstanding for the period. Diluted net income per share is computed using the weighted-average number of shares of common stock outstanding for the period plus the effect to all potentially dilutive common shares outstanding during the period, including contingently issuable shares and certain stock options, calculated using the treasury stock method. A reconciliation of the share denominator of the basic and diluted net income per share computations is as follows (in thousands):

	<b>Years Ended</b>		
	<b>December 29, 2018</b>	<b>December 30, 2017</b>	<b>December 31, 2016</b>
Weighted average common shares outstanding used in basic net income per share calculation	24,120	25,334	24,655
Potential dilutive common stock equivalents, using treasury stock method	480	585	498
Weighted average shares used in diluted net income per share calculation	<u>24,600</u>	<u>25,919</u>	<u>25,153</u>

For the year ended December 29, 2018, December 30, 2017, and December 31, 2016, the Company had securities outstanding which could potentially dilute basic earnings per share in the future. For the years ended December 29, 2018, December 30, 2017 and December 31, 2016, the weighted average common share equivalents consisting of stock options and restricted stock units included in the calculation of diluted net income per share were 0.5 million, 0.6 million and 0.5 million shares, respectively.

#### **Note 12. Stockholders' Equity and Stock-Based Compensation**

##### *Stockholders' Equity*

##### *Preferred and Common Stock*

The authorized capital stock of Nanometrics consists of 47,000,000 shares of common stock, par value \$0.001 per share, and 3,000,000 shares of preferred stock, par value \$0.001 per share.

##### *Repurchases of Common Stock*

On November 15, 2017 the Company's Board of Directors authorized the repurchase of up to \$50.0 million of its common stock. This plan is referred to as the Stock Repurchase Plan. The Stock Repurchase Plan was completed in February 2018.

Shares repurchased and retired in the years ended December 29, 2018 and December 30, 2017 under the Stock Repurchase Plan, with the associated cost of repurchase and amount available for repurchase were as follows (in thousands, except number of shares and weighted average price per share):

	<b>Fiscal Year 2018</b>	<b>Fiscal Year 2017</b>
Number of shares of common stock repurchased	896,187	1,065,848
Weighted average price per share	\$ 25.65	\$ 25.33
Total cost of repurchase	\$ 22,987	\$ 26,999
Amount available for repurchase at end of period	—	\$ 23,001

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*Stock Option Plans*

The Nanometrics option plans are as follows:

Plan Name	Participants	Shares Authorized
2005 Equity Incentive Plan	Employees, consultants and directors	8,292,594
2000 Employee Stock Option Plan	Employees and consultants	2,450,000
2000 Director Stock Option Plan	Non-employee directors	250,000
Accent Optical Technologies, Inc. Stock Incentive Plan	Employees and consultants	205,003

*Employee Stock Purchase Plan*

Under the 2003 Employee Stock Purchase Plan (“ESPP”), eligible employees can elect to have salary withholdings of up to 10% of their base compensation to purchase shares of common stock at a price equal to 85% of the lower of the market value of the stock at the beginning or end of each six-month offering period, subject to an annual statutory limitation. As of December 29, 2018, the Company had 443,694 shares remaining for issuance under the ESPP. Shares purchased under the ESPP were 70,214 shares, 122,298 shares and 212,619 shares in 2018, 2017 and 2016 at a weighted average price of \$21.46, \$21.19 and \$14.29, respectively.

*Stock-based Compensation*

The Company measures and recognizes compensation expense for all share-based payment awards made to employees and directors including employee stock options, restricted stock units and employee stock purchases related to the Employee Stock Purchase Plan (collectively “Employee Stock Purchases”) based on estimated fair values. The fair value of share-based payment awards is estimated on the date of grant using an option-pricing model. The value of the portion of the award that is ultimately expected to vest is recognized as expense over the requisite service periods in the Company's consolidated statement of operations.

*Valuation and Expense Information*

The fair value of stock-based awards to employees is calculated using the Black-Scholes option pricing model, which requires subjective assumptions, including future stock price volatility and expected time to exercise. The expected life was calculated using the simplified method allowed by the SAB 107. The risk-free rates were based on the U.S Treasury rates in effect during the corresponding period. The expected volatility was based on the historical volatility of the Company's stock price. The dividend yield reflects that the Company has not paid any cash dividends since inception and does not intend to pay any cash dividends in the foreseeable future. Forfeitures are recognized upon occurrence. These factors could change in the future, which would affect the stock-based compensation expense in future periods.

The weighted-average fair value of stock-based compensation to employees is based on the single option valuation approach. The estimated fair value of stock-based compensation awards to employees is amortized over the vesting period. The weighted-average fair value calculations are based on the following average assumptions:

	Fiscal Year 2018	Fiscal Year 2017	Fiscal Year 2016
Employee Stock Purchase Plan:			
Expected life	0.5 years	0.5 years	0.5 years
Volatility	52.46%	37.2%	38.7%
Risk free interest rate	2.14%	0.91%	0.44%
Dividends	—	—	—

*Stock Options and Restricted Stock Units (“RSUs”)*

*Stock Options*

No stock options were granted in fiscal years 2018, 2017 and 2016. A summary of activity of stock options is as follows:

	Number of Shares Outstanding (Options)	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term (Years)	Aggregate Intrinsic Value (in Thousands)
Options				
Outstanding at December 31, 2016	440,545	\$ 15.06	2.12	\$ 4,405
Exercised	(223,364)	13.35		
Cancelled/Forfeited	(855)	16.63		
Outstanding at December 30, 2017	216,326	16.82	1.76	\$ 1,752
Exercised	(132,932)	17.46		
Cancelled/Forfeited	-	-		
Outstanding at December 29, 2018	83,394	\$ 15.80	1.19	\$ 988
Exercisable at December 29, 2018	83,394	\$ 15.80	1.19	\$ 988

The aggregate intrinsic value in the above table represents the total pretax intrinsic value, based on the Company’s closing stock price of \$27.65 as of December 29, 2018, which would have been received by the option holders had all option holders exercised their options as of that date. The total intrinsic value of options exercised during 2018, 2017 and 2016 was \$2.5 million, \$3.1 million and \$2.7 million, respectively. The fair value of options vested during 2018 was negligible and during 2017 and 2016 was \$0.3 million and \$0.7 million, respectively.

The following table summarizes ranges of outstanding and exercisable options as of December 29, 2018.

Exercise Prices	Options Outstanding			Options Exercisable	
	Number Outstanding	Weighted Average Remaining Contractual Life (Years)	Weighted Average Exercise Price	Number Exercisable	Weighted Average Exercise Price
\$12.98 - \$14.59	1,694	1.58	\$ 14.03	1,694	\$ 14.03
\$14.95 - \$14.95	1,025	1.49	14.95	1,025	14.95
\$15.00 - \$15.00	10,000	0.62	15.00	10,000	15.00
\$15.61 - \$15.61	2,500	1.09	15.61	2,500	15.61
\$15.65 - \$15.65	3,375	1.21	15.65	3,375	15.65
\$15.85 - \$15.85	60,000	1.20	15.85	60,000	15.85
\$16.00 - \$16.00	100	1.72	16.00	100	16.00
\$17.33 - \$17.33	2,500	1.87	17.33	2,500	17.33
\$18.22 - \$18.22	1,200	2.16	18.22	1,200	18.22
\$18.79 - \$18.79	1,000	2.24	18.79	1,000	18.79
	<u>83,394</u>			<u>83,394</u>	

As of December 29, 2018, the total unrecognized compensation costs related to unvested stock options was negligible.

*Restricted Stock Units (“RSUs”)*

Each RSU counts against the Company’s “2005 Equity Incentive Plan” at a ratio of one and seven tenths shares for each unit granted but represents an amount equal to the fair value of one share of the Company’s common stock. The Company granted 484,087 and 454,600 RSUs during the years ended December 29, 2018 and December 30, 2017, respectively, to key employees with vesting periods up to three years.

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A summary of activity for RSUs is as follows:

<u>Summary of activity for RSUs</u>	<u>Number of RSUs</u>	<u>Weighted Average Fair Value</u>
Outstanding RSUs as of December 31, 2016	819,785	\$ 16.79
Granted	454,600	27.12
Released	(387,592)	16.81
Cancelled	(96,494)	19.01
Outstanding RSUs as of December 30, 2017	790,299	22.46
Granted	484,087	36.57
Released	(362,762)	20.79
Cancelled	(142,621)	26.44
Outstanding RSUs as of December 29, 2018	<u>769,003</u>	<u>\$ 31.39</u>

As of December 29, 2018, the total unrecognized compensation costs related to RSU's was \$12.5 million and is expected to be recognized as an expense over a weighted average remaining amortization period of 1.75 years.

*Market-Based Performance Stock Units ("PSUs")*

In addition to granting RSUs that vest on the passage of time only, the Company granted PSUs to certain executives. The PSUs will vest in tranches over one, two, and three years based on the relative performance of the Company's stock during those periods, compared to the performance of a peer group over the same period. If target stock price performance is achieved, 66.7% of the shares of the Company's stock subject to the PSUs will vest, and up to a maximum of 100% of the shares subject to the PSUs will vest if the maximum stock price performance is achieved for each tranche. For certain shares granted in fiscal 2018, 62,500 shares are the cumulative maximum number of shares that may vest for all measurement periods.

A summary of activity for PSUs is as follows:

<u>Summary of activity for PSUs</u>	<u>Number of PSUs</u>	<u>Weighted Average Fair Value</u>
Outstanding PSUs as of December 31, 2016	107,500	\$ 9.94
Granted	122,050	20.51
Released	(38,500)	10.41
Cancelled	(61,100)	19.41
Outstanding PSUs as of December 30, 2017	129,950	15.60
Granted	63,133	24.45
Released	(47,929)	12.10
Cancelled	(32,991)	24.52
Outstanding PSUs as of December 29, 2018	<u>112,163</u>	<u>\$ 22.37</u>

*Valuation of PSUs*

On the date of grant, the Company estimated the fair value of PSUs using a Monte Carlo simulation model. The assumptions for the valuation of PSUs are summarized as follows:

	<u>2018 Award</u>	<u>2017 Award</u>	<u>2016 Award</u>
Grant Date Fair Value Per Share	\$20.73-\$25.18	\$14.57-\$26.75	\$8.52
Weighted-average assumptions/inputs:			
Expected Dividend	—	—	—
Range of risk-free interest rates	2.39%-2.63%	1.74%-1.84%	0.92%
Range of expected volatilities for peer group	22%-66%	22%-66%	22%-93%

The number of RSUs granted during fiscal year 2018 was 484,087, which counted as 822,948 shares against the 2005 Equity Incentive Plan, and the number of PSUs granted during fiscal year 2018 was 63,133, which counted as 107,327 shares against the 2005 Equity Incentive Plan. The number of RSUs cancelled during fiscal year 2018 was 142,621, which counted as 242,456 shares against the 2005 Equity Incentive Plan, and the number of PSUs cancelled during fiscal 2018 was 32,991, which counted as 56,085 shares against the 2005 Equity Incentive Plan.

The number of RSUs granted during fiscal year 2017 was 454,600, which counted as 772,820 shares, and PSUs granted during fiscal year 2017 was 122,050, which counted as 207,485 against the 2005 Equity Incentive Plan. The number of RSUs cancelled during fiscal year 2017 was 96,494, which counted as 164,040 shares, and PSUs cancelled during fiscal year 2017 was 61,100, which counted as 103,870, against the 2005 Equity Incentive Plan. Each RSU represents an amount equal to the fair value of one share of the Company's common stock.

A summary of activity under the Company's stock option plans including options, RSUs and PSUs during fiscal year 2018, 2017 and 2016 and shares available for grant as of the respective period end dates, is as follows:

	<u>Fiscal Year 2018</u>	<u>Fiscal Year 2017</u>	<u>Fiscal Year 2016</u>
Shares available for grant at beginning of fiscal year	1,874,765	1,334,581	1,916,589
Additional Shares Authorized	—	1,000,000	—
Options - cancelled	—	855	176,587
Options - expired plan shares	—	—	(116,192)
RSUs - granted	(822,948)	(772,820)	(810,334)
RSUs - cancelled	242,456	164,040	92,230
RSUs - shares issued to satisfy tax withholding obligations	-	251,724	179,117
PSUs - granted	(107,327)	(207,485)	(114,750)
PSUs - cancelled	56,085	103,870	11,334.00
Shares available for grant at end of fiscal year	<u>1,243,031</u>	<u>1,874,765</u>	<u>1,334,581</u>

#### *Stock-based Compensation Expense*

Stock-based compensation expense recognized during the period is based on the value of the portion of share-based payment awards that is ultimately expected to vest during the period. Effective January 1, 2017, because of the adoption of ASU No. 2016-09 "Improvements to Employee Share-Based Payment Accounting", the Company has elected to account for forfeitures as they occur. Refer to Note 2. Recent Accounting Pronouncements for further discussion on the adoption. As such, for fiscal year ended December 30, 2017, stock-based compensation expense is recognized in the consolidated statement of operations, net of actual forfeitures during the period. Prior to the adoption of ASU No. 2016-09, the Company estimated forfeitures at the time of grant, based on historical forfeiture experience, and revised if necessary in subsequent periods if actual forfeitures differed from estimates. Stock-based compensation expense recognized in the consolidated statement of operations for the year ended December 31, 2016, has been reduced for estimated forfeitures.

Tax benefits resulting from tax deductions in excess of the compensation cost recognized for those options are required to be separately classified in the consolidated statements of cash flows. The Company recognized \$1.0 million of excess tax benefits in fiscal year 2016, and immaterial amounts in both fiscal years 2018 and 2017, respectively.

Stock-based compensation expense for all share-based payment awards made to the Company's employees and directors pursuant to the employee stock option and employee stock purchase plans by function were as follows (in thousands):

	<u>Fiscal Year 2018</u>	<u>Fiscal Year 2017</u>	<u>Fiscal Year 2016</u>
Cost of products	\$ 704	\$ 842	\$ 403
Cost of service	772	616	509
Research and development	2,450	1,720	1,408
Selling	2,786	2,323	2,046
General and administrative	4,670	3,318	3,300
Total stock-based compensation expense related to employee stock options and employee stock purchases	<u>\$ 11,382</u>	<u>\$ 8,819</u>	<u>\$ 7,666</u>

#### **Note 13. Defined Benefit Pension Plan**

Nanometrics sponsors a statutory government mandated defined benefit pension plan (the "Benefit Plan") in Taiwan for its local employees. The fair value of plan assets was \$0.3 million for fiscal year ended 2018, and \$0.3 million for each of fiscal years 2017 and 2016, respectively; and the net funding deficiency of the Benefit Plan was \$0.2 million, \$0.5 million, and \$0.4 million for the fiscal years ended December 29, 2018, December 30, 2017, and December 31, 2016, respectively. Based on the nature and limited extent of the pension plan, we determined this pension plan was not material for separate disclosure.

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**Note 14. Income Taxes**

*Income Tax Assets and Liabilities* - The Company accounts for income taxes whereby deferred tax assets and liabilities are recognized using enacted tax rates for the effect of temporary differences between the book and tax accounting for assets and liabilities. Also, deferred tax assets are reduced by a valuation allowance to the extent that management cannot conclude that it is more likely than not that a portion of the deferred tax asset will be realized in the future. The Company evaluates the deferred tax assets on a continuous basis throughout the year to determine whether or not a valuation allowance is appropriate. Factors used in this determination include future expected income and the underlying asset or liability which generated the temporary tax difference. The income tax provision is primarily impacted by federal statutory rates, state and foreign income taxes, and changes in the valuation allowance.

Income (loss) before provision for income taxes consists of the following (in thousands):

	Years Ended		
	December 29, 2018	December 30, 2017	December 31, 2016
Domestic	\$ 52,836	\$ 34,238	\$ 25,372
Foreign	14,688	9,060	3,763
Income (loss) before income taxes	<u>\$ 67,524</u>	<u>\$ 43,298</u>	<u>\$ 29,135</u>

The provision (benefit) for income taxes consists of the following (in thousands):

	Years Ended		
	December 29, 2018	December 30, 2017	December 31, 2016
Current:			
Federal	\$ 616	\$ 3,250	\$ 697
State	142	9	85
Foreign	5,054	2,998	2,111
	<u>5,812</u>	<u>6,257</u>	<u>2,893</u>
Deferred:			
Federal	3,875	6,314	(16,641)
State	(18)	53	(320)
Foreign	207	472	(832)
	<u>4,064</u>	<u>6,839</u>	<u>(17,793)</u>
Provision (benefit) for income taxes	<u>\$ 9,876</u>	<u>\$ 13,096</u>	<u>\$ (14,900)</u>

Significant components of the Company's deferred tax assets and liabilities are as follows (in thousands):

	At	
	December 29, 2018	December 30, 2017
Deferred tax assets:		
Reserves and accruals	\$ 5,704	\$ 5,797
Deferred revenue	241	240
Shared-based compensation	1,644	1,483
Tax credit carry-forwards	6,920	9,669
Net operating losses	6,022	9,755
Depreciation & amortization	(7,528)	(1,525)
Other	532	207
Total deferred tax assets	<u>13,535</u>	<u>25,626</u>
Less: Valuation allowance	<u>(10,966)</u>	<u>(13,702)</u>
Total deferred tax assets net of valuation allowance	<u>2,569</u>	<u>11,924</u>
Deferred tax liabilities:		
Depreciation & amortization	(13)	(12)
Other	(149)	(167)
Total deferred tax liabilities	<u>(162)</u>	<u>(179)</u>
Net deferred tax assets	<u>\$ 2,407</u>	<u>\$ 11,745</u>

As of December 29, 2018, the Company had net operating loss carryforwards of \$23.5 million in California, \$1.7 million in other states, and \$18.3 million in foreign countries, which begin to expire in 2018.

As of December 29, 2018, the Company had available carryforward Federal and California R&D tax credits of \$5.4 million and \$10.2 million, respectively. Federal R&D tax credit carryforwards begin to expire in 2034. State R&D tax credits carryforward indefinitely.

During the years ended December 29, 2018, and December 30, 2017, the change in valuation allowances was (\$2.7) million and \$1.5 million, respectively. The decrease in the valuation allowance in 2018 was primarily related to a \$4.8 million decrease from the dissolution of Nanda Technologies, a Germany based subsidiary. This amount was offset by an increase net benefit of the California deferred tax assets of \$0.5 million and a \$1.6 million increase from deferred tax assets in the Company's Switzerland subsidiary. The realization of deferred tax assets is primarily dependent on the Company generating sufficient U.S. and foreign taxable income in future fiscal years. The Company regularly assesses the need for a valuation allowance against its deferred tax assets. In making that assessment, the Company considers both positive and negative evidence related to the likelihood of realization of the deferred tax assets to determine, based on the weight of available evidence, whether it is more-likely-than-not that some or all the deferred tax assets will not be realized.

The Company continues to maintain valuation allowances against its California and Switzerland deferred tax assets as a result of uncertainties regarding the realization of the assets due to cumulative losses and uncertainty of future taxable income. The Company will continue to assess the realizability of the deferred tax assets in each of the applicable jurisdictions and maintain the valuation allowances until sufficient positive evidence exists to support a reversal. In the event the Company determines that the deferred tax assets are realizable, an adjustment to the valuation allowances will be reflected in the tax provision for the period such determination is made.

Differences between income taxes computed by applying the statutory federal income tax rate to income (loss) before income taxes and the provision (benefit) for income taxes consist of the following (in thousands):

	Years Ended		
	December 29, 2018	December 30, 2017	December 31, 2016
Income taxes computed at U.S. statutory rate	\$ 14,180	\$ 15,153	\$ 10,197
State income taxes	379	227	223
Foreign tax rate differential	(2,382)	794	3,502
Change in valuation allowance	3,037	1,490	(25,738)
Non-deductible equity compensation	(1,241)	(1,803)	380
Tax credits	(3,876)	(2,336)	(3,191)
Domestic production activities deduction	-	(608)	(354)
Liabilities for uncertain tax positions	12	18	67
Other, net	(233)	161	14
Provision (benefit) for income taxes	<u>\$ 9,876</u>	<u>\$ 13,096</u>	<u>\$ (14,900)</u>

As of December 29, 2018, The Company has provided U.S income taxes on all its foreign earnings. The Company continues to permanently reinvest the cash held offshore to support its working capital needs. Accordingly, no additional foreign withholding taxes that may be required from certain jurisdictions in the event of a cash distribution have been provided thereon.

In December 2017, the SEC staff issued Staff Accounting Bulletin No. 118, Income Tax Accounting Implications of the Tax Cuts and Jobs Act (SAB 118), which allowed the Company to record provisional amounts during a measurement period not to extend beyond one year of the enactment date. As of December 29, 2018, the Company had finalized all provisional amounts related to the Tax Act. Finalizing provisional adjustments related to the Tax Act did not have a material impact on the Company's consolidated financial statements as of December 29, 2018. The Company expects further guidance may be forthcoming from the Financial Accounting Standards Board and the Securities and Exchange Commission, as well as regulations, interpretations and rulings from federal and state tax agencies, which could result in additional impacts.

The 2017 Tax Act creates a new requirement that global intangible low-taxed income ("GILTI") earned by controlled foreign corporations ("CFCs") must be included currently in the gross income of the CFCs' U.S. shareholder. Under U.S. GAAP, the Company is allowed to make an accounting policy choice of either (1) treating taxes due on future U.S. inclusions in taxable income related to GILTI as a current-period expense when incurred (the "period cost method") or (2) factoring such amounts into a company's measurement of its deferred taxes (the "deferred method"). The Company's selection of an accounting policy for 2018 with respect to the GILTI tax rules was to treat GILTI tax as a current period expense under the period cost method.

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The Company recognizes tax liabilities for uncertain tax positions and adjusts these liabilities when its judgment changes as a result of the evaluation of new information not previously available. Due to the complexity of some of these uncertainties, the ultimate resolution may result in a payment that is materially different from the Company's current estimate of the tax liabilities. These differences will be reflected as increases or decreases to income tax expense in the period in which they are determined.

The accounting for uncertainty in income taxes recognized in an enterprise's financial statements prescribes a recognition threshold and measurement attribute for the financial statement recognition and measurement of a tax position taken or expected to be taken on a tax return, and the derecognition of tax benefits, classification on the balance sheet, interest and penalties, accounting in interim periods, disclosure, and transition.

A reconciliation of the beginning and ending amount of unrecognized tax benefits is as follows (in thousands):

	At		
	December 29, 2018	December 30, 2017	December 31, 2016
Unrecognized tax benefits - beginning of the period	\$ 7,151	\$ 6,477	\$ 6,961
Gross increases-tax positions in prior period	132	32	23
Gross decreases-tax positions in prior period	—	—	(1,193)
Gross increases-current-period tax positions	1,000	723	686
Lapse of statute of limitations	(175)	(81)	—
Unrecognized tax benefits - end of the period	<u>\$ 8,108</u>	<u>\$ 7,151</u>	<u>\$ 6,477</u>

The unrecognized tax benefit at December 29, 2018, was \$8.1 million, of which \$4.6 million would impact the effective tax rate if recognized. The Company accrues interest and penalties related to unrecognized tax benefits in its provision for income taxes. The total amount of penalties and interest were not material as of December 29, 2018, December 30, 2017, and December 31, 2016. The Company does not expect a material change in its unrecognized tax benefits within the next 12 months.

The Company is subject to taxation in the U.S. and various states including California, and the foreign jurisdictions of Korea, Japan, Taiwan, China, Singapore, Germany, France, United Kingdom, Switzerland, and Israel. Due to tax attribute carry-forwards, the Company is subject to examination for tax years 2003 forward for U.S. tax purposes. The Company was also subject to examination in various states for tax years 2002 forward. The Company is subject to examination for tax years 2010 forward for various foreign jurisdictions.

## Note 15. Segment, Geographic, and Significant Customer Information

The Company has one operating segment, which is the sale, design, manufacture, marketing and support of thin film and optical critical dimension systems. The Chief Executive Officer has been identified as the Chief Operating Decision Maker (“CODM”) because he has the final authority over resource allocation decisions and performance assessment. The CODM does not receive discrete financial information about individual components of the Company’s business. For the years ended December 29, 2018, December 30, 2017, and December 31, 2016, the Company recorded revenue from customers primarily in the United States, Asia and Europe. The following tables summarize total net revenues and long-lived assets (excluding intangible assets) attributed to significant countries (in thousands):

	Years Ended		
	December 29, 2018	December 30, 2017	December 31, 2016
<b>Total net revenues</b> <sup>(1)</sup> :			
South Korea	\$ 108,938	\$ 94,082	\$ 44,735
China	72,305	29,826	43,460
Japan	64,252	41,979	26,604
United States	29,415	33,983	29,887
Singapore	22,167	21,810	37,096
Taiwan	14,012	20,147	27,189
Other	13,434	16,794	12,158
<b>Total net revenues</b>	<u>\$ 324,523</u>	<u>\$ 258,621</u>	<u>\$ 221,129</u>

<sup>(1)</sup> Net revenues are attributed to countries based on the customer’s deployment and service locations of systems.

	Years Ended	
	December 29, 2018	December 30, 2017
<b>Long-lived tangible assets:</b>		
United States	\$ 46,325	\$ 43,427
Taiwan	275	510
South Korea	420	576
Japan	59	60
Singapore	618	92
All Other	203	145
<b>Total long-lived tangible assets</b>	<u>\$ 47,900</u>	<u>\$ 44,810</u>

With respect to customer concentration, Samsung Electronics Co. Ltd., SK hynix, Toshiba Corporation, and Intel Corporation each accounted for more than 10% of total sales for the year ended December 29, 2018, and Samsung Electronics Co. Ltd., SK hynix, Micron Technology, Inc., Intel Corporation, and Toshiba Corporation each accounted for more than 10% of total sales for the year ended December 30, 2017, and Micron Technology, Inc., Intel Corporation, SK hynix, and Taiwan Semiconductor Manufacturing Company Limited each accounted for more than 10% of total sales for the year ended December 31, 2016.

With respect to accounts receivable concentration, Toshiba Corporation and SK hynix each accounted for more than 10% of total receivables as of December 29, 2018, and Samsung Electronics Co. Ltd., Micron Technology, Inc., and Intel Corporation each accounted for more than 10% of accounts receivable as of December 30, 2017.

## SUPPLEMENTAL FINANCIAL INFORMATION

### Selected Quarterly Financial Results (Unaudited)

The following table sets forth selected consolidated quarterly results of operations for the years ended December 29, 2018 and December 30, 2017 (in thousands, except per share amounts):

	Quarters Ended			
	December 29, 2018	September 29, 2018	June 30, 2018	March 31, 2018
Total net revenues	\$ 77,016	\$ 76,590	\$ 88,604	\$ 82,313
Gross profit	\$ 42,038	\$ 43,634	\$ 50,891	\$ 47,531
Income from operations	\$ 10,868	\$ 14,271	\$ 20,784	\$ 20,564
Net income	\$ 12,024	\$ 11,568	\$ 17,675	\$ 16,381
Net income per share:				
Basic	\$ 0.50	\$ 0.48	\$ 0.74	\$ 0.68
Diluted	\$ 0.49	\$ 0.47	\$ 0.72	\$ 0.67
Shares used in per share computations:				
Basic	24,131	24,059	23,953	24,063
Diluted	24,481	24,466	24,442	24,483

	Quarters Ended			
	December 30, 2017	September 30, 2017	July 1, 2017	April 1, 2017
Total net revenues	\$ 78,205	\$ 56,675	\$ 64,427	\$ 59,314
Gross profit	\$ 43,973	\$ 30,660	\$ 33,621	\$ 28,447
Income from operations	\$ 19,162	\$ 7,484	\$ 10,652	\$ 5,508
Net income <sup>(1)</sup>	\$ 10,798	\$ 5,764	\$ 8,288	\$ 5,352
Net income per share:				
Basic	\$ 0.43	\$ 0.23	\$ 0.33	\$ 0.21
Diluted	\$ 0.42	\$ 0.22	\$ 0.32	\$ 0.21
Shares used in per share computations:				
Basic	25,378	25,494	25,307	25,133
Diluted	25,819	25,932	25,906	25,833

<sup>(1)</sup> Our net income included a \$2.9 million additional tax expense from the remeasurement of deferred tax assets relating to the Tax Cuts and Jobs Act that was signed into law on December 22, 2017

## **ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE**

None.

### **ITEM 9A. CONTROLS AND PROCEDURES**

#### **Evaluation of Disclosure Controls and Procedures**

We maintain disclosure controls and procedures that are designed to ensure that information required to be disclosed in our reports that we file or submit under the Securities Exchange Act of 1934 (“Exchange Act”), as amended, is recorded, processed, summarized and reported within the time periods specified in the SEC’s rules and forms, and that such information is accumulated and communicated to management, including our Chief Executive Officer (“CEO”) and our Vice President, Finance (who is our Principal Financial Officer (“PFO”)), as appropriate, to allow timely decisions regarding required disclosure. Our management, with participation by our CEO and PFO, has evaluated the effectiveness of our disclosure controls and procedures as of December 29, 2018, the end of the period covered by this Annual Report on Form 10-K.

Based on the evaluation of our disclosure controls and procedures, our CEO and PFO have concluded that as of the end of the period covered by this report, our disclosure controls and procedures were effective as of such date.

#### **Report of Management on Internal Control over Financial Reporting**

Our management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act, as amended. Our internal control over financial reporting was designed to provide reasonable, not absolute, assurance regarding the reliability of our financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles.

Internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that in reasonable detail accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the company’s assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Under the supervision and with the participation of our management, including our CEO and PFO, we assessed the effectiveness of our internal control over financial reporting as of December 29, 2018. In making this assessment, we used the criteria established in Internal Control – Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (“COSO”).

Based on our assessment, which was conducted based on the COSO criteria, our management, including our CEO and PFO have concluded our internal control over financial reporting was effective, as of December 29, 2018.

We excluded 4D Technology Corporation (“4D”) from our assessment of internal controls over financial reporting as of December 29, 2018 because we acquired 4D in a purchase business combination on November 15, 2018. The total assets and total revenues of 4D represent 3% and less than 1% of the related consolidated financial statement amounts as of and for the year ended December 29, 2018.

The effectiveness of our internal control over financial reporting as of December 29, 2018, has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report which appears under Item 8.

#### **Changes in Internal Control over Financial Reporting**

There has been no change in our internal control over financial reporting that occurred during the fourth quarter ended December 29, 2018, that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

**ITEM 9B. OTHER INFORMATION**

None.

## PART III

### ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The information required by this Item is incorporated by reference to our Proxy Statement for our 2019 Annual Meeting of Stockholders (the "Proxy Statement") to be filed with the SEC not later than 120 days after the end of our fiscal year ended December 29, 2018, specifically:

- Information regarding our directors and any persons nominated to become a director, as well as with respect to some other required board matters, is set forth under Proposal 1 entitled "Election of Directors" and under "Corporate Governance."
- Information regarding our audit committee and our designated "audit committee financial expert" is set forth under the caption "Corporate Governance."
- Information on our code of business conduct and ethics for directors, officers and employees is set forth under the caption "Code of Ethics" under "Corporate Governance."
- Information regarding Section 16(a) beneficial ownership reporting compliance is set forth under the caption "Section 16(a) Beneficial Ownership Reporting Compliance."
- Information regarding procedures by which stockholders may recommend nominees to our board of directors is set forth under the caption "Nominating and Governance Committee" under "Corporate Governance."

Information regarding our executive officers is set forth at the end of Item I, Part 1 of this Annual Report on Form 10-K under the caption "Executive Officers of the Registrant."

### ITEM 11. EXECUTIVE COMPENSATION

Information regarding compensation of our named executive officers is set forth under the caption "Executive Compensation" in the Proxy Statement, which information is incorporated herein by reference.

Information regarding compensation of our directors is set forth under the caption "Compensation of Directors" in the Proxy Statement, which information is incorporated herein by reference.

Information regarding compensation committee interlocks is set forth under the caption "Compensation Committee Interlocks and Insider Participation" in the Proxy Statement, which information is incorporated herein by reference.

The Compensation Committee Report is set forth under the caption "Compensation Committee Report" in the Proxy Statement, which report is incorporated herein by reference.

**ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS**

Information regarding security ownership of certain beneficial owners, directors and executive officers is set forth under the caption "Security Ownership of Certain Beneficial Owners and Management" in the Proxy Statement, which information is incorporated herein by reference.

**Equity Compensation Plan Information**

The following table gives information about the common stock that may be issued under all our existing equity compensation plans as of December 29, 2018.

Plan category	Number of securities to be issued upon exercise of outstanding options, warrants and rights	Weighted-average exercise price of outstanding options	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in first column)
Equity compensation plans approved by security holders <sup>(1)</sup>	83,394	\$ 15.80	1,411,835
Equity plans not approved by security holders	—	—	—
<b>Total</b>	<b>83,394</b>	<b>\$ 15.80</b>	<b>1,411,835</b>

<sup>(1)</sup> Consists of shares issuable under the company's Accent Optical Technologies, Inc. Stock Incentive Plan, 2000 Employee Stock Option Plan, 2000 Director Stock Option Plan, 2003 Employee Stock Purchase Plan and 2005 Equity Incentive Plan ("ESPP"). As of December 29, 2018, a total of 443,694 shares of our common stock remained available for issuance under the ESPP, and up to a maximum of 66,658 shares of our common stock may be purchased in the current purchase period. The shares issuable pursuant to our ESPP are not included in the number of shares to be issued pursuant to rights outstanding and the weighted-average exercise price of such rights as of December 29, 2018, as those numbers are not known. The weighted-average exercise price does not take into account 881,166 shares issuable upon vesting of outstanding awards of restricted stock units and performance-based shares, which have no exercise price.

**ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS AND DIRECTOR INDEPENDENCE**

Information regarding certain relationships and related transactions is set forth under the caption "Related Person Transaction Policy" under the caption "Corporate Governance" in the Proxy Statement, which information is incorporated herein by reference.

Information regarding director independence is set forth under the caption "Board of Directors Meetings and Committees" under "Corporate Governance" in the Proxy Statement, which information is incorporated herein by reference.

**ITEM 14. PRINCIPAL ACCOUNTING FEES AND SERVICES**

Information regarding principal auditor fees and services is set forth under the proposal entitled "Ratification of Appointment of Independent Registered Public Accounting Firm" in the Proxy Statement, which information is incorporated herein by reference.

## PART IV

### ITEM 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES

(a) The following documents are filed as part of this report on Form 10-K:

(1) **Consolidated Financial Statements.**

See Index to Consolidated Financial Statements in Item 8 on page 34 of this Annual Report on Form 10-K.

(2) **Consolidated Financial Statement Schedule.**

The following consolidated financial statement schedule of Nanometrics Incorporated is filed as part of this Annual Report on Form 10-K and should be read in conjunction with the Consolidated Financial Statements:

II — Valuation and Qualifying Accounts as of and for the years ended December 29, 2018, December 30, 2017 and December 31, 2016

Our allowance for doubtful accounts receivable consists of the following (in thousands):

Year Ended	Balance at beginning of period	Additions to Allowance	Charges Utilized/Write-offs	Balance at end of period
December 29, 2018	\$ 126	\$ 129	\$ (85)	\$ 170
December 30, 2017	\$ 73	\$ 78	\$ (25)	\$ 126
December 31, 2016	\$ 150	\$ —	\$ (77)	\$ 73

Our valuation allowance for deferred tax assets consists of the following (in thousands):

Year Ended	Balance at beginning of period	Additions to Allowance	Charges Utilized/Write-offs	Balance at end of period
December 29, 2018	\$ 13,702	\$ 470	\$ (3,206)	\$ 10,966
December 30, 2017	\$ 10,980	\$ 2,984	\$ (262)	\$ 13,702
December 31, 2016	\$ 36,786	\$ 1,643	\$ (27,449)	\$ 10,980

Schedules not listed above have been omitted because they are not applicable or are not required or the information required to be set forth therein is included in the Consolidated Financial Statements or notes thereto.

(3) **Exhibits.**

See Exhibit Index under part (b) below.

## (b) Exhibit Index

Exhibit No.	Exhibit Description	Form	File Number	Date of First Filing	Exhibit Number/Appendix Reference
<b>3.(i)</b>	<b>Certificate of Incorporation</b>				
3.1	Certificate of Incorporation of the Registrant	8-K	000-13470	10/5/2006	3.1
<b>3.(ii)</b>	<b>Bylaws</b>				
3.2	Bylaws of the Registrant	8-K	000-13470	4/12/2012	3.1
<b>4</b>	<b>Instruments Defining the Rights of Security Holders, Including Indentures</b>				
4.1	Form of Common Stock Certificate	10-Q	000-13470	11/9/2006	4.1
<b>10</b>	<b>Material Contracts</b>				
	<b>Management Contracts, Compensatory Plans, Contracts or Arrangements</b>				
10.1	Registrant's 2000 Employee Stock Option Plan and form of Stock Option Agreement	S-8	333-40866	7/6/2000	4.2
10.2	Form of Subscription Agreement Under the Registrant's Amended and Restated 2003 Employee Stock Purchase Plan	S-8	333-40866	9/3/2003	4.1
10.3	Registrant's 2000 Director Stock Option Plan and form of Stock Option Agreement	10-K	000-13470	3/13/2008	10.2
10.4	Registrant's Amended and Restated 2005 Equity Incentive Plan forms of Stock Option and Restricted Stock Unit Agreements	10-K	000-13470	3/13/2008	10.8
10.5	Form of Indemnification Agreement between the Registrant and each of its directors and executive officers	8-K	000-13470	2/20/2013	10.1
10.6	Form of Performance-Based Restricted Stock Unit Agreement	8-K	000-13470	3/24/2015	99.1
10.7	General Severance Benefits and Change in Control Severance Benefits Agreement between Registrant and Timothy J. Stultz, Ph.D., dated May 19, 2015	8-K	000-13470	5/22/2015	10.1
10.8	General Severance Benefits and Change in Control Severance Benefits Agreement between Registrant and Kevin Heidrich, dated May 19, 2015	8-K	000-13470	5/22/2015	10.4
10.9	General Severance Benefits and Change in Control Severance Benefits Agreement between Registrant and Janet Taylor, dated August 27, 2015	10-Q	000-13470	10/30/2015	10.1
10.10	Registrant's Amended and Restated 2003 Employee Stock Purchase Plan	DEF 14A	000-13470	4/4/2016	App 1
10.11	Compensation Arrangement with Non-Employee Directors	10-Q	000-13470	7/28/2016	10.3
10.12	General Severance Benefits and Change in Control Severance Benefits Agreement between Registrant and Rollin Kocher, dated November 10, 2016	10-K	000-13470	3/3/2017	10.22
10.13	Registrant's Amended and Restated 2005 Equity Incentive Plan	DEF 14A	000-13470	4/4/2017	App B
10.14	Nanometrics Incorporated 2017 Executive Performance Bonus Plan	DEF 14A	000-13470	4/4/2017	App A
10.15	Transition and Consulting Agreement, dated as of August 9, 2017, between Nanometrics Incorporated and Timothy J. Stultz.	8-K	000-13470	8/11/2017	10.1
10.16	Employment Agreement between the Registrant and Pierre-Yves Lesaichere, dated November 27, 2017	10-K	000-13470	2/26/2018	10.20
10.17	Separation Agreement between Registrant and S. Mark Borowicz, dated January 8, 2018	10-K	000-13470	2/26/2018	10.21
10.18	Independent Contractor Agreement between Registrant and S. Mark Borowicz, dated January 8, 2018	10-K	000-13470	2/26/2018	10.22
10.19	Retention Bonus Agreement between Registrant and Greg Swyt, dated December 18, 2017	10-K	000-13470	2/26/2018	10.23
10.20	Relocation Agreement between Registrant and Rollin Kocher, dated December 16, 2016	10-K	000-13470	2/26/2018	10.24
10.21	Compensation Arrangements with Named Executive Officers	8-K	000-13470	3/1/2018	Item 5.02
10.22	Separation Agreement between Registrant and Jonathan Chou, dated June 25, 2018	10-Q	000-13470	8/2/2018	10.1
10.23	Retention Bonus Agreement between Registrant and Greg Swyt, dated June 25, 2018	8-K	000-13470	11/26/2018	10.1
	<b>All Other Material Contracts</b>				
10.24	Stock Purchase Agreement by and among Registrant, 4D Technology Corporation and Dr. James Wyant, James Millerd and Neal Brock, dated October 26, 2018	-	-	-	-
<b>21</b>	<b>Subsidiaries</b>				
21.1	Subsidiaries of the Registrant	-	-	-	-
<b>23</b>	<b>Consents of Experts and Counsel</b>				
23.1	Consent of PricewaterhouseCoopers LLP Independent Registered Public Accounting Firm	-	-	-	-
<b>31</b>	<b>Rule 13a-14(a)/15d-14(a) Certifications</b>				
31.1	Certification of Pierre-Yves Lesaichere, principal executive officer of the Registrant, pursuant to Section 302 of the Sarbanes-Oxley Act of 2002	-	-	-	-
31.2	Certification of Greg Swyt, principal financial officer of the Registrant, pursuant to Section 302 of the Sarbanes-Oxley Act of 2002	-	-	-	-
<b>32</b>	<b>Section 1350 Certifications</b>				
32.1*	Certification of Pierre-Yves Lesaichere, principal executive officer of the Registrant, and Greg Swyt, principal financial officer of the Registrant pursuant to Section 906 of the Sarbanes-Oxley Act of 2002. This Certification accompanies this report and shall, not, except to the extent required by the Sarbanes-Oxley Act of 2002, be deemed filed for purposes of §18 of the Securities Exchange Act of 1934, as amended.	-	-	-	-
100.INS	XBRL Instance Document				
100.SCH	XBRL Taxonomy Extension Schema Document				
100.CAL	XBRL Taxonomy Extension Calculation Linkbase Document				
100.DEF	XBRL Taxonomy Extension Definition Linkbase Document				
100.LAB	XBRL Taxonomy Extension Label Linkbase Document				
100.PRE	XBRL Taxonomy Extension Presentation Linkbase Document				

Documents previously filed in the table above are incorporated by reference.

**ITEM 16. FORM 10-K SUMMARY**

None.

## SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

Dated: February 25, 2019

### NANOMETRICS INCORPORATED

By: /S/ PIERRE-YVES LESAICHERRE  
Pierre-Yves Lesaicherre  
President and Chief Executive Officer  
(Duly Authorized Officer and Principal Executive Officer)

Pursuant to the requirements of the Securities Exchange Act of 1934, this Report on Form 10-K has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/S/ PIERRE-YVES LESAICHERRE</u> Pierre-Yves Lesaicherre	President, Chief Executive Officer and Director (Principal Executive Officer)	February 25, 2019
<u>/S/ GREG SWYT</u> Greg Swyt	Vice President, Finance (Principal Financial Officer and Principal Accounting Officer)	February 25, 2019
<u>/S/ BRUCE C. RHINE</u> Bruce C. Rhine	Chairman of the Board of Directors	February 25, 2019
<u>/S/ J. THOMAS BENTLEY</u> J. Thomas Bentley	Director	February 25, 2019
<u>/S/ EDWARD J. BROWN JR.</u> Edward J. Brown Jr.	Director	February 25, 2019
<u>/S/ ROBERT G. DEUSTER</u> Robert G. Deuster	Director	February 25, 2019
<u>/S/ CHRISTOPHER A. SEAMS</u> Christopher A. Seams	Director	February 25, 2019
<u>/S/ TIMOTHY J. STULTZ</u> Timothy J. Stultz	Director	February 25, 2019
<u>/S/ CHRISTINE A. TSINGOS</u> Christine A. Tsingos	Director	February 25, 2019

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