

**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 31, 2017

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 1-12031



**UNIVERSAL DISPLAY CORPORATION**

(Exact name of registrant as specified in its charter)

Pennsylvania

(State or other jurisdiction of  
incorporation or organization)

375 Phillips Boulevard, Ewing, New Jersey

(Address of principal executive offices)

23-2372688

(I.R.S. Employer  
Identification No.)

08618

(Zip Code)

Registrant's telephone number, including area code: (609) 671-0980

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

Title of Each Class

Common Stock, \$0.01 par value

Name of Each Exchange on Which Registered

The NASDAQ Stock Market LLC

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 and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted 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 and post 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 an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer

Non-accelerated filer  (Do not check if a smaller reporting company)

Accelerated filer

Smaller reporting company

Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. Yes  No

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

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the registrant computed by reference to the closing sale price of the registrant's common stock on the NASDAQ Global Market as of June 30, 2017, was \$4,523,257,539. Solely for purposes of this calculation, all executive officers and directors of the registrant and all beneficial owners of more than 10% of the registrant's common stock (and their affiliates) were considered affiliates.

As of February 20, 2018, the registrant had outstanding 47,050,527 shares of common stock.

**DOCUMENTS INCORPORATED BY REFERENCE**

Portions of the registrant's Proxy Statement for the 2018 Annual Meeting of Shareholders, which is to be filed with the Securities and Exchange Commission no later than April 30, 2018, are incorporated by reference into Part III of this report.

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**CAUTIONARY STATEMENT  
CONCERNING FORWARD-LOOKING STATEMENTS**

This report and the documents incorporated by reference in this report contain some “forward-looking statements” within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934. Forward-looking statements concern possible or assumed future events, results and business outcomes. These statements often include words such as “believe,” “expect,” “anticipate,” “intend,” “plan,” “estimate,” “seek,” “will,” “may,” “project” or similar expressions. These statements are based on assumptions that we have made in light of our experience in the industry, as well as our perceptions of historical trends, current conditions, expected future developments and other factors we believe are appropriate under the circumstances.

As you read and consider this report, you should not place undue reliance on any forward-looking statements. You should understand that these statements involve substantial risk and uncertainty and are not guarantees of future performance or results. They depend on many factors that are discussed further under Item 1A (Risk Factors) below, including:

- successful commercialization by organic light emitting diode (OLED) manufacturers of products incorporating our OLED technologies and materials and their continued willingness to utilize our OLED technologies and materials;
- the adequacy of protections afforded to us by the patents that we own or license and the cost to us of maintaining, enforcing and defending those patents;
- our ability to obtain, expand and maintain patent protection in the future, and to protect our non-patented intellectual property;
- our exposure to and ability to defend third-party claims and challenges to our patents and other intellectual property rights;
- our ability to maintain and improve our competitive position following the expiration of certain of our fundamental phosphorescent organic light-emitting diode (PHOLED) patents;
- our ability to form and continue strategic relationships with manufacturers of OLED products;
- the payments that we expect to receive under our existing contracts with OLED manufacturers and the terms of contracts that we expect to enter into with OLED manufacturers in the future;
- the potential commercial applications of and future demand for our OLED technologies and materials, and of OLED products in general;
- our customers' development and use of more efficient manufacturing processes and material processing protocols that result in the more efficient utilization of our materials, and therefore reduce their requirements for our materials;
- the comparative advantages and disadvantages of our OLED technologies and materials versus competing technologies and materials currently in the market;
- the nature and potential advantages of any competing technologies that may be developed in the future;
- the outcomes of our ongoing and future research and development activities, and those of others, relating to OLED technologies and materials;
- our ability to access future OLED technology developments of our academic and commercial research partners;
- our ability to acquire and supply OLED materials at cost competitive pricing;
- our ability to compete against third parties with resources greater than ours;
- our future capital requirements and our ability to obtain additional financing if and when needed;
- our quarterly cash dividend policy;
- our future OLED technology licensing and OLED material revenues and results of operations, including supply and demand for our OLED materials; and
- general economic and market conditions.

Changes or developments in any of these areas could affect our financial results or results of operations and could cause actual results to differ materially from those contemplated by any forward-looking statements.

All forward-looking statements speak only as of the date of this report or the documents incorporated by reference, as the case may be. We do not undertake any duty to update, correct, modify, or supplement any of these forward-looking statements to reflect events or circumstances after the date of this report or to reflect the occurrence of unanticipated events.

**ITEM 1. BUSINESS**

**Our Company**

We are a leader in the research, development and commercialization of organic light emitting diode, or OLED, technologies and materials for use in display and solid-state lighting applications. OLEDs are thin, lightweight and power-efficient solid-state devices that emit light that can be manufactured on both flexible and rigid substrates, making them highly suitable for use in full-color displays and as lighting products. OLED displays are capturing a growing share of the flat panel display market, especially in the mobile phone, television, virtual reality and automotive markets. We believe that this is because OLEDs offer potential advantages over competing display technologies with respect to power efficiency, contrast ratio, viewing angle, video response time, form factor and manufacturing cost. We also believe that OLED lighting products have the potential to replace many existing light sources in the future because of their high power efficiency, excellent color rendering index, low operating temperature and novel form factor. Our technology leadership and intellectual property position should enable us to share in the revenues from OLED displays and lighting products as they continue to be more broadly adopted.

Our primary business strategy is to (1) further develop and license our proprietary OLED technologies to manufacturers of products for display applications, such as mobile phones, wearable electronic devices, tablets, notebook computers and televisions, and specialty and general lighting products; and (2) develop new OLED materials and sell the materials to those product manufacturers. We have established a significant portfolio of proprietary OLED technologies and materials, primarily through our internal research and development efforts and acquisitions of patents and patent applications, as well as maintaining our relationships with world-class universities and other partners such as Princeton University (Princeton), the University of Southern California (USC), the University of Michigan (Michigan) and PPG Industries, Inc. (PPG Industries). We currently own, exclusively license or have the sole right to sublicense more than 4,500 patents issued and pending worldwide.

We sell our proprietary OLED materials to customers for evaluation and use in commercial OLED products. We also enter into agreements with manufacturers of OLED display and lighting products under which we grant them licenses to practice under our patents and to use our proprietary know-how. At the same time, we work with these and other companies who are evaluating our OLED technologies and materials for possible use in commercial OLED display and lighting products.

**Market Overview**

***The Display Panel Market***

Thin, energy efficient display panels that can be manufactured on glass or flexible substrates are essential for a wide variety of portable consumer electronics products, such as mobile phones, VR headsets, digital cameras, wearables, tablets and notebook computers. Due to their narrow profile and light weight, flat panel displays have also become the display of choice for larger product applications, such as computer monitors and televisions.

Liquid crystal displays, or LCDs, continue to dominate the flat panel display market. However, we believe that OLED displays are an attractive alternative to LCDs because they offer a number of potential advantages, including:

- higher power efficiencies, thereby reducing energy consumption;
- a thinner profile and lighter weight;
- higher contrast ratios, leading to sharper picture images and graphics;
- wider viewing angles;
- deposition on non-rigid substrates which enables conformable and flexible displays;
- faster response times for video; and
- lower cost manufacturing methods and materials.

Based on these characteristics, product manufacturers have adopted small-area OLED displays for use in a wide variety of electronic devices, such as smartphones, wearables and tablets. Manufacturers are increasingly commercializing large area OLED displays for use in televisions. We believe that if these efforts are successful, they could result in sizeable markets for OLED displays.

In addition, due to the inherent transparency of organic materials and through the use of transparent electrode technology, OLEDs eventually may enable the production of transparent displays for use in products such as automotive windshields and windows with embedded displays. Organic materials also make technically possible the development of flexible displays for use in an entirely

new set of product applications. Such applications include display devices that can be conformed to certain shapes for wearable, industrial and ruggedized applications.

### ***The Solid-State Lighting Market***

Traditional incandescent light bulbs are inefficient because they convert only about 5% of the energy they consume into visible light, with the rest emerging as heat. Fluorescent lamps use excited gases, or plasmas, to achieve a higher energy conversion efficiency of about 20%. However, the color rendering index, or CRI, of most fluorescent lamps – in other words, the quality of their color compared to an ideal light source – is inferior to that of an incandescent bulb. Fluorescent lamps also pose environmental concerns because they typically contain mercury.

Solid-state lighting relies on the direct conversion of electricity to visible light using semiconductor materials. By avoiding the heat and plasma-producing processes of incandescent bulbs and fluorescent lamps, respectively, solid-state lighting products can have substantially higher energy conversion efficiencies.

There are currently two basic types of solid-state lighting devices: inorganic light emitting diodes, or LEDs, and OLEDs. Current LEDs are very small in size (about one square millimeter) and are extremely bright. Having been developed about 25 years before OLEDs, LEDs are already employed in a variety of lighting products, such as traffic lights, billboards, replacements for incandescent lighting, backlights for smartphones, computer monitors and televisions, and as border or accent lighting. However, the high operating temperatures and intense brightness of LEDs may make them less desirable for many general illumination and diffuse lighting applications.

OLEDs, on the other hand, are larger in size and can be viewed directly, without using diffusers that are required to temper the intense brightness of LEDs. OLEDs can be added to any suitable surface, including glass, plastic or metal foil, and could be cost-effective to manufacture in high volume. Given these characteristics, product manufacturers are working and have introduced limited product applications of OLEDs for diffuse specialty lighting applications and ultimately general illumination. If these efforts are successful, we believe that OLED lighting products could begin to be used for applications currently addressed by incandescent bulbs and fluorescent lamps, as well as for new applications that take advantage of the OLED form factor. In particular, the ability of OLED technology to produce uniform illumination over arbitrary shapes is making OLED lighting very attractive to the automobile industry.

### **Our Competitive Strengths**

We believe our position as one of the leading technology developers in the OLED industry is the direct result of our technological innovation. We have built an extensive intellectual property portfolio around our OLED technologies and materials, and are working diligently to enable our manufacturing partners to adopt our OLED technologies and materials for expanding commercial usage. Our key competitive strengths include:

#### ***Technology Leadership***

We are a recognized technology leader in the OLED industry. Along with our research partners, we have pioneered the development of our UniversalPHOLED® phosphorescent OLED technologies, which can be used to produce OLEDs that are up to four times more efficient than fluorescent OLEDs and significantly more efficient than current LCDs, which are illuminated using backlights. We believe that our phosphorescent OLED technologies and materials are well-suited for industry usage in the commercial production of OLED displays and lighting products. Through our relationships with companies such as PPG Industries and our academic partners, we have also developed other important OLED technologies, as well as novel OLED materials that we believe will facilitate the adoption of our various OLED technologies by product manufacturers.

#### ***Broad Portfolio of Intellectual Property***

We believe that our extensive portfolio of patents, trade secrets and non-patented know-how provides us with a competitive advantage in the OLED industry. Through our internal development efforts, acquisitions, and our relationships with world-class partners such as Princeton, USC, Michigan and PPG Industries, we own, exclusively license or have the sole right to sublicense more than 4,500 patents issued and pending worldwide. In 2011, we purchased 74 issued U.S. patents from Motorola Solutions, Inc. (f/k/a Motorola, Inc.) (Motorola), together with foreign counterparts in various countries, which patents we had previously licensed from Motorola, and in 2012, we acquired the entire worldwide patent portfolio of more than 1,200 OLED patents and patent applications of Fujifilm Corporation (Fujifilm). In 2016, we acquired more than 500 issued and then pending patents in the area of phosphorescent materials and technologies from BASF SE (BASF). We also continue to accumulate valuable non-patented technical know-how relating to our OLED technologies and materials.

### ***Leading Supplier of UniversalPHOLED® Emitter Materials***

We are the leading supplier of phosphorescent emitter materials to OLED product manufacturers. The emitter material, which is designed to efficiently convert electrical energy to a desired wavelength of light, is the key component in an OLED device. We develop, supply, and offer for sale proprietary phosphorescent emitter materials. PPG Industries currently manufactures our materials for us, which we then qualify and resell to OLED product manufacturers. We record revenues based on our sales of these materials to OLED product manufacturers. Our sales allow us to maintain close technical and business relationships with the OLED product manufacturers purchasing our proprietary materials, which in turn further supports our technology licensing business.

### ***Established Material Supply Relationships***

We have established relationships with well-known manufacturers that are using, or are evaluating for use, our OLED materials in commercial products. In 2017, our customers for such materials included Samsung Display Co., Ltd. (SDC), LG Display Co., Ltd. (LG Display), AU Optronics Corporation (AU Optronics), BOE Technology Group Co., Ltd. (BOE), Konica Minolta Holdings Inc. (Konica Minolta), Tianma Micro-electronics Co., Ltd. (Tianma), Tohoku Pioneer Corporation, Innolux Corporation (Innolux) (formerly Chimei Innolux Corporation), Kaneka Corporation (Kaneka), and EverDisplay Optronics (Shanghai) Limited, among others.

### ***Licensing Our OLED Technologies and Patents***

We license our proprietary OLED technologies and patents to product manufacturers on a non-exclusive basis. We do not directly manufacture or sell OLED display or lighting products. Instead, we enter into licensing arrangements with OLED product manufacturers who pay us license fees and/or royalties based on their sales of licensed products. We believe this business model allows us to concentrate on our core strengths of technology development and innovation, while at the same time providing significant operating leverage. We also believe that this approach may reduce potential competitive conflicts between our customers and us.

### ***Licenses with Key Product Manufacturers***

We have licensed our OLED technologies and patents to manufacturers for use in commercial products. In 2017, we had license agreements for the manufacture and sale of certain display products with SDC (as successor to Samsung Mobile Display Co. Ltd.), LG Display, BOE, and Tianma. We also have license agreements with Konica Minolta, Sumitomo Chemical Company, Ltd. (Sumitomo), Lumiotec, Inc. (Lumiotec), Pioneer Corporation (Pioneer), Kaneka and OLEDWorks L.L.C. (OLEDWorks) for the manufacture of OLED lighting products. Additionally, we have a license agreement with DuPont Displays for its manufacture of solution-processed OLED display products using proprietary OLED materials obtained through us.

### ***Complementary UniversalPHOLED® Host Material Business***

We develop, supply and offer for sale certain of our proprietary phosphorescent host materials to OLED product manufacturers. In one design, the emitter material is disbursed into a host material, with the resulting mixture consisting of predominantly host material. We believe that host material sales can be complementary to our phosphorescent emitter material sales business; however, our OLED product manufacturing customers are not required to purchase our host materials in order to utilize our phosphorescent emitter materials. In addition, the host material business is more competitive than the phosphorescent emitter material sales business. This means our long-term prospects for host material sales are uncertain.

### ***Experienced Management and Scientific Advisory Team***

Our management team has significant experience in developing business models focused on licensing disruptive technologies in high growth industries. In addition, our management team has assembled a Scientific Advisory Board that includes some of the leading researchers in the OLED industry, such as Professor Stephen R. Forrest of Michigan (formerly of Princeton) and Professor Mark E. Thompson of USC.

## **Our Business Strategy**

Our current business strategy is to promote and continue to expand our portfolio of OLED technologies and materials for widespread use in OLED displays and lighting products. We generate revenues primarily by selling our proprietary OLED materials and licensing our OLED technologies to display and lighting product manufacturers. We are presently focused on the following steps to implement our business strategy:

### ***Target Leading Product Manufacturers***

We are targeting leading manufacturers of displays and lighting products as potential commercial licensees of our OLED technologies and purchasers of our OLED materials. We also supply our proprietary OLED materials to manufacturers of OLED displays and lighting products for evaluation and for use in product development and for pre-commercial activities, and we provide technical assistance and support to these manufacturers. We concentrate on working closely with OLED product manufacturers because we believe that the successful incorporation of our technologies and materials into commercial products is critical to their widespread adoption.

### ***Enhance Our Existing Portfolio of PHOLED Technologies and Materials***

We believe that a strong portfolio of proprietary OLED technologies and materials for both displays and lighting products is critical to our success. Consequently, we are continually seeking to expand this portfolio through our internal development efforts, our collaborative relationships with academic and other research partners, and other strategic opportunities. One of our primary goals is to develop new and improved phosphorescent OLED (PHOLED) technologies and materials with increased efficiencies, enhanced color gamut and extended lifetimes, which are compatible with different manufacturing methods, so that they can be used by various manufacturers in a broad array of OLED display and lighting products.

### ***Develop Next-Generation Organic Technologies***

We continue to conduct research and development activities relating to next-generation OLED technologies for both displays and lighting products. We also are funding research by our academic partners on the use of organic thin-film technology in other applications. Our focus on next-generation technologies is designed to enable us to maintain our position as a leading provider of OLED and other organic electronics technologies and materials as new markets emerge.

## **Business and Geographic Markets**

We derive revenue from the following:

- sales of OLED materials for evaluation, development and commercial manufacturing;
- intellectual property and technology licensing; and
- contract research services in the areas of organic and organometallic materials synthesis research, development and commercialization;
- technology development and support, including government contract work and support provided to third parties for commercialization of their OLED products.

Most manufacturers of displays and lighting products who are or might potentially be interested in our OLED technologies and materials are currently located outside of the United States, particularly in the Asia-Pacific region. To provide on-the-ground support to these manufacturers, we have established wholly-owned subsidiaries in Ireland, Korea, Japan, China and Hong Kong, as well as a representative office in Taiwan. Our subsidiary in Ireland is responsible for all material sales world-wide (excluding the United States) and for licensing and managing intellectual property and undertaking certain other business transactions in all non-U.S. territories.

We receive a majority of our revenues from customers that are domiciled outside of the United States, and our business is heavily dependent on our relationships with these customers. In particular, one of our key customers located in the Asia-Pacific region, SDC, accounted for 62% of our consolidated revenues for 2017. Substantially all revenue derived from our customers is denominated in U.S. dollars.

For more information on our revenues, costs and expenses associated with our business, as well as a breakdown of revenues from North America and foreign sources, please see our Consolidated Financial Statements and the notes thereto, as well as “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” included elsewhere in this report.

## **Our Technology and its Relation to OLED Technology and Structure**

OLED devices are solid-state semiconductor devices made from thin films of organic material that emit light of various wavelengths when electricity is selectively applied to the emissive layer of the device. OLED devices are typically referred to as incorporating an “OLED stack.” OLED stacks vary in specific structure but those commonly used today may include a cathode, an electron injection layer, an electron transport layer, an emissive layer, a hole transport layer, a hole injection layer and an anode, all of which are placed on a substrate which may be made of a number of different materials, including glass, plastic and metal.

Our technology and materials are most commonly utilized in the emissive layer; the materials in the emissive layer are the light -generating component of the OLED stack. Many of our key technologies relate primarily to phosphorescent emitter materials, which we believe are more energy efficient than fluorescent emitter materials that can also be used to generate light within the emissive layer of the OLED device. We began selling emitter materials commercially in 2003. A manufacturer will use a small amount of emitter material for each device through a process called “doping” into a host material. The emitter material(s) and the host material(s) together form an emissive layer system. Depending on the nature of the OLED device, the emissive materials and emissive layer system may be designed to emit different colors. We have commercially produced and sold phosphorescent emitter materials that produce red, yellow, green and light-blue light, which are combined in various ways for the display and lighting markets.

Our current materials business, conducted outside the United States by our Irish subsidiary, is focused primarily on the delivery of such emissive materials. We have also developed host materials for the emissive layer and began selling them commercially in 2011. In addition to our materials, which are protected by patents covering various molecular structures, we also have fundamental and important patents that cover various aspects of the OLED device, including the use of phosphorescent emission in an OLED device, flexible OLEDs, lighting, encapsulation, and methods of manufacturing OLEDs, including through the use of our proprietary materials in OLED devices. These patents are important to our licensing business because they enable us to provide our business partners important OLED related technologies.

### **Our Phosphorescent OLED Technologies**

Phosphorescent OLEDs utilize specialized materials and device structures that allow OLEDs to emit light through a process known as phosphorescence. Traditional fluorescent OLEDs emit light through an inherently less efficient process. Theory and experiment show that phosphorescent OLEDs exhibit device efficiencies up to four times higher than those exhibited by fluorescent OLEDs. Phosphorescence substantially reduces the power requirements of an OLED and is useful in displays for hand-held devices, such as smartphones, where battery power is often a limiting factor.

Phosphorescence is also important for large-area displays such as televisions, where higher device efficiency and lower heat generation may enable longer product lifetimes and increased energy efficiency.

We have a strong intellectual property portfolio surrounding our existing PHOLED technologies and materials for both displays and lighting products which we market under the UniversalPHOLED® brand. We devote a substantial portion of our efforts to developing new and improved proprietary PHOLED materials and device architectures for red, green, yellow, blue and white OLED devices. In 2017, we continued our commercial supply relationships with companies such as SDC, LG Display and Tianma to use such materials to manufacture OLED displays. In addition, we continued to work closely with customers evaluating and qualifying our proprietary PHOLED materials for commercial usage in both displays and lighting products, and with other material suppliers to match our PHOLED emitters with their phosphorescent hosts and other OLED materials.

### **Our Additional Proprietary OLED Technologies**

Our intellectual property, research, development and commercialization efforts also encompass a number of other OLED device and manufacturing technologies, including the following:

#### ***FOLED™ Flexible OLEDs***

We are working on a number of technologies required for the fabrication of OLEDs on flexible substrates. Most OLED and other flat panel displays are built on rigid substrates such as glass. In contrast, FOLEDs are OLEDs built on non-rigid substrates such as plastic or metal foil. This has the potential to enhance durability and enable conformation to certain shapes or repeated bending or flexing. Eventually, FOLEDs may be capable of being rolled into a cylinder, similar to a window shade. These features create the possibility of new display product applications that do not exist commercially today, such as a portable, roll-up Internet connectivity and communications device as well as enhance the usefulness of such devices in ruggedized, industrial and wearable computing systems. One of our customers, LG Display, recently demonstrated a 65-inch rollable display at the 2018 CES (Consumer Electronics Show) in Las Vegas. Manufacturers also may be able to produce FOLEDs using more efficient continuous, or roll-to-roll, processing methods. We currently are conducting research and development on FOLED technologies internally.

#### ***Thin-Film Encapsulation***

We have developed proprietary, patented encapsulation technology for the packaging of flexible OLEDs and other thin-film devices, as well as for use as a barrier film for plastic substrates. Addressing a major roadblock to the successful commercialization of flexible OLEDs, our hybrid, multi-layer approach provides barrier performance useful for OLEDs using a potentially cost-effective process. In addition to accelerating the commercial viability of flexible OLEDs, our thin-film encapsulation technology has the potential to provide benefits for a variety of other flexible thin-film devices, including photovoltaics and thin-film batteries.

### ***UniversalP<sup>2</sup> OLED® Printable Phosphorescent OLEDs***

The standard approach for manufacturing a small molecule OLED, including a PHOLED, is based on a vacuum thermal evaporation, or VTE, process. With a VTE process, the thin layers of organic material in an OLED are deposited in a high-vacuum environment. An alternate approach for manufacturing a small molecule OLED involves solution processing of the various organic materials in an OLED using techniques such as spin coating or inkjet printing onto the substrate. Solution-processing methods, and inkjet printing in particular, have the potential to be scalable to large area displays.

### ***OVJP® Organic Vapor Jet Printing***

OLEDs could be manufactured using other processes as well, including OVJP. As a direct printing technique, OVJP technology has the potential to offer high deposition rates for large area OLEDs. In addition, OVJP technology reduces OLED material waste associated with use of a shadow mask (*i.e.*, the waste of material that deposits on the shadow mask itself when fabricating an OLED). By comparison to inkjet printing, an OVJP process does not use liquid solvents and therefore the OLED materials utilized are not limited by their viscosity or solvent solubility. OVJP also avoids generation of solvent wastes and eliminates the additional step of removing residual solvent from the OLED device. We have installed a prototype OVJP tool at our Ewing, New Jersey facility, and we continue to collaborate on OVJP technology development with Professor Forrest of Michigan.

### ***OVPD® Organic Vapor Phase Deposition***

Another approach for manufacturing a small molecule OLED is based on OVPD. The OVPD process utilizes a carrier gas, such as nitrogen, in a hot walled reactor in a low pressure environment to deposit the layers of organic material in an OLED. The OVPD process may offer advantages over the VTE process or solution processing methods through more efficient materials utilization and enhanced deposition control. We have licensed Aixtron AG, a leading manufacturer of metal-organic chemical vapor deposition equipment, to develop and qualify equipment for the fabrication of OLED displays utilizing the OVPD process.

### ***TOLED Transparent OLEDs***

We have developed a technology for the fabrication of OLEDs that have transparent cathodes. Conventional OLEDs use a reflective metal cathode and a transparent anode. In contrast, TOLEDs use a transparent cathode and either a transparent, reflective or opaque metal anode. TOLEDs utilizing transparent cathodes and reflective metal anodes are known as “top-emission” OLEDs. In a “top-emission” AMOLED, light is emitted without having to travel through much of the device electronics where a significant portion of the usable light is lost. This results in OLED displays having image qualities and lifetimes superior to those of conventional AMOLEDs. TOLEDs utilizing transparent cathodes and transparent anodes may also be useful in novel flat panel display applications requiring semi-transparency or transparency, such as graphical displays in automotive windshields and signage.

## **Our Strategic Relationships with Product Manufacturers**

We have established early-stage evaluation programs, development and pre-commercial programs, and commercial arrangements with a substantial number of manufacturers or potential manufacturers of OLED display and lighting products. Many of these relationships are directed towards tailoring our proprietary OLED technologies and materials for use by individual manufacturers. Our ultimate objective is to license our OLED technologies and sell our OLED materials to these manufacturers for their commercial production of OLED products.

### ***Relationships with OLED Display Manufacturers***

We license our OLED technologies and patents to display manufacturers for use in commercial products, and supply our proprietary OLED materials to these manufacturers for both commercial use and evaluative purposes. We have been collaborating with some of these display manufacturers for many years.

We have been working with SDC and providing our PHOLED materials to SDC for evaluation since 2001. Under the terms of a 2011 patent license agreement, we licensed our patents and technologies to SDC for its manufacture and sale of AMOLED display products. Under the terms of a 2011 supplemental purchase agreement, we supplied our proprietary PHOLED materials to SDC for its use in manufacturing licensed products. We also continue to supply SDC with our proprietary UniversalPHOLED materials for use in its development efforts under a 2001 joint development agreement.

The 2011 license and purchase agreements with SDC expired on December 31, 2017, and on February 13, 2018, we entered into a new patent license agreement and supplemental purchase agreement, with an effective date of January 1, 2018. These 2018 agreements extend for a five-year term and provide SDC with an option to extend the agreements for two additional years. Under the 2018 license agreement, SDC has a non-exclusive license to make and sell certain OLED displays under our patent portfolio, and pays us license fees. The 2018 supplemental purchase agreement provides for certain minimum annual purchase obligations of

phosphorescent emitter material from us for use in the manufacture of licensed products. SDC is currently the largest manufacturer of AMOLED displays for handset and other personal electronic devices.

We have been working with LG Display or its affiliates for over 15 years. Under the terms of an OLED commercial supply agreement which was effective as of January 1, 2015, we continued to supply our proprietary PHOLED materials for use in licensed AMOLED display products. Under a concurrent 2015 OLED patent license agreement, LG Display has a non-exclusive, royalty bearing portfolio license to make and sell OLED displays under the Company's patent portfolio. The license agreement calls for license fees, prepaid royalties and running royalties on licensed products. The agreements provide for certain other minimum obligations relating to the volume of materials sales anticipated over the life of the agreements as well as minimum royalty revenue to be generated under the patent license agreement. Revenue under these agreements is predominantly tied to LG Display's sales of OLED licensed products.

In 2017, we entered into long-term, multi-year agreements with BOE, granting BOE non-exclusive license rights to manufacture and sell licensed OLED display products using phosphorescent emitter materials purchased from us. These agreements superseded our 2016 commercial supply agreement with BOE.

In 2017, we continued to supply our proprietary OLED materials to Tianma for use in its commercial AMOLED display products and for evaluation purposes, under a 2016 material supply agreement. We also continued to license certain of our OLED patents and technologies to Tianma under a 2016 OLED patent license agreement.

We have been collaborating with AU Optronics since 2001, and we continue to provide our proprietary PHOLED materials to AU Optronics under a 2016 commercial supply agreement through which AU Optronics also has certain license rights.

We also continue to support numerous display manufacturers in their evaluation of our technologies and proprietary OLED materials, through evaluation arrangements in which we provide our proprietary OLED materials to such manufacturers for limited scale commercial production, evaluation and for purposes of development, manufacturing qualification and product testing. Many of these strategic relationships have been in place for longer than a decade, and we continue to establish new relationships.

In 2017, we announced that we entered into new OLED evaluation agreements with EverDisplay Optronics (Shanghai) Limited and Shenzhen Royole Display Technologies Co. Ltd. We also expanded the terms of our existing evaluation agreement relationships with Japan Display Inc. and with Sharp Corporation.

### ***Relationships with OLED Lighting Manufacturers***

We license our OLED technologies and patents to lighting manufacturers for use in commercial products, and supply our proprietary OLED materials to these manufacturers for both commercial use and evaluative purposes. Many of these strategic relationships have also been in place for longer than a decade.

Since 2004, we have been supporting Konica Minolta in its efforts to develop OLED lighting products. We continue to license our patents and technology to Konica Minolta under a 2008 OLED technology license agreement for its manufacture and sale of OLED lighting products that utilize our phosphorescent and other OLED technologies. We also continue to provide Konica Minolta with our proprietary PHOLED materials for its manufacture of commercial OLED lighting products under a 2011 commercial material supply agreement, and for evaluation purposes under a 2012 evaluation agreement.

We also continue to license our OLED patents to Sumitomo under a 2015 OLED patent portfolio license agreement in which we granted Sumitomo a non-exclusive, world-wide, royalty bearing license to make and sell OLED lighting panels using a solution-based manufacturing process. Under the license agreement, Sumitomo may also purchase certain of our phosphorescent materials.

We continue to supply LG Display with materials in connection with the OLED lighting business it acquired from LG Chem, Ltd. (LG Chem) in 2015-2016. This lighting business continues to generate commercial chemical sales and license fee revenues under a limited-term commercial sales agreement we signed with LG Chem prior to its acquisition.

We continue to license our OLED patents, and to provide our OLED materials, to OLEDWorks for use in OLED lighting products under patent license and commercial supply agreements signed in 2015. We have also extended the rights under these agreements to OLEDWorks GmbH, the German company and facility that OLEDWorks acquired in 2015 from Philips Technologie GmbH.

We continue to license our technologies and patents to Kaneka for the manufacture and sale of OLED lighting products, under the terms of a 2013 license agreement, and we continue to supply our materials to Kaneka under a 2014 commercial material supply agreement. We also have license agreements for the manufacture and sale of OLED lighting products with Lumiotec and Pioneer, among others.

Similar to our arrangements with display manufacturers, we continue to support numerous lighting manufacturers in their evaluation of our technologies and proprietary OLED materials, typically through evaluation agreements under which we provide our proprietary OLED materials to such manufacturers for evaluation and potential commercial application.

#### ***Relationships with Manufacturers for Other Commercial Products***

In addition to our relationships with lighting and display manufacturers, we have agreements and arrangements with manufacturers or potential manufacturers to use our proprietary OLED technologies and materials in other commercial products, such as in automotive interiors and exteriors.

#### **Our OLED Materials Manufacturing Business**

We supply our proprietary UniversalPHOLED® materials to display manufacturers, lighting manufacturers and others. We qualify our materials in OLED devices before shipment in order to ensure that they meet required specifications. We believe that our inventory-carrying practices, along with the terms under which we sell our OLED materials (including payment terms), are typical for the markets in which we operate. In 2015, our OLED materials business received recertification in accordance with ISO 9001:2008 Quality Management Systems and the certification was transitioned to ISO 9001:2015 Quality Management Systems during 2017.

#### ***PPG Industries***

We have maintained a close working relationship with PPG Industries since 2000. In 2011, we entered into an agreement with PPG Industries, the term of which continues through December 31, 2018 and shall be automatically renewed for additional one year terms, unless terminated by us with prior notice of one year or terminated by PPG Industries with prior notice of two years. Under that agreement, PPG Industries is responsible, under our direction, for manufacturing scale-up of our proprietary OLED materials, and for supplying us with those materials. We use these materials for our own research and development as well as for resale to our customers, both for their evaluation and for use in commercial OLED products. Through our collaboration with PPG Industries, key raw materials are sourced from multiple suppliers to ensure that we are able to meet the needs of our customers on a timely basis. The raw materials we require for our emitter and host materials are available from multiple sources and historically, we have not had any issues with obtaining access to adequate amounts of any key raw materials.

We invested a total of \$15.4 million during 2016 and 2017 in PPG Industries' Barberton, Ohio manufacturing facility, to approximately double commercial production capacity for our UniversalPHOLED® phosphorescent emitter products. The expansion project was nearing completion in 2017 and should be operational during 2018.

#### ***Collaborations with Other OLED Material Manufacturers***

We continued our non-exclusive collaborative relationships with other manufacturers of OLED materials during 2017. Most of these relationships are focused on matching our proprietary PHOLED emitters with the host and other OLED materials of these companies. We believe that collaborative relationships such as these are important for ensuring success of the OLED industry and broader adoption of our PHOLED and other OLED technologies.

#### **Research and Development**

Our research and development activities are focused on the advancement of our OLED technologies and materials for displays, lighting and other applications. We conduct this research and development both internally and through various relationships with our commercial business partners and academic institutions. In the years 2017, 2016 and 2015, we incurred expenses of \$49.1 million, \$42.7 million and \$44.6 million, respectively, on both internal and third-party sponsored research and development activities with respect to our various OLED technologies and materials.

#### ***Internal Development Efforts***

We conduct a substantial portion of our OLED development activities at our state-of-the-art development and testing facility in Ewing, New Jersey. At this expanded facility, which now exceeds 50,000 square feet, we perform technology development, including device and process optimization, prototype fabrication, manufacturing scale-up studies, process and product testing, characterization and reliability studies, and technology transfer with our business partners.

Our Ewing facility houses multiple OLED deposition systems, including a full-color flexible OLED system and an OVJP organic vapor jet printing system. In addition, the facility contains equipment for substrate patterning, organic material deposition, display packaging, module assembly and extensive testing in Class 100 and 100,000 clean rooms and opto-electronic test

laboratories. Our facility also includes state-of-the-art synthetic and analytical chemistry laboratories in which we conduct OLED materials research and make small quantities of new materials that we then test in OLED devices.

In 2016, we acquired Adesis, Inc. (Adesis) with operations in New Castle, Delaware. Adesis is a contract research organization (CRO) that provides support services to the OLED, pharma, biotech, catalysis and other industries. Adesis operates in a facility of over 25,000 square feet, and as of December 31, 2017, employed a team of 50 chemists. Prior to our acquisition, we utilized more than 50% of Adesis' technology service and production output. Although we expect to continue to utilize the majority of its technology research capacity for the benefit of our OLED technology development, Adesis is expected to continue operating as a CRO in the above mentioned industries.

As of December 31, 2017, we employed a team of 128 research scientists, engineers and laboratory technicians in our Ewing, New Jersey and New Castle, Delaware facilities. This team includes chemists, physicists, engineers and technicians with physics, electrical engineering, mechanical engineering and organic/inorganic chemistry backgrounds, and highly-trained theoreticians and experimentalists.

### ***University Sponsored Research***

We have long-standing relationships with Princeton University and USC, dating back to 1994, for the conduct of research relating to our OLED and other organic thin-film technologies and materials for applications such as displays and lighting. This research had been performed at Princeton under the direction of Professor Forrest and at USC under the direction of Professor Thompson. In 2006, Professor Forrest transferred to the University of Michigan, where we continue to fund his research.

We funded research at Princeton under a research agreement executed in 1997 (the 1997 Research Agreement). The 1997 Research Agreement was allowed to expire in 2007, after Professor Forrest transferred to Michigan. We have exclusive license rights to all OLED and other thin-film organic electronic patents (other than for organic photovoltaic solar cells) arising out of research conducted under that agreement.

In connection with Professor Forrest's transfer to Michigan, in 2006 we entered into a new sponsored research agreement with USC under which we are funding organic electronics research being conducted by Drs. Forrest and Thompson (the 2006 Research Agreement). Work by Professor Forrest is being funded through a subcontract between USC and Michigan. As with the 1997 Research Agreement, we have exclusive license rights to all OLED and thin-film organic electronic patents (other than for organic photovoltaic solar cells) arising out of this research.

Effective May 1, 2017, we amended the 2006 Research Agreement once again to extend the term of the agreement for an additional three years. As of December 31, 2017, in connection with this amendment, we are obligated to reimburse the universities up to \$6.6 million for work to be performed during the remaining extended term, which expires April 30, 2020.

In 2005, we entered into a separate sponsored research agreement with Princeton to fund research under the direction of Professor Sigurd Wagner on thin-film encapsulation and fabrication of OLED devices. This research was completed as of December 31, 2013. Like our other relationships with Princeton, we have exclusive license rights to all patents arising out of the research.

We entered into a contract research agreement with the Chitose Institute of Science and Technology of Japan (CIST) in 2004. Under that agreement, we funded a research program headed by Professor Chihaya Adachi relating to high-efficiency OLED materials and devices. We were granted exclusive rights to all intellectual property developed under this program. Our relationship with CIST ended in 2006 when Professor Adachi transferred to Kyushu University. However, we have continued our relationship with Professor Adachi under a separate consulting arrangement.

In 2006 and 2007, we entered into one-year research agreements with Kyung Hee University to sponsor research programs on flexible, amorphous silicon thin-film transistor (TFT) backplane technology. The programs were directed by Professor Jin Jang. In 2008 and 2009, we entered into contract research agreements with Silicon Display Technology, Ltd. (SDT), a company founded by Professor Jang, and in 2013, we entered into another one-year agreement with SDT. We continue to maintain a good working relationship with Professor Jang.

### ***Aixtron***

In 2000, we entered into a development and license agreement with Aixtron AG of Aachen, Germany to develop and commercialize equipment used in the manufacture of OLEDs using the OVPD process. Under this agreement, we granted Aixtron an exclusive license to produce and sell its equipment for the manufacture of OLEDs and other devices using our proprietary OVPD process. Aixtron is required to pay us royalties on its sales of this equipment. Purchasers of the equipment also must obtain rights to

use our proprietary OVPD process to manufacture OLEDs and other devices using the equipment, which they may do through us or Aixtron. If these rights are granted through Aixtron, Aixtron is required to make additional payments to us under our agreement.

Aixtron has reported to us the delivery of nine OVPD systems since 2002. These include two second-generation systems, one of which was sold to the Fraunhofer Institute for Photonic Microsystems in Dresden, Germany in 2007, and the other of which was sold to RiTdisplay Corporation of Taiwan in 2003. We record royalty income from Aixtron's sales of these various systems in the quarters in which Aixtron notifies us of the sale and the related royalties are due.

### ***U.S. Government-Funded Research***

We have entered into several U.S. government contracts and subcontracts to fund a portion of our efforts to develop next-generation OLED technologies. On contracts for which we were the prime contractor, we subcontract portions of the work to various entities and institutions. All of our government contracts and subcontracts are subject to termination at the election of the contracting governmental agency.

Our government-funded programs are concentrated primarily in the area of solid-state lighting. In the past, we have received support for our work on flexible OLED technology through various U.S. Department of Defense (DOD) agencies, including the Army Research Laboratory (ARL), the Air Force Research Laboratory (AFRL), the Army Communications-Electronics Research Development and Engineering Center (CERDEC) and the National Science Foundation (NSF). The U.S. Department of Energy (DOE) supports our work on white OLEDs for lighting, including through its Solid State Lighting (SSL) initiative. Several of our key U.S. government program initiatives in 2017 were as follows:

#### *Technology Development for OLED Lighting*

During 2017, we continued working to develop technical approaches for using our proprietary PHOLED and other OLED technologies for high-efficiency white lighting applications. In 2017, we received funding from the DOE to work with Arizona State University and the University of Michigan.

#### *OLED Association*

We are a charter member of the OLED Association (OLED-A). OLED-A is a trade association whose mission involves serving as an OLED information resource, driving OLED technology development, and promoting interest in OLED products. We are one of 17 members of OLED-A, and we actively participate on its marketing and technology committees. Mike Hack, our Vice President of Business Development, serves as a member of the Board of Directors of OLED-A.

#### *Next Generation Lighting Industry Alliance*

We joined the Next Generation Lighting Industry Alliance (NGLIA) in 2009. NGLIA was formed in 2003 to foster industry-government partnership to accelerate the technical foundation, and ultimate commercialization, of solid state lighting systems. NGLIA was designated in 2005 as the "industry partner" by DOE for its SSL program. The SSL program is being undertaken to research, develop and conduct demonstration activities on advanced solid state white lighting technologies based on LEDs and OLEDs. We are one of 9 members of NGLIA. Mike Hack is currently Vice-Chairman of NGLIA.

#### *OLED Lighting Coalition*

We are a founding member of the OLED Lighting Coalition, a subgroup of OLED-A and NGLIA. The OLED Lighting Coalition is a group of U.S. companies and advocates of OLED technology joined together to promote the OLED lighting industry to the government, public and the lighting community. Dr. Hack serves as a member of the Board of Directors of the OLED Lighting Coalition.

### **Intellectual Property**

Along with our personnel, our primary and most fundamental assets are patents and other intellectual property. This includes numerous U.S. and foreign patents and patent applications that we own, exclusively license or have the sole right to sublicense. It also includes a substantial body of non-patented technical know-how that we have accumulated over time.

### ***Our Patents***

Our research and development activities, conducted both internally and through collaborative programs with our partners, have resulted in the filing of a substantial number of patent applications relating to our OLED technologies and materials. As of December 31, 2017, we owned, through assignment to us alone or jointly with others, 366 pending U.S. applications (active U.S. cases and international applications designated in the U.S.) and 833 U.S. patents, together with counterparts filed in various foreign countries. These owned patents will start expiring in the U.S. in 2020.

### ***Patents We License from Princeton, USC and Michigan***

We exclusively license many of our patent rights, including certain of our key PHOLED technology patents, under the 1997 Amended License Agreement. In 2006, based on Professor Forrest's transfer to Michigan that year, Michigan was added as a party to this agreement. As of December 31, 2017, the patent rights we license from these universities included 220 issued U.S. patents, 53 pending U.S. patent applications, together with counterparts filed in various foreign countries. The earliest of these patents expired in the U.S. in 2014, while one of our PHOLED technology patents licensed from these universities expired in 2017.

Under the 1997 Amended License Agreement, Princeton, USC and Michigan granted us worldwide, exclusive license rights to specified patents and patent applications relating to OLED technologies and materials (including our PHOLED technology and materials). Our license rights also extend to any patent rights arising out of the research conducted by Princeton, USC or Michigan under our various research agreements with these entities. We are free to sublicense to third parties all or any portion of our patent rights under the 1997 Amended License Agreement. The term of the 1997 Amended License Agreement continues for the lifetime of the licensed patents, though it is subject to termination for an uncured material breach or default by us, or if we become bankrupt or insolvent.

Princeton is primarily responsible for the filing, prosecution and maintenance of all patent rights licensed to us under the 1997 Amended License Agreement pursuant to an inter-institutional agreement between Princeton, USC and Michigan. However, we manage this process and have the right to instruct patent counsel on specific matters to be covered in any patent applications filed by Princeton. We are required to bear all costs associated with the filing, prosecution and maintenance of these patent rights.

We are required under the 1997 Amended License Agreement to pay Princeton royalties for licensed products sold by us or our sublicensees. These royalties amount to 3% of the net sales price for licensed products sold by us and 3% of the revenues we receive for licensed products sold by our sublicensees. These royalty rates are subject to renegotiation for products not reasonably conceivable as arising out of the research agreements if Princeton reasonably determines that the royalty rates payable with respect to these products are not fair and competitive. Princeton shares portions of these royalties with USC and Michigan under their inter-institutional agreement.

We have a minimum royalty obligation of \$100,000 per year during the term of the 1997 Amended License Agreement. We owed royalties under the 1997 Amended License Agreement with Princeton of \$9.7 million for 2017. We also are required under the 1997 Amended License Agreement to use commercially reasonable efforts to bring the licensed OLED technology to market. However, this requirement is deemed satisfied if we invest a minimum of \$800,000 per year in research, development, commercialization or patenting efforts respecting the patent rights licensed to us under the 1997 Amended License Agreement.

### ***Patents We Acquired from Motorola***

In 2000, we entered into a license agreement with Motorola whereby Motorola granted us perpetual license rights to what are now 74 issued U.S. patents relating to Motorola's OLED technologies, together with foreign counterparts in various countries. These patents expire in the U.S. through 2018.

In 2011, we purchased these patents from Motorola, including all existing and future claims and causes of action for any infringement of the patents. This effectively terminated our license agreement with Motorola, including any obligation to make royalty payments to Motorola. In consideration for Motorola assigning and transferring the patents to us, we made a one-time cash payment to Motorola of \$440,000, and we granted Motorola a royalty-free, non-exclusive and non-sublicensable license under the patents for use by Motorola and its affiliates in their respective businesses.

### ***Patents We Acquired from Fujifilm Corporation***

In 2012, we entered into a Patent Sale Agreement (the Fujifilm Agreement) with Fujifilm. Under the Fujifilm Agreement, Fujifilm sold more than 1,200 OLED-related patents and patent applications for a total cost of \$109.5 million. The Fujifilm Agreement contains customary representations and warranties and covenants, including respective covenants not to sue by both parties thereto. The Fujifilm Agreement permitted us to assign all of our rights and obligations under the Fujifilm Agreement to our affiliates, and we

assigned, prior to the consummation of the transactions contemplated by the Fujifilm Agreement, our rights and obligations to UDC Ireland Limited (UDC Ireland), a wholly-owned subsidiary formed under the laws of the Republic of Ireland. The transactions contemplated by the Fujifilm Agreement were consummated on July 26, 2012.

### ***Patents We Acquired from BASF***

In 2016, our Irish subsidiary UDC Ireland entered into an IP Transfer Agreement (the BASF Agreement) with BASF. Under the BASF Agreement, BASF sold us more than 500 OLED-related patents and patent applications for a total cost of \$96.0 million. The transactions contemplated by the BASF Agreement were consummated on June 28, 2016.

### ***Intellectual Property Developed under Our Government Contracts***

We and our subcontractors have developed, and may continue to develop, patentable OLED technology inventions under our various U.S. government contracts and subcontracts. Under these arrangements, we or our subcontractors generally can elect to take title to any patents on these inventions, and to control the manner in which these patents are licensed to third parties. However, the U.S. government reserves rights to these inventions and associated technical data that could restrict our ability to market them to the government for military and other applications, or to third parties for commercial applications. In addition, if the U.S. government determines that we or our subcontractors have not taken effective steps to achieve practical application of these inventions in any field of use in a reasonable time, the government may require that we or our subcontractors license these inventions to third parties in that field of use.

### ***Non-patented Technical Know-How***

We have accumulated, and continue to accumulate, a substantial amount of non-patented technical know-how relating to OLED technologies and materials. Where practicable, we share portions of this information with display manufacturers and other business partners on a confidential basis. We also employ various methods to protect this information from unauthorized use or disclosure, although no such methods can afford complete protection. Moreover, because we derive some of this information and know-how from academic institutions such as Princeton, USC and Michigan, there is an increased potential for public disclosure. We also cannot prevent the actual independent development of the same or similar information and know-how by third parties.

## **Competition**

The industry in which we operate is highly competitive. We compete against alternative display technologies, in particular LCDs, as well as other OLED technologies. We also compete in the lighting market against incumbent technologies, such as incandescent bulbs, fluorescent lamps, and inorganic LEDs, and against emerging technologies, such as other OLED technologies.

### ***Display Panel Industry Competitors***

Numerous domestic and foreign companies have developed or are developing and improving LCD and other display technologies that compete with our OLED display technologies. We believe that OLED display technologies can compete with LCDs and other display technologies for many product applications on the basis of lower power consumption, better contrast ratios, faster video rates, form factor and lower manufacturing cost. However, other companies may succeed in continuing to improve these competing display technologies, or in developing new display technologies, that are superior to OLED display technologies in various respects. We cannot predict the timing or extent to which such improvements or developments may occur.

### ***Lighting Industry Competitors***

Although there has been a movement to phase out traditional incandescent bulbs throughout many countries, traditional incandescent bulbs and fluorescent lamps remain well-entrenched products in the lighting industry. In addition, compact fluorescent lamps and solid-state LEDs have been introduced into the market and would compete with OLED lighting products. Having attributes different from fluorescent lamps and LEDs, OLEDs may compete directly with these products for certain lighting applications. However, manufacturers of LEDs and compact fluorescent lamps may succeed in more broadly adapting their products to various lighting applications, or others may develop competing solid-state lighting technologies that are superior to OLEDs. Again, we cannot predict whether or when this might occur.

### ***OLED Technology and Materials Competitors***

Eastman Kodak Company (Kodak) developed and patented the original fluorescent OLED technology in 1987. Cambridge Display Technology, Ltd. (CDT), which was acquired by Sumitomo Chemical Company in 2007, developed and patented polymer

OLED technology in 1989. Display and lighting manufacturers, including customers of ours, are engaged in their own OLED research, development and commercialization activities, and have developed and may continue to develop proprietary OLED technologies that are necessary or useful for commercial OLED devices. In addition, other material manufacturers, such as Sumitomo, Idemitsu Kosan Co., Ltd. (Idemitsu Kosan), Merck KGaA, Cynora GmbH and Kyulux Inc., are selling or sampling competing OLED materials to customers, including companies to which we sell our proprietary PHOLED materials.

Our licensing business is based on our control of a broad portfolio of OLED-related device patents and technology. We believe this portfolio includes fundamental patents in the field of phosphorescent OLED materials and devices, as well as certain additional complementary OLED technologies. As discussed above, alternative technologies, such as fluorescent OLED emitter materials, exist and could be competitive to our phosphorescent OLED material solutions. However, fluorescent materials have characteristics that we believe many market participants consider less desirable than those of phosphorescent materials. Suppliers of fluorescent emitter materials include Doosan Electronics, Dow Chemical (previously Gracel Display), Idemitsu Kosan and SFC Co. Ltd. Fluorescent materials may also be viewed as complementary in that they can be used in the same OLED stack as phosphorescent materials, especially for use as emitters for generating deep blue pixels in display modules until such time as the OLED industry improves the properties of currently available deep blue phosphorescent materials.

The competitive landscape with respect to our host materials business is characterized by a larger number of established chemical material suppliers who have long-term relationships with many of our existing customers and licensees. We have elected to partner with certain of these companies to manufacture and deliver host solutions to our customers, as well as selling our host materials directly to device manufacturers. We believe our competitive advantage stems, in part, from our deep knowledge of our phosphorescent emitter materials, which are complementary with the host solutions. We believe that our understanding of the phosphorescent emitter materials enables us to create host material solutions that are especially well suited for use with a certain class of emitter materials that are implemented commercially today. However, we note that many of our technology partners have their own host solutions and the competitive landscape includes many well-established companies such as Doosan Electronics, Dow Chemical, Duksan, Idemitsu Kosan, Merck KGaA, NSCC and Samsung SDI Co. Ltd. and which have significant resources and may aggressively pursue such business in the future.

Our existing business relationships with SDC and other product manufacturers suggest that our OLED technologies and materials, particularly our PHOLED technologies and materials, may achieve a significant level of market penetration in the display and lighting industries. However, others, such as those working to develop thermally activated delayed fluorescence (TADF) and micro-LED alternative technologies, may succeed in developing new OLED technologies, materials and alternative solutions that may supplement or be utilized in place of ours. We cannot be sure of the extent to which product manufacturers will adopt and continue to utilize our OLED technologies and materials for the production of commercial displays and lighting products.

#### **Our Contract Research Organization Business: Adesis, Inc.**

Adesis, which we acquired in July 2016, is a contract research organization (CRO) headquartered in New Castle, Delaware that provides support services to the OLED, pharma, biotech, catalysis and other industries. As of December 31, 2017, Adesis employed a team of 50 chemists. Prior to our acquisition in 2016, we utilized more than 50% of Adesis' technology service and production output. We continue to utilize a significant portion of its technology research capacity for the benefit of our OLED technology development, and Adesis uses the remaining capacity to operate as a CRO in the above-mentioned industries.

In May 2017, Adesis purchased its New Castle, Delaware building, to expand its custom organic synthesis, research and development, and specialty manufacturing capabilities. The New Castle facility is a 47,500-square-foot building in the Southgate Industrial Center, of which Adesis had previously leased about 25,100 square feet. We believe the purchase of the building will allow Adesis to continue to expand its CRO offerings and allow us to enhance our chemistry expertise and capabilities.

In December 2017, Adesis signed an agreement with Delaware Innovation Space, Inc. for approximately 7,000 square feet of laboratory space at the Experimental Station in Wilmington, Delaware, in which Adesis is opening a new suite of laboratories to expand its organic chemistry team and research and development programs. The new space, which includes additional ancillary work and meeting space, is expected to support Adesis' ongoing operations.

#### **Employees**

As of December 31, 2017, we had 222 active full-time employees and two part-time employees, none of whom are unionized. We believe that relations with our employees are good.

## **Our Company History**

Our corporation was organized under the laws of the Commonwealth of Pennsylvania in 1985. Our business was commenced in 1994 by a company then known as Universal Display Corporation, which had been incorporated under the laws of the State of New Jersey. In 1995, a wholly-owned subsidiary of ours merged into this New Jersey corporation. The surviving corporation in this merger became a wholly-owned subsidiary of ours and changed its name to UDC, Inc. Simultaneously with the consummation of this merger, we changed our name to Universal Display Corporation. UDC, Inc. functions as an operating subsidiary of ours and has certain overlapping officers and directors. We have also formed or acquired other wholly-owned subsidiaries, including Universal Display Corporation Hong Kong, Limited (2008), Universal Display Corporation Korea, Y.H. (2010), Universal Display Corporation Japan GK (2011), UDC Ireland Limited (2012), Universal Display Corporation China, Ltd. (2016) and Adesis, Inc. (2016), and we established a representative office in Taiwan (2011).

## **Our Compliance with Environmental Protection Laws**

We are not aware of any material effects that compliance with Federal, State or local environmental protection laws or regulations will have on our business. We have not incurred substantial costs to comply with any environmental protection laws or regulations, and we do not anticipate having to do so in the foreseeable future.

## **Our Internet Site**

Our Internet address is [www.oled.com](http://www.oled.com). We make available through our Internet website, free of charge, our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934 as soon as reasonably practicable after we file such material with the Securities and Exchange Commission (the SEC). In addition, we have made available on our Internet website under the heading "Corporate Governance" the charter for the Audit Committee of our Board of Directors, the charter for the Compensation Committee of our Board of Directors, the charter for the Nominating & Corporate Governance Committee of our Board of Directors, our Code of Ethics & Business Conduct for Employees, our Code of Conduct for Directors, and our Corporate Governance Guidelines. We intend to make available on our website any future amendments or waivers to our Code of Ethics & Business Conduct for Employees and our Code of Conduct for Directors. The information on our Internet site is not part of this report.

## **ITEM 1A. RISK FACTORS**

You should carefully consider the following risks and uncertainties when reading this Annual Report on Form 10-K. The following factors, as well as other factors affecting our operating results and financial condition, could cause our actual future results and financial condition to differ materially from those projected.

***If we cannot obtain and maintain appropriate patent and other intellectual property protection for our OLED technologies and materials, our business will suffer.***

The value of our OLED technologies and materials is dependent on our ability to secure and maintain appropriate patent and other intellectual property rights protection. Although we own or license many patents respecting our OLED technologies and materials that have already been issued, there can be no assurance that additional patents applied for will be obtained, or that any of these patents, once issued, will afford commercially significant protection for our OLED technologies and materials, or will be found valid if challenged. Also, there is no assurance that we will be successful in defending the validity of our current or future patents in pending and future patent oppositions, invalidation trials, interferences, reexaminations, reissues, or other administrative or court proceedings. Moreover, we have not obtained patent protection for some of our OLED technologies and materials in all foreign countries in which OLED products or materials might be manufactured or sold.

We believe that the strength of our current intellectual property position results primarily from the essential nature of our fundamental patents covering phosphorescent OLED devices and certain materials utilized in these devices. Certain of our existing fundamental phosphorescent OLED patents expired in the United States in 2017 or will expire in the United States in 2019, and in other countries of the world in 2018 and 2020. While we hold a wide range of additional patents and patent applications whose expiration dates extend (and in the case of patent applications, will extend) beyond 2020, many of which are also of importance in the OLED industry, none are of an equally essential nature as our fundamental patents, and therefore our competitive position may be less certain as these patents expire.

We may become engaged in litigation to protect or enforce our patent and other intellectual property rights, or in International Trade Commission proceedings to abate the importation of goods that would compete unfairly with those of our licensees. In addition, we are participating in or have participated in, and in the future will likely have to participate in, interference, reissue, or reexamination proceedings before the U.S. Patent and Trademark Office, and opposition, nullity or other proceedings before foreign

patent offices, with respect to some of our patents or patent applications. All of these actions place our patents and other intellectual property rights at risk and may result in substantial costs to us as well as a diversion of management attention from our business and operations. Moreover, if successful, these actions could result in the loss of patent or other intellectual property rights protection for the key OLED technologies and materials on which our business depends.

We rely, in part, on several non-patented proprietary technologies to operate our business. Others may independently develop the same or similar technologies or otherwise obtain access to our unpatented technologies. Furthermore, these parties may obtain patent protection for such technology, inhibiting or preventing us from practicing the technology. To protect our trade secrets, know-how and other non-patented proprietary information, we require employees, consultants, financial advisors and strategic partners to enter into confidentiality agreements. These agreements may not ultimately provide meaningful protection for our trade secrets, know-how or other non-patented proprietary information. In particular, we may not be able to fully or adequately protect our proprietary information as we conduct discussions with potential strategic partners. Additionally, although we take many measures to prevent theft and misuse of our proprietary information, we may face attempts by others to gain unauthorized access through the Internet to our information technology systems or to our intellectual property, which might be the result of industrial or other espionage or actions by hackers seeking to harm our company or its products. If we are unable to protect the proprietary nature of our technologies, it will harm our business.

***We or our customers may incur substantial costs or lose important rights as a result of litigation or other proceedings relating to our patent and other intellectual property rights or with respect to our OLED materials business.***

There are a number of other companies and organizations that have been issued patents and are filing patent applications relating to OLED technologies and materials, including, without limitation, Kodak (substantially all of whose OLED assets were sold to a group of LG companies in 2009), CDT (acquired by Sumitomo in 2007), Canon, Inc., Semiconductor Energy Laboratories Co., Idemitsu Kosan and Mitsubishi Chemical Corporation. In addition, some of our customers such as SDC and LG Display have been issued patents and are filing patent applications relating to OLED technologies and materials. As a result, there may be issued patents or pending patent applications of third parties that would be infringed by the use of our OLED technologies or materials, thus subjecting our customers to possible suits for patent infringement in the future. Such lawsuits could result in our customers being liable for damages or require our customers to obtain additional licenses that could increase the cost of their products. This, in turn, could have an adverse effect on our customers' sales and thus our royalties or material sales revenues, or cause our customers to seek to renegotiate our royalty rates or pricing. In addition, we have agreed to indemnify customers purchasing our OLED materials for commercial usage against certain claims of patent infringement by third parties, as a result of which we may incur substantial legal costs in connection with defending these customers from such claims.

Our licensees may also seek to avoid paying future royalties by attempting to have our patents declared invalid and unenforceable by a court. Our licensees may be more likely to file such declaratory actions in light of the U.S. Supreme Court's decision in *MedImmune, Inc. v. Genentech, Inc.* (2007), in which the Court found that a licensee need not refuse to pay royalties and commit material breach of the license agreement before bringing an action to declare a licensed U. S. patent invalid and unenforceable.

In addition, we may be required, from time-to-time, to assert our intellectual property rights by instituting legal proceedings against others. We cannot be assured that we will be successful in enforcing our patents in any lawsuits we may commence. Defendants in any litigation we may commence to enforce our patents may attempt to establish that our patents are invalid or are unenforceable. Thus, any patent litigation we commence could lead to a determination that one or more of our patents are invalid or unenforceable. If a third party succeeds in invalidating one or more of our patents, that party and others could compete more effectively against us. Our ability to derive licensing revenues from products or technologies covered by these patents would also be adversely affected.

Whether our customers are defending the assertion of third-party intellectual property rights against their businesses arising as a result of the use of our technology, or we are asserting our own intellectual property rights against others, such litigation can be complex, costly, protracted and highly disruptive to our or our customers' business operations by diverting the attention and energies of management and key technical personnel. As a result, the pendency or adverse outcome of any intellectual property litigation to which we or our customers are subject could disrupt business operations, require the incurrence of substantial costs and subject us or our customers to significant liabilities, each of which could severely harm our business. Costs associated with these actions are likely to increase as AMOLED products using our PHOLED and other OLED technologies and materials continue to enter the consumer marketplace.

Plaintiffs in intellectual property cases often seek injunctive relief in addition to money damages. Any intellectual property litigation commenced against our customers may force them to take actions that could be harmful to their businesses and thus to revenues, including the halting of sales of products that incorporate or otherwise use our technology or materials.

Furthermore, the measure of damages in intellectual property litigation can be complex, and is often subjective or uncertain. If our customers were to be found liable for infringement of proprietary rights of a third party, the amount of damages they might have to pay could be substantial and is difficult to predict. Decreased sales of our customers' products incorporating our technology or materials would have an adverse effect on our royalty revenues under existing licenses and material sales under our existing sales agreements. Were this to occur, it would likely harm our ability to (i) obtain new licensees which would have an adverse effect on the terms of the royalty arrangements we could enter into with any new licensees, and (ii) sell our UniversalPHOLED® materials to existing and new customers. Moreover, to the extent any third party claims are directed specifically to materials supplied by us to our customers, we may be required to incur significant costs associated with the defense of such claims and potential damages associated with such claims that may be awarded against our customers.

As is commonplace in technology companies, we employ individuals who were previously employed at other technology companies. To the extent our employees are involved in research areas that are similar to those areas in which they were involved at their former employers, we may be subject to claims that such employees or we have, inadvertently or otherwise, used or disclosed the alleged trade secrets or other proprietary information of the former employers. Litigation may be necessary to defend against such claims. The costs associated with these actions or the loss of rights critical to our or our customers' businesses could negatively impact our revenues or cause our business to fail.

***Recent court decisions in various patent cases may make it more difficult for us to obtain future patents, enforce our patents against third parties or obtain favorable judgments in cases where the patents are enforced.***

Recent case law may make it more difficult for patent holders to secure future patents and/or enforce existing patents. For example, in *KSR International Co. vs. Teleflex, Inc.* (2007), the U.S. Supreme Court mandated a more expansive and flexible approach to determine whether a patent is obvious and invalid. As a result of the less rigid approach to assessing obviousness, defending the validity of or obtaining patents may be more difficult.

Recent court decisions may also impact the enforcement of our patents. For example, we may not be able to enjoin certain third party uses of products or methods covered by our patents following the initial authorized sale, even where those uses are expressly proscribed in an agreement with the buyer. Also, we may face increased difficulty enjoining infringement of our patents. The U.S. Supreme Court has held that an injunction should not automatically issue based on a finding of patent infringement, but should be determined based on a test balancing considerations of the patentee's interest, the infringer's interest, and the public's interest. Obtaining enhanced damages for willful infringement of our patents may also be more difficult even in those cases where we successfully prove a third party has infringed our patents, as a recent case set a more stringent standard for proving willful infringement.

Therefore, as a result of such rulings, it may be more difficult for us to defend our currently issued patents, obtain additional patents in the future or achieve the desired competitive effect even when our patents are enforced. If we are unable to so defend our currently issued patents, or to obtain new patents for any reason, our business would suffer.

***If we cannot form and maintain lasting business relationships with OLED product manufacturers, our business strategy will fail.***

Our business strategy ultimately depends upon our development and maintenance of commercial licensing and material supply relationships with high-volume manufacturers of OLED products. We have entered into only a limited number of such relationships from which most of our material sales and licensing revenue are generated. Our other relationships with product manufacturers currently are limited to technology development and the evaluation of our OLED technologies and materials for possible use in commercial products. Some or all of these relationships may not succeed or, even if they are successful, may not result in the product manufacturers entering into commercial licensing and material supply relationships with us.

Many of our agreements with product manufacturers last for only limited periods of time, such that our relationships with these manufacturers will expire unless they are renewed. These product manufacturers may not agree to renew their relationships with us on a continuing basis or may agree to do so on terms that are less favorable to us. In addition, we regularly continue working with product manufacturers after our existing agreements with them have expired while we are attempting to negotiate contract extensions or new agreements with them. Should our relationships with the various product manufacturers not continue or be renewed on less favorable terms, or if we are not able to identify other product manufacturers and enter into contracts with them, our business may materially suffer.

Our ability to enter into additional commercial licensing and material supply relationships, or to maintain our existing relationships, may depend on our ability to make certain financial or other commitments. We might not be able, for financial or other reasons, to enter into or continue these relationships on commercially acceptable terms, or at all. Failure to do so may cause our business strategy to fail.

***If we fail to make advances in our OLED research and development activities, we might not succeed in commercializing our OLED technologies and materials.***

Further advances in our OLED technologies and materials depend, in part, on the success of the research and development work we conduct, both alone and with our research partners. We cannot be certain that this work will yield additional advances in the research and development of these technologies and materials.

Our research and development efforts remain subject to all of the risks associated with the development of new products based on emerging and innovative technologies, including, without limitation, unanticipated technical or other problems and the possible insufficiency of funds for completing development of these products. Technical problems may result in delays and cause us to incur additional expenses that would increase our losses. If we cannot complete research and development of our OLED technologies and materials successfully, or if we experience delays in completing research and development of our OLED technologies and materials for use in potential commercial applications, particularly after incurring significant expenditures, our business may fail.

***Conflicts or other problems may arise with our customers or joint development partners, resulting in renegotiation, breach or termination of, or litigation related to, our agreements with them. This would adversely affect our revenues.***

Conflicts or other problems could arise between us and our customers or joint development partners, some of which we have made strategic investments in, as to royalty rates, milestone payments or other commercial terms. Similarly, we may disagree with our customers or joint development partners as to which party owns or has the right to commercialize intellectual property that is developed during the course of the relationship or as to other non-commercial terms. If such a conflict were to arise, a customer or joint development partner might attempt to compel renegotiation of certain terms of their agreement or terminate their agreement entirely, and we might lose the royalty revenues, material sales revenues and other benefits of the agreement. Either we or the customer or joint development partner might initiate litigation to determine commercial obligations, establish intellectual property rights or resolve other disputes under the agreement. Such litigation could be costly to us and require substantial attention of management. If we were unsuccessful in such litigation, we could lose the commercial benefits of the agreement, be liable for financial damages and suffer losses of intellectual property or other rights that are the subject of dispute.

***If our OLED technologies and materials are not feasible for broad-based product applications, we may not be able to continue to generate revenues sufficient to support ongoing operations.***

Our main business strategy is to license our OLED technologies and sell our OLED materials to manufacturers for incorporation into the display and lighting products that they sell. Consequently, our success depends on the ability and willingness of these manufacturers to develop, manufacture and sell commercial products integrating our technologies and materials.

Before product manufacturers will agree to expand the use of our OLED technologies and materials for wider scale commercial production, they will likely require us to demonstrate to their satisfaction that our OLED technologies and materials are feasible for broad-based product applications beyond current commercial application, such as smartphones, wearables and television displays. This, in turn, may require additional advances in our technologies and materials, as well as those of others, for applications in a number of areas, including, without limitation, advances with respect to the development of:

- OLED materials with improved lifetimes, efficiencies and color coordinates for larger area full-color OLED displays and general lighting products;
- more robust OLED materials for use in more demanding large-scale manufacturing environments; and
- scalable and cost-effective methods and technologies for the fabrication of large volume OLED materials and products.

We cannot be certain that these advances will occur, and hence our OLED technologies and materials may not be feasible for additional broad-based product applications and expansion.

***Even if our OLED technologies are technically feasible, they may not be adopted by product manufacturers.***

The potential size, timing and viability of market opportunities targeted by us are uncertain at this time. Market acceptance of our OLED technologies beyond current product offerings will depend, in part, upon these technologies providing benefits comparable or superior to current display and lighting technologies at an advantageous cost to manufacturers, and the adoption of products incorporating these technologies by consumers. Many current and potential customers for our OLED technologies utilize and have invested significant resources in competing technologies, and may, therefore, be reluctant to redesign their products or manufacturing processes to incorporate our OLED technologies.

During the entire product development process for a new product, we face the risk that our technology will fail to meet the manufacturer's technical, performance or cost requirements or will be replaced by a competing product or alternative technology. Even if we offer technologies that are satisfactory to a product manufacturer, the manufacturer may choose to delay or terminate its product development efforts for reasons unrelated to our technologies. In addition, our agreements with our customers do not require them to purchase our host materials in order to utilize our phosphorescent emitter materials, and those customers may elect not to purchase our host materials.

Mass production of new mass market OLED products will require the availability of suitable manufacturing equipment, components and materials, many of which are available only from a limited number of suppliers. In addition, there may be a number of other technologies that manufacturers need to utilize in conjunction with our OLED technologies in order to bring these new OLED products to the market. Thus, even if our OLED technologies are a viable alternative to competing approaches, if product manufacturers are unable to obtain access to this equipment and these components, materials and other technologies, they may not utilize our OLED technologies.

***There are numerous potential alternatives to OLEDs, which may limit our ability to commercialize our OLED technologies and materials.***

The flat panel display market is currently, and will likely continue to be for some time, dominated by displays based on LCD technology. Numerous companies are making substantial investments in, and conducting research to improve characteristics of, LCDs; additionally, other competing flat panel display technologies have been, or are being, developed. A similar situation exists in the solid-state lighting market, which is currently dominated by LED products. Advances in any of these various technologies may overcome their current limitations and permit them to become the leading technologies in their field, either of which could limit the potential market for products utilizing our OLED technologies and materials. This, in turn, would cause product manufacturers to avoid entering into commercial relationships with us, or to terminate or not renew their existing relationships with us.

***Other OLED technologies may be more successful or cost-effective than ours, which may limit the commercial adoption of our OLED technologies and materials.***

Our competitors have developed and continue to develop OLED technologies that differ from or compete with our OLED technologies. In particular, competing fluorescent and thermally activated delayed fluorescence OLED technology may become a viable alternative to our phosphorescent OLED technology. Moreover, our competitors may succeed in developing new OLED technologies that may become more cost-effective or have fewer limitations than our OLED technologies. If our OLED technologies, and particularly our phosphorescent OLED technology, are unable to capture a substantial portion of the OLED product market, our business strategy may fail.

***The consumer electronics industry experiences significant downturns from time to time, any of which may adversely affect the demand for and pricing of our OLED technologies and materials.***

Our success depends upon the ability and continuing willingness of our customers to manufacture and sell products utilizing our technologies and materials, specifically our phosphorescent emitters and host materials, and the widespread acceptance of our customers' products in the consumer marketplace. Any slowdown in the demand for our customers' products or a decrease in our customers' use of or demand for our materials would adversely affect our material sales and royalty revenues and thus our business. Our customers' decrease in the use of or demand for our materials may depend on several factors, including pricing, availability, continued technical improvements and competitive product offerings. The markets for flat panel displays and lighting products are highly competitive. Success in the market for end-user products that may integrate our OLED technologies and materials also depends on factors beyond the control of our customers and us, including the cyclical and seasonal nature of the end-user markets that our customers serve, as well as industry and general economic conditions.

The markets that we hope to penetrate have experienced significant periodic downturns, often in connection with, or in anticipation of, declines in general economic conditions. These downturns have been characterized by lower product demand, production overcapacity and erosion of average selling prices. Our business strategy is dependent on manufacturers building and selling products that incorporate our OLED technologies and materials. Industry-wide fluctuations and downturns in the demand for displays and solid-state lighting products could cause significant harm to our business.

***Our customers may develop new or more efficient manufacturing processes, which may adversely affect demand for our OLED materials.***

OLED device manufacturing is in its early stages. By developing enhanced material processing methods and more efficient manufacturing techniques, our customers who purchase our phosphorescent emitter and host materials could become more efficient in the utilization of our materials, which could limit or reduce the amount of materials they purchase from us. Thus, demand for our

materials may not expand in proportion to the number of OLED related products manufactured by our customers, and may result in reduced demand for our materials and technology relative to our customers' manufacture and sale of products made with such materials.

***Any downturn in U.S. or global economic conditions may have a significant adverse effect on our business.***

There have been significant and sustained economic downturns in the U.S. and globally in the past. These downturns have placed pressure on consumer demand, and the resulting impact on consumer spending has had a material adverse effect on the demand for consumer electronic products. Similar downturns in the future may have a significant adverse effect on one or more of our licensees as an enterprise, which could result in those licensees reducing their efforts to commercialize products that incorporate our OLED technologies and materials. Consumer demand and the condition of the display and lighting industries may also be impacted by other external factors such as war, terrorism, geopolitical uncertainties and other business interruptions. The impact of these external factors is difficult to predict, and one or more of these factors could adversely impact the demand for our licensees' products, and thus our business.

***Many of our competitors have greater resources, which may make it difficult for us to compete successfully against them.***

The flat panel display and solid-state lighting industries are characterized by intense competition. Many of our competitors have better name recognition and greater financial, technical, marketing, personnel and research capabilities than we do. Because of these differences, we may never be able to compete successfully in these markets or maintain any competitive advantages we are able to achieve over time.

***If we cannot keep our key employees or hire other talented persons as we grow, our business might not succeed.***

Our performance is substantially dependent on the continued services of our executive officers and other key technical and managerial personnel, and on our ability to offer competitive salaries and benefits to these and our other employees. We do not have employment agreements with any of our executive officers or other key technical or managerial personnel. Additionally, competition for highly skilled technical and managerial personnel is intense. We might not be able to attract, hire, train, retain and motivate the highly skilled employees we need to be successful. If we fail to attract and retain the necessary technical and managerial personnel, our business will suffer and might fail.

***We rely solely on PPG Industries to manufacture the OLED materials we use and sell to product manufacturers.***

Our business prospects depend significantly on our ability to obtain proprietary OLED materials for our own use and for sale to product manufacturers. Our agreement with PPG Industries provides us with a source for these materials for development, evaluation and commercial purposes. Our agreement with PPG Industries currently runs through the end of 2018 and shall be automatically renewed for additional one year terms, unless terminated by us with prior notice of one year or terminated by PPG with prior notice of two years. Our inability to continue obtaining these OLED materials from PPG Industries or another source at cost-competitive prices and to continue obtaining these OLED materials in sufficient quantities to meet our product manufacturers' current and future demands and timetables would have a material adverse effect on our revenues and cost of goods sold relating to sales of these materials to OLED product manufacturers, as well as on our ability to perform future development work.

***We strive to maintain sufficient levels of inventory to accommodate our manufacturing customers. Inventory management relating to our material sales is complex, and excess inventory may harm our business and cause it to suffer.***

Inventory management remains an area of focus as we balance the need to maintain strategic inventory levels of our OLED materials to ensure competitive lead times against the risk of inventory obsolescence because of rapidly changing technology and customer requirements. As a just-in-time supplier to our customers, we carry sufficient inventory to accommodate their capacity requirements, sometimes without firm purchase commitments. Our dependence on third-party manufacturers to provide our materials to us exposes us to longer lead times than if we were a direct manufacturer, increasing our risk of inventory obsolescence comparatively. Our customers may increase orders during periods of product shortages, cancel orders if their inventory is too high, or delay orders in anticipation of new products. They also may adjust their orders in response to the supply and demand of their products by end-users, or the supply and demand of our products and the products of our competitors that are available to them.

Inventory management risks are heightened when our largest customers launch new products and retire existing products. At such times, these customers tend to change product designs and may introduce some of our new materials into new designs. The production of these materials requires us to purchase essential raw material and commence manufacturing well in advance of receiving firm customer orders for such materials. Accordingly, we are subject to the risk of unanticipated changes in our customers' manufacturing plans and designs. Unanticipated product cessation and product introduction delays or cancellation may cause us to order or produce excess or insufficient inventory. Excess inventory of our OLED materials is subject to the risk of inventory

obsolescence. In the event that a substantial portion of our inventory becomes obsolete, it could have a material adverse effect on earnings due to the resulting costs associated with the inventory impairment charges and inventory write downs.

***We are the sole source supplier for certain critical components used in OLED technologies, which subjects customers to risk if we are unable to meet the demand for such components.***

Our customers depend on us as the sole source for certain critical components used in manufacturing OLED products, which makes them susceptible to supply shortages if we are unable to meet their demand for such components. A potential customer could be hesitant to adopt OLED technology given the risks inherent in depending on a sole source for critical components and the inability to establish alternate supply relationships. If we are unable to supply the components needed by our existing customers in a timely manner, or if potential customers do not utilize OLED technology because of concerns about our ability to meet supply demands, our business may materially suffer.

***We may require additional funding in the future in order to continue our business.***

Our capital requirements have been and will continue to be significant. We may require additional funding in the future for the research, development and commercialization of our OLED technologies and materials, to obtain and maintain patents and other intellectual property rights in these technologies and materials, and for working capital and other purposes, the timing and amount of which are difficult to ascertain. Our cash on hand may not be sufficient to meet all of our future needs. When we need additional funds, such funds may not be available on commercially reasonable terms or at all. If we cannot obtain more money when needed, our business might fail. Additionally, if we attempt to raise money in an offering of shares of our common stock, preferred stock, warrants or depositary shares, or if we engage in acquisitions involving the issuance of such securities, the issuance of these shares will dilute our then-existing shareholders.

***Because the vast majority of OLED product manufacturers are located in the Asia-Pacific region, we are subject to international operational, financial, legal and political risks which may negatively impact our operations.***

Many of our customers and prospective customers have a majority of their operations in countries other than the United States, particularly in the Asia-Pacific region. We also have offices in various countries located outside of the United States. Risks associated with our doing business outside of the United States include, without limitation:

- compliance with a wide variety of foreign laws and regulations, including certain registration requirements for the OLED materials we sell;
- legal uncertainties regarding taxes, tariffs, quotas, export controls, export licenses and other trade barriers;
- economic instability in the countries of our customers, causing delays or reductions in orders for their products and therefore our royalties;
- political instability in the countries in which our customers operate, particularly in South Korea relating to its disputes with and proximity to North Korea and in Taiwan relating to its disputes with China;
- difficulties in collecting accounts receivable and longer accounts receivable payment cycles; and
- potentially adverse tax and tariff consequences.

Any of these factors could impair our ability to license our OLED technologies and sell our OLED materials, thereby harming our business. Compliance with changing laws and regulations may involve significant costs or require changes in business practice that could result in reduced profitability.

***We rely on information technology systems to operate various elements of our business and a cyber-attack or other breach of our systems, or those of third parties on whom we may rely, could subject us to liability or interrupt the operation of our business.***

We are dependent on information technology systems to operate various elements of our business. A breakdown, invasion, corruption, destruction or interruption of critical information technology systems by employees, others with authorized access to our systems or unauthorized persons could negatively impact operations. In the ordinary course of business, we collect, store and transmit important data and it is critical that we do so in a secure manner to maintain the confidentiality and integrity of such information. Additionally, we outsource certain elements of our information technology systems to third parties. As a result of this outsourcing, our third party vendors may or could have access to our confidential information making such systems vulnerable. Data breaches of our information technology systems, or those of our third party vendors, may pose a risk that sensitive data may be exposed to unauthorized persons or to the public. While we believe that we have taken appropriate security measures to protect our data and information technology systems, and have been informed by our third party vendors that they have as well, there can be no assurance

that our efforts will prevent breakdowns or breaches in our systems, or those of our third party vendors, that could adversely affect our business.

***The U.S. government has rights to intellectual property derived from our government-funded work that might prevent us from realizing the full benefits of our intellectual property portfolio.***

The U.S. government, through various government agencies, has provided and continues to provide funding to us, Princeton, USC and Michigan for work related to certain aspects of our OLED technologies. Because we have been provided with this funding, the government has rights to any intellectual property derived from this work that could restrict our ability to market OLED products to the government for military and other applications, or to license this intellectual property to third parties for commercial applications. Moreover, if the government determines that we have not taken effective steps to achieve practical application of this intellectual property in any field of use in a reasonable time, the government could require us to license this intellectual property to other parties in that field of use. Any of these occurrences would limit our ability to obtain maximum value from our intellectual property portfolio.

***The market price of our common stock may be highly volatile.***

The market price of our common stock may be highly volatile, as has been the case with our common stock in the past as well as the securities of many companies, particularly other emerging-growth companies in the technology industry. We have included in the section of this report entitled “Market for Registrant’s Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities,” a table indicating the high and low closing prices of our common stock as reported on the NASDAQ Global Market for the past two years. Factors such as the following may have a significant impact on the market price of our common stock in the future:

- our revenues, expenses and operating results;
- announcements by us, by our customers, or our competitors of technological developments, new product applications or contractual arrangements;
- announcements relating to dividends and share repurchases; and
- other factors affecting the flat panel display and solid-state lighting industries in general.

***Our operating results may have significant period-to-period fluctuations, which would make it difficult to predict our future performance.***

Due to the current stage of commercialization of our OLED technologies and materials, the limited number of commercially successful consumer products utilizing our OLED technologies that customers have introduced in the marketplace, the relatively short product lifetimes of these consumer products, and the significant development and manufacturing objectives that we and our customers must achieve for the widespread inclusion of our OLED technologies in consumer products such as tablets, television displays and lighting products, our quarterly operating results are difficult to predict and may vary significantly from quarter to quarter.

We believe that period-to-period comparisons of our operating results are not a reliable indicator of our future performance at this time. Among other factors affecting our period-to-period results, our license and technology development fees often consist of large one-time, annual or semi-annual payments, which may result in significant fluctuations in our revenues. In addition, our reliance on a small number of licensees with large volumes of consumer product sales makes our quarterly operating results subject to our licensee's specific plans and the success of their specific product offerings.

With respect to material sales, our sales are primarily dependent on purchases made by a small number of customers. In addition to the other factors described above relating to our customers’ sales opportunities, our quarter-to-quarter sales may be materially impacted by our customers’ inventory management plans, which may vary substantially based on financial management considerations, changes in their product mix plans, modified material processing techniques and manufacturing line modifications.

If, in some future period, our operating results or business outlook fall below the expectations of securities analysts or investors, our stock price would be likely to decline and investors in our common stock may not be able to resell their shares at or above their purchase price. Broad market, industry and global economic factors may also materially reduce the market price of our common stock, regardless of our operating performance.

***The issuance of additional shares of our common stock could drive down the price of our stock.***

The price of our common stock could decrease if:

- shares of our common stock that are currently subject to restriction on sale become freely salable, whether through an effective registration statement or based on Rule 144 under the Securities Act of 1933, as amended; or
- we issue additional shares of our common stock that might be or become freely salable, including shares that would be issued upon conversion of our preferred stock or the exercise of outstanding stock options.

***We can issue shares of preferred stock that may adversely affect the rights of shareholders of our common stock.***

Our Articles of Incorporation authorize us to issue up to 5,000,000 shares of preferred stock with designations, rights and preferences determined from time-to-time by our Board of Directors. Accordingly, our Board of Directors is empowered, without shareholder approval, to issue preferred stock with dividend, liquidation, conversion, voting or other rights superior to those of shareholders of our common stock. For example, an issuance of shares of preferred stock could:

- adversely affect the voting power of the shareholders of our common stock;
- make it more difficult for a third party to gain control of us;
- discourage bids for our common stock at a premium; or
- otherwise adversely affect the market price of our common stock.

As of February 22, 2018, we have issued and outstanding 200,000 shares of Series A Nonconvertible Preferred Stock, all of which are held by an entity controlled by members of the family of Sherwin I. Seligsohn, our Founder and Chairman of the Board of Directors. Our Board of Directors has authorized and issued other shares of preferred stock in the past, none of which are currently outstanding, and may do so again at any time in the future.

***Any decisions to reduce or discontinue paying cash dividends to our shareholders could cause the market price for our common stock to decline.***

In 2017, our Board of Directors declared quarterly cash dividends on our common stock, and we intend to pay regular quarterly dividends in the future. However, payment of future cash dividends will be at the discretion of our Board of Directors and will depend upon our results of operations, earnings, capital requirements, contractual restrictions and other factors deemed relevant by our Board of Directors. As such, we may modify, suspend or cancel our cash dividend policy in any manner and at any time. Any reduction or discontinuance by us of the payment of quarterly cash dividends could cause the market price of our common stock to decline. Moreover, in the event our payment of quarterly cash dividends are reduced or discontinued, our failure or inability to resume paying cash dividends at historical levels could cause the market price of our common stock to decline. There is no guarantee that our common stock will appreciate in value or even maintain the price at which current shareholders purchased their shares.

***Our executive officers and directors own a significant percentage of our common stock and could exert significant influence over matters requiring shareholder approval, including takeover attempts.***

Our executive officers and directors and their respective affiliates and the adult children of Sherwin Seligsohn, beneficially own, as of February 22, 2018, approximately 10.2% of the outstanding shares of our common stock. Accordingly, these individuals may, as a practical matter, be able to exert significant influence over matters requiring approval by our shareholders, including the election of directors and the approval of mergers or other business combinations. This concentration also could have the effect of delaying or preventing a change in control of us.

***Natural disasters or other unforeseen catastrophic events could unfavorably affect our business.***

Natural disasters, such as hurricanes, tsunamis, or earthquakes, particularly in Asia-Pacific region, where many of our customers are located, or the occurrence of other unforeseen catastrophic events, such a fire or flood, could unfavorably affect our business and financial performance. Such events could unfavorably affect our licensees in many ways, such as causing physical damage to one or more of their properties, the temporary or permanent closure of one or more plants, the disruption or cessation of manufacturing of product lines, and the temporary or long-term disruption in the supply or demand for their products. A resulting by-product of such natural disasters or other unforeseen catastrophic events could be a temporary or long-term disruption in the supply of or demand for our products.

***Our effective tax rate may increase or decrease.***

We are subject to income taxes in the U.S. and numerous foreign jurisdictions. Significant judgment is required in determining our worldwide provision for income taxes. In the ordinary course of our business, there are many transactions and calculations where the ultimate tax determination is uncertain. We are subject to audit by tax authorities where we do business. Although we believe that our tax estimates and tax positions are reasonable, they could be materially affected by many factors including the final outcome of tax audits and related litigation, the introduction of new tax accounting standards, legislation, regulations, and related interpretations, our global mix of earnings and the realizability of deferred tax assets. An increase or decrease in our effective tax rate could have a material adverse impact on our financial condition and results of operations.

In addition, at any time, U.S. federal tax laws or the administrative interpretations of those laws may be changed. In December 2017, the legislation commonly referred to as the Tax Cuts and Jobs Act, which made widespread changes to the Internal Revenue Code, was signed into law. While we believe that this law generally will have a favorable effect on U.S. corporations and their shareholders, uncertainty remains regarding the full effect that this law will have on us, particularly given the global nature of our operations, or the impact on our customers, vendors, shareholders and other stakeholders. We also cannot predict whether, when or to what extent other new U.S. federal tax laws, regulations, interpretations or rulings will be issued. As a result, changes in U.S. federal tax laws could negatively impact our operating results, financial condition and business operations, and adversely impact our shareholders.

Occasionally, changes in state and local tax laws or regulations are enacted that may result in an increase in our tax liability. Shortfalls in tax revenues for states and municipalities in recent years may lead to an increase in the frequency and size of such changes. If such changes occur, we may be required to pay additional taxes on our assets or income.

**ITEM 1B. *UNRESOLVED STAFF COMMENTS***

None.

**ITEM 2. *PROPERTIES***

Our corporate offices and research and development laboratories are located at 375 Phillips Boulevard in Ewing, New Jersey. In 2004, we acquired the building and property at which this facility is located. During 2005, we conducted a two-stage expansion of our laboratory and office space in the building, as well as a recent expansion in 2013 and 2015. We currently occupy the entire newly expanded facility. In 2017, we acquired the building and property at which the Adesis facility is located at 27 McCullough Drive in New Castle, Delaware.

**ITEM 3. *LEGAL PROCEEDINGS***

**Patent Related Challenges and Oppositions**

Each major jurisdiction in the world that issues patents provides both third parties and applicants an opportunity to seek a further review of an issued patent. The process for requesting and considering such reviews is specific to the jurisdiction that issued the patent in question, and generally does not provide for claims of monetary damages or a review of specific claims of infringement. The conclusions made by the reviewing administrative bodies tend to be appealable and generally are limited in scope and applicability to the specific claims and jurisdiction in question.

We believe that opposition proceedings are frequently commenced in the ordinary course of business by third parties who may believe that one or more claims in a patent do not comply with the technical or legal requirements of the specific jurisdiction in which the patent was issued. We view these proceedings as reflective of our goal of obtaining the broadest legally permissible patent coverage permitted in each jurisdiction. Once a proceeding is initiated, as a general matter, the issued patent continues to be presumed valid until the jurisdiction's applicable administrative body issues a final non-appealable decision. Depending on the jurisdiction, the outcome of these proceedings could include affirmation, denial or modification of some or all of the originally issued claims. We believe that as OLED technology becomes more established and as our patent portfolio increases in size, so will the number of these proceedings.

Below are summaries of certain active proceedings that have been commenced against issued patents that are either exclusively licensed to us or which are now assigned to us. We do not believe that the confirmation, loss or modification of our rights in any individual claim or set of claims that are the subject of the following legal proceedings would have a material impact on our materials sales or licensing business or on our consolidated financial statements, including our consolidated statements of income, as a whole. However, as noted within the descriptions, some of the following proceedings involve issued patents that relate to our fundamental phosphorescent OLED technologies and we intend to vigorously defend against claims that, in our opinion, seek to restrict or reduce the scope of the originally issued claim, which may require the expenditure of significant amounts of our resources. In certain circumstances, when permitted, we may also utilize the proceedings to request modification of the claims to better distinguish the patented invention from any newly identified prior art and/or improve the claim scope of the patent relative to commercially important categories of the invention. The entries marked with an "\*" relate to our UniversalPHOLED® phosphorescent OLED technology, some of which may be commercialized by us.

#### **Opposition to European Patent No. 1394870\***

On April 20, 2010, Merck Patent GmbH; BASF Schweitz AG of Basel, Switzerland; Osram GmbH of Munich, Germany; Siemens Aktiengesellschaft of Munich, Germany; and Koninklijke Philips Electronics N.V., of Eindhoven, The Netherlands filed Notices of Opposition to European Patent No.1394870 (the EP '870 patent). The EP '870 patent, which was issued on July 22, 2009, is a European counterpart patent, in part, to U.S. patents 6,303,238; 6,579,632; 6,872,477; 7,279,235; 7,279,237; 7,488,542; 7,563,519; and 7,901,795; and to pending U.S. patent application 13/035,051, filed on February 25, 2011 (hereinafter the "U.S. '238 Patent Family"). They are exclusively licensed to us by Princeton, and we are required to pay all legal costs and fees associated with this proceeding.

An Oral Hearing was held before an EPO panel of first instance in Munich, Germany, on April 8-9, 2014. After the completion of the hearing, the panel decided that the broad claims originally issued did not satisfy EPO requirements and amended the claims to more narrowly define the scope of the claims. The '870 patent, in its amended form, was held by the panel to comply with the EPO requirements.

We believe the EPO's decision relating to the broad original claims is erroneous and have appealed the ruling to reinstate a broader set of claims. Subsequent to the filing of the appeal, BASF withdrew its opposition to the patent. A hearing on the merits of the appeal has now been scheduled for the first quarter of 2018. This patent, as originally granted by the EPO, is deemed valid during the pendency of the appeals process.

At this time, based on our current knowledge, we believe that the patent being challenged should be declared valid and that at least some of our claims will be upheld. However, we cannot make any assurances of this result.

#### **Opposition to European Patent No. 1390962**

On November 16, 2011, Osram AG and BASF SE each filed a Notice of Opposition to European Patent No. 1390962 (the EP '962 patent), which relates to our white phosphorescent OLED technology. The EP '962 patent, which was issued on February 16, 2011, is a European counterpart patent to U.S. patents 7,009,338 and 7,285,907. They are exclusively licensed to us by Princeton, and we are required to pay all legal costs and fees associated with this proceeding.

The EPO combined the oppositions into a single opposition proceeding, and a hearing was held in December 2015, wherein the EPO Opposition Division revoked the patent claims for alleged insufficiencies under EPC Article 83. We believe the EPO's decision relating to the original claims is erroneous, and we have appealed the decision. Subsequent to the filing of the appeal, BASF withdrew its opposition to the patent. This patent, as originally granted by the EPO, is deemed valid during the pendency of the appeals process.

At this time, based on our current knowledge, we believe that the patent being challenged should be declared valid and that all or a significant portion of our claims should be upheld. However, we cannot make any assurances of this result.

#### **Opposition to European Patent No. 1933395\***

On February 24 and 27, 2012, Sumitomo, Merck Patent GmbH and BASF SE filed oppositions to our European Patent No. 1933395 (the EP '395 patent). The EP '395 patent is a counterpart patent to the EP '637 patent, and, in part, to the U.S. Patents 7,001,536; 6,902,830; and 6,830,828 and to JP patents 4358168 and 4357781. This patent is exclusively licensed to us by Princeton, and we are required to pay all legal costs and fees associated with this proceeding.

At an Oral Hearing on October 14, 2013, the EPO panel issued a decision that affirmed the basic invention and broad patent coverage in the EP '395 patent, but narrowed the scope of the original claims.

On February 26, 2014, we appealed the ruling to reinstate a broader set of claims. The patent, as originally granted by the EPO, is deemed to be valid during the pendency of the appeals process. Two of the three opponents also filed their own appeals of the ruling. In January 2015, Sumitomo withdrew its opposition of the '395 patent, and the EPO accepted the withdrawal notice. The appeal proceedings were held in the second quarter of 2016. As a result of the proceedings, the board concluded the oral proceedings and proposed to reinstate a broader set of claims pending the resolution of a remaining question of the applicable law, a question that the board has deferred to the Enlarged Board of Appeals for review. In December 2017, the Enlarged Board of Appeals issued a written opinion in which they have generally followed our reasoning regarding the question of law. The written opinion should be used as guidance by the EPO opposition panel when the oral proceedings are rescheduled. The originally-granted claims remain in force during the pendency of this process.

In addition to the above proceedings and now concluded proceedings which have been referenced in prior filings, from time to time, we may have other proceedings that are pending which relate to patents we acquired as part of the Fujifilm patent or BASF OLED patent acquisitions or which relate to technologies that are not currently widely utilized in the marketplace.

## EXECUTIVE OFFICERS OF THE REGISTRANT

The following table sets forth certain information with respect to our executive officers as of February 22, 2018:

Name	Age	Position
Sherwin I. Seligsohn	82	Founder and Chairman of the Board of Directors
Steven V. Abramson	66	President, Chief Executive Officer and Director
Sidney D. Rosenblatt	70	Executive Vice President, Chief Financial Officer, Treasurer, Secretary and Director
Julia J. Brown	56	Senior Vice President and Chief Technical Officer
Janice M. DuFour	60	Vice President of Technology Commercialization and General Manager, PHOLED Material Sales Business
Mauro Premutico	52	Vice President, Legal and General Manager, Patents and Licensing

Our Board of Directors has appointed these executive officers to hold office until their successors are duly appointed.

**Sherwin I. Seligsohn** is our Founder and has been the Chairman of our Board of Directors since June 1995. He also served as our Chief Executive Officer from June 1995 through December 2007, and as our President from June 1995 through May 1996. Mr. Seligsohn serves as the sole Director, President and Secretary of American Biomimetics Corporation, International Multi-Media Corporation, and Wireless Unified Network Systems Corporation. He was also previously the Chairman of the Board of Directors, President and Chief Executive Officer of NanoFlex Power Corporation (formally known as Global Photonic Energy Corporation) (NanoFlex) since its inception until April 2012, when he resigned from his positions at NanoFlex. Since that time, the only relationship Mr. Seligsohn has had with NanoFlex is as a shareholder and option holder. From June 1990 to October 1991, Mr. Seligsohn was Chairman Emeritus of InterDigital Communications, Inc. (InterDigital), formerly International Mobile Machines Corporation. He founded InterDigital and from August 1972 to June 1990 served as its Chairman of the Board of Directors. Mr. Seligsohn is a member of the Industrial Advisory Board of the Princeton Institute for the Science and Technology of Materials (PRISM) at Princeton.

**Steven V. Abramson** is our President and Chief Executive Officer, and has been a member of our Board of Directors since May 1996. Mr. Abramson served as our President and Chief Operating Officer from May 1996 through December 2007. From March 1992 to May 1996, Mr. Abramson was Vice President, General Counsel, Secretary and Treasurer of Roy F. Weston, Inc., a worldwide environmental consulting and engineering firm. From December 1982 to December 1991, Mr. Abramson held various positions at InterDigital, including General Counsel, Executive Vice President and General Manager of the Technology Licensing Division.

**Sidney D. Rosenblatt** is an Executive Vice President and has been our Chief Financial Officer, Treasurer and Secretary since June 1995. He also has been a member of our Board of Directors since May 1996. Mr. Rosenblatt was the owner of S. Zitner Company from August 1990 through August 2010 and served as its President from August 1990 through December 1998. From May 1982 to August 1990, Mr. Rosenblatt served as the Senior Vice President, Chief Financial Officer and Treasurer of InterDigital. Mr. Rosenblatt is on the Board of Managers of the Overbrook School for the Blind. He is also a member of the Board of the Careers in Culinary Arts Program.

**Julia J. Brown, Ph.D.** is a Senior Vice President and has been our Chief Technical Officer since June 2002. She joined us in June 1998 as our Vice President of Technology Development. From November 1991 to June 1998, Dr. Brown was a Research Department Manager at Hughes Research Laboratories where she directed the pilot line production of high-speed Indium Phosphide-based integrated circuits for insertion into advanced airborne radar and satellite communication systems. Dr. Brown received an M.S. and Ph.D. in Electrical Engineering/Electrophysics at USC under the advisement of Professor Stephen R. Forrest. Dr. Brown has

served as an Associate Editor of the Journal of Electronic Materials and as an elected member of the Electron Device Society Technical Board. She co-founded an international engineering mentoring program sponsored by the Institute of Electrical and Electronics Engineers (IEEE) and is a Fellow of the IEEE. Dr. Brown has served on numerous technical conference committees and is presently a member of the Society of Information Display.

**Janice M. DuFour (formally Janice K. Mahon)** has been our Vice President of Technology Commercialization since January 1997, and became the General Manager of our PHOLED Material Sales Business in January 2007. From 1992 to 1996, Ms. DuFour was Vice President of SAGE Electrochromics, Inc., a thin-film electrochromic technology company, where she oversaw a variety of business development, marketing and finance and administrative activities. From 1984 to 1989, Ms. DuFour was a Vice President and General Manager for Chronar Corporation, a leading developer and manufacturer of amorphous silicon photovoltaic (PV) panels. Prior to that, Ms. DuFour worked as Senior Engineer for the Industrial Chemicals Division of FMC Corporation. Ms. DuFour received her B.S. in Chemical Engineering from Rensselaer Polytechnic Institute in 1979, and an M.B.A. from Harvard University in 1984. Ms. DuFour was a member of the Technical Council of the FlexTech Alliance from 1997 through 2010, and a member of its Governing Board from 2008 through 2010. Ms. DuFour was a member of the Board of Directors and Marketing Committee Chairperson of the OLED Association from 2009-2014.

**Mauro Premutico** has been our Vice President of Legal and General Manager of Patents and Licensing since April 2012. Prior to joining us, Mr. Premutico was the Managing Vice President and Chief Patent Counsel for The Walt Disney Company from 2009 to 2012, and Vice President of Intellectual Property and Associate General Counsel for Lenovo Group Ltd. from 2005 to 2009. Mr. Premutico was also Special Counsel at the international law firm of Cleary, Gottlieb, Steen & Hamilton from 2002 until 2005 where he served as the co-head of the New York's office Intellectual Property and Technology Law practice. Mr. Premutico received his law degree from Boston University School of Law and a BSEE from Worcester Polytechnic Institute.

**ITEM 4. MINE SAFETY DISCLOSURES**

Not applicable.

**PART II**

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

**Our Common Stock**

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

	High Close	Low Close	Dividend
<b>2017</b>			
Fourth Quarter	\$ 190.95	\$ 126.60	\$ 0.03
Third Quarter	142.20	108.60	0.03
Second Quarter	127.10	81.00	0.03
First Quarter	87.30	57.00	0.03
<b>2016</b>			
Fourth Quarter	\$ 62.85	\$ 49.22	-
Third Quarter	73.82	55.26	-
Second Quarter	70.84	52.85	-
First Quarter	54.76	41.69	-

As of February 22, 2018, there were approximately 288 holders of record of our common stock.

During 2017, we declared and paid for the first time cash dividends on our common stock. See Note 21 of the Notes to Consolidated Financial Statements. While we intend to pay regular quarterly dividends in the future, payment of future cash dividends will be at the discretion of our Board of Directors and will depend upon our results of operations, earnings, capital requirements, contractual restrictions and other factors deemed relevant by our Board of Directors. As such, we may modify, suspend or cancel our cash dividend policy in any manner and at any time.

**Share Repurchases**

In June 2014, we announced that the Board of Directors had approved a program to repurchase up to \$50 million of the outstanding shares of our common stock from time to time over the next twelve months (the Repurchase Program). During the period, we repurchased 956,362 shares of common stock at a cost of \$29.5 million. The repurchase program ended during the second quarter of 2015.

During the quarter ended December 31, 2017, we acquired 751 shares of common stock through transactions related to the vesting of restricted share awards previously granted to employees of ours. Upon vesting, the employees turned in shares of common stock in amounts sufficient to pay the minimum statutory tax withholding at rates required by the relevant tax authorities.

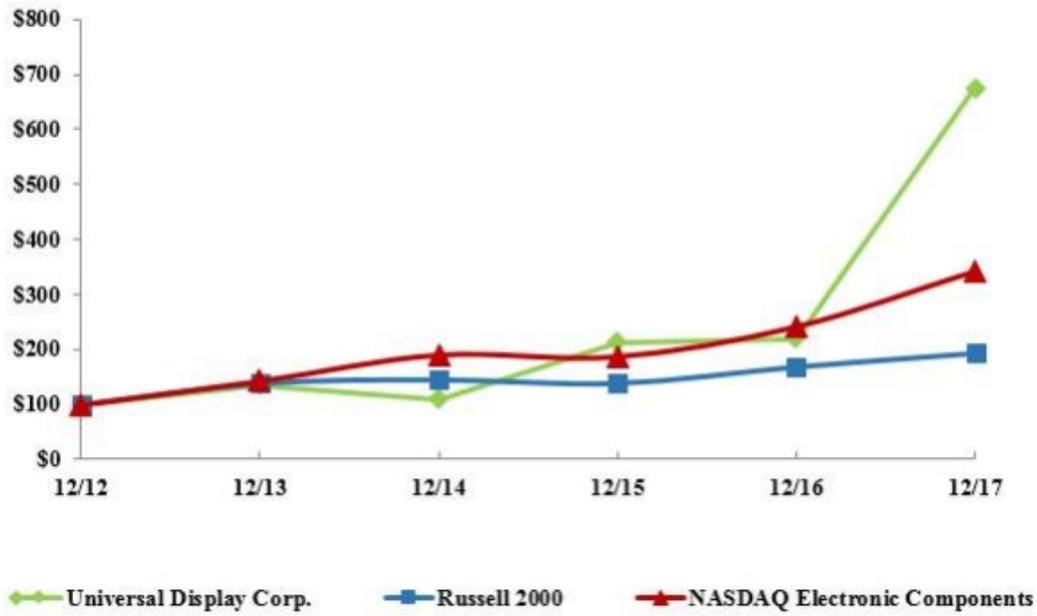
The following table provides information relating to the shares we acquired during the fourth quarter of 2017 (dollar amounts in thousands, other than per share amounts):

Period	Total Number of Shares Purchased	Weighted Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Program	Approximate Dollar Value of Shares that May Yet Be Purchased Under the Program
October 1 – October 31	674	131.09	—	\$ —
November 1 – November 30	77	158.10	—	—
December 1 – December 31	—	—	—	—
Total	<u>751</u>	—	<u>—</u>	—

## Performance Graph

The performance graph below compares the change in the cumulative shareholder return of our common stock from December 31, 2012 to December 31, 2017, with the percentage change in the cumulative total return over the same period on (i) the Russell 2000 Index, and (ii) the Nasdaq Electronics Components Index. This performance graph assumes an initial investment of \$100 on December 31, 2012 in each of our common stock, the Russell 2000 Index and the Nasdaq Electronics Components Index.

### COMPARISON OF 5 YEAR CUMULATIVE TOTAL RETURN



	Cumulative Total Return					
	12/12	12/13	12/14	12/15	12/16	12/17
Universal Display Corp.	100.00	134.11	108.31	212.49	219.75	674.57
Russell 2000	100.00	138.82	145.62	139.19	168.85	193.58
NASDAQ Electronic Components	100.00	142.79	190.07	186.91	241.21	341.27

## Securities Authorized for Issuance under Equity Compensation Plans

The information required by this item with respect to our equity compensation plans will be set forth in our Proxy Statement, and is incorporated herein by reference.

**ITEM 6. SELECTED FINANCIAL DATA**

The following selected consolidated financial data has been derived from, and should be read in conjunction with, our Consolidated Financial Statements and the notes thereto, and with “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” included elsewhere in this report.

(in thousands, except share and per share data)

	Year Ended December 31,				
	2017	2016	2015	2014	2013
<b>Operating Results:</b>					
Total revenue	\$ 335,629	\$ 198,886	\$ 191,046	\$ 191,031	\$ 146,639
Cost of sales (1)	54,698	26,288	62,997	41,315	28,889
Research and development expense	49,144	42,744	44,641	41,154	34,215
Selling, general and administrative expense	46,808	32,876	29,046	28,135	24,745
Amortization of acquired technology and other intangible assets	21,983	16,493	10,999	10,997	10,973
Patent costs	7,010	6,249	5,717	6,291	6,300
Interest income, net	3,294	2,113	783	707	764
Income tax (expense) benefit (2)	(45,652)	(20,528)	(18,381)	(17,473)	35,044
Net income	103,885	48,070	14,678	41,854	74,052
Net income per common share, basic	\$ 2.19	\$ 1.02	\$ 0.31	\$ 0.90	\$ 1.61
Net income per common share, diluted	\$ 2.18	\$ 1.02	\$ 0.31	\$ 0.90	\$ 1.59
<b>Balance Sheet Data:</b>					
Total assets	\$ 779,956	\$ 627,559	\$ 559,412	\$ 489,847	\$ 462,754
Current liabilities	63,824	40,206	34,510	26,823	23,229
Shareholders’ equity	659,054	528,468	466,765	448,742	427,686
<b>Other Financial Data:</b>					
Working capital	\$ 455,358	\$ 345,164	\$ 413,174	\$ 343,682	\$ 303,819
Capital expenditures	29,803	7,300	5,103	6,153	4,710
Purchase of intangibles	—	95,989	—	—	359
Weighted average shares used in computing basic net income per common share	46,725,289	46,408,460	46,816,394	46,252,960	45,898,019
Weighted average shares used in computing diluted net income per common share	46,805,194	46,535,980	47,494,188	46,685,145	46,543,605
Shares of common stock outstanding, end of period	48,476,034	48,270,990	48,132,223	47,061,826	46,423,667

(1) During the second quarter of 2015, the Company experienced a faster-than-anticipated decline in host material sales, which we believe was a result of our customer's selling new products that did not include our host materials. Based on the most recent sales forecast, we determined that there were likely to be significantly lower sales of our existing host material. As such, a write-down in net realizable value of our inventory of \$33.0 million during the second quarter of 2015 was required.

(2) During the year ended December 31, 2013, we released income tax valuation allowances of \$59.4 million.

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

*The following discussion and analysis of our financial condition and results of operations should be read in conjunction with the section entitled "Selected Financial Data" in this report and our Consolidated Financial Statements and related notes to this report. This discussion and analysis contains forward-looking statements based on our current expectations, assumptions, estimates and projections. These forward-looking statements involve risks and uncertainties. Our actual results could differ materially from those indicated in these forward-looking statements as a result of certain factors, as more fully discussed in Item 1A of this report, entitled "Risk Factors."*

### OVERVIEW

We are a leader in the research, development and commercialization of organic light emitting diode, or OLED, technologies and materials for use in displays for mobile phones, televisions, tablets, wearables, portable media devices, notebook computers, personal computers, and automotive applications, as well as specialty and general lighting products. Since 1994, we have been exclusively engaged, and expect to continue to be primarily engaged, in funding and performing research and development activities relating to OLED technologies and materials, and commercializing these technologies and materials. We derive our revenue from the following:

- sales of OLED materials for evaluation, development and commercial manufacturing;
- intellectual property and technology licensing;
- contract research services; and
- technology development and support, including government contract work and support provided to third parties for commercialization of their OLED products.

Material sales relate to our sale of OLED materials for incorporation into our customers' commercial OLED products or for their OLED development and evaluation activities. Material sales are recognized at the time title passes, which is typically at the time of shipment or at the time of delivery, depending upon the contractual agreement between the parties.

We receive license and royalty payments under certain commercial, development and technology evaluation agreements, some of which are non-refundable advances. These payments may include royalty and license fees made pursuant to license agreements and also license fees included as part of certain commercial supply agreements. For arrangements with extended payment terms, where the fee is not fixed or determinable, we recognize revenue when the payment is due and payable. Royalty revenue and license fees included as part of commercial supply agreements are recognized when earned and the amount is fixed and determinable.

In 2017, our most significant commercial license agreement was a 2011 license agreement with SDC covering the manufacture and sale of specified OLED display products. The 2011 agreement expired at the end of 2017 and has been extended with a new five year license agreement with a two-year extension option. Under the 2011 agreement, we were being paid a license fee, payable in semi-annual installments over the agreement term of 6.4 years. The installments, which were due in the second and fourth quarter of each year, increased on an annual basis over the term of the 2011 agreement. The 2011 agreement conveyed to SDC the non-exclusive right to use certain of our intellectual property assets for a limited period of time that were less than the estimated life of the assets. Ratable recognition of revenue was impacted by the agreement's extended increasing payment terms in light of our limited history with similar agreements. As a result, revenue was recognized at the lesser of the proportional performance approach (ratable) and the amount of due and payable fees from SDC. Given the increasing contractual payment schedule, license fees under the 2011 agreement were recognized as revenue when they became due and payable in the second and fourth quarter of each year.

At the same time we entered into the 2011 patent license agreement with SDC, we also entered into a supplemental material purchase agreement with SDC which also expired in 2017 and was also extended with a new five year supply agreement with a two year extension option. Under the 2011 supplemental material purchase agreement, SDC agreed to purchase from us a minimum dollar amount of phosphorescent emitter materials for use in the manufacture of licensed products. This minimum purchase commitment was subject to SDC's requirements for phosphorescent emitter materials and our ability to meet these requirements over the term of the supplemental agreement.

In 2015, we entered into an OLED patent license agreement and an OLED commercial supply agreement with LG Display Co., Ltd. (LG Display), which were effective as of January 1, 2015 and superseded the existing 2007 commercial supply agreement between the parties. The new agreements have a term that is set to expire by the end of 2022. The patent license agreement provides LG Display a non-exclusive, royalty bearing portfolio license to make and sell OLED displays under the Company's patent portfolio. The patent license calls for license fees, prepaid royalties and running royalties on licensed products. The agreements include customary provisions relating to warranties, indemnities, confidentiality, assignability and business terms. The agreements provide for certain other minimum obligations relating to the volume of materials sales anticipated over the life of the agreements as well as

minimum royalty revenue to be generated under the patent license agreement. The Company expects to generate revenue under these agreements that are predominantly tied to LG Display's sales of OLED licensed products. The OLED commercial supply agreement provides for the sales of materials for use by LG Display, which may include phosphorescent emitters and host materials.

In 2017, we entered into long-term, multi-year agreements with BOE Technology Group Co., Ltd. (BOE). Under these agreements, we have granted BOE non-exclusive license rights under various patents owned or controlled by us to manufacture and sell OLED display products. We have also agreed to supply phosphorescent OLED materials to BOE.

In 2016, we entered into OLED patent license and material purchase agreements having five year durations with Tianma Micro-electronics Co. Ltd. (Tianma). Under the license agreement, we have granted Tianma non-exclusive license rights under various patents owned or controlled by us to manufacture and sell OLED display products. The license agreement calls for license fees and running royalties on licensed products. Additionally, we expect to supply phosphorescent OLED materials to Tianma for use in its licensed products.

In 2016, we acquired Adesis, Inc. (Adesis) with operations in New Castle, Delaware. Adesis is a contract research organization (CRO) that provides support services to the OLED, pharma, biotech, catalysis and other industries. As of December 31, 2017, Adesis employed a team of 50 chemists. Prior to our acquisition in 2016, we utilized more than 50% of Adesis' technology service and production output. We continue to utilize a significant portion of its technology research capacity for the benefit of our OLED technology development, and Adesis uses the remaining capacity to operate as a CRO in the above-mentioned industries providing contract research services to those third party customers. Contract research services is revenue earned by performing organic and organometallic synthetics research, development and commercialization on a contractual basis for our customers.

We also generate technology development and support revenue earned from government contracts, development and technology evaluation agreements and commercialization assistance fees, which include reimbursements by government entities for all or a portion of the research and development costs we incur in relation to our government contracts. Revenues are recognized as services are performed, proportionally as research and development costs are incurred, or as defined milestones are achieved.

We anticipate fluctuations in our annual and quarterly results of operations due to uncertainty regarding, among other factors:

- the timing, cost and volume of sales of our OLED materials;
- the timing of our receipt of license fees and royalties, as well as fees for future technology development and evaluation;
- the timing and magnitude of expenditures we may incur in connection with our ongoing research and development and patent-related activities; and
- the timing and financial consequences of our formation of new business relationships and alliances.

### **Critical Accounting Policies and Estimates**

The discussion and analysis of our financial condition and results of operations is based on our consolidated financial statements, which have been prepared in accordance with U.S. generally accepted accounting principles. The preparation of these financial statements requires us to make estimates and judgments that affect our reported assets and liabilities, revenues and expenses, and other financial information. Actual results may differ significantly from our estimates under other assumptions and conditions.

We believe that our accounting policies related to revenue recognition, inventories, the valuation and recoverability of acquired technology, and income taxes, as described below, are our "critical accounting policies" as contemplated by the SEC. These policies, which have been reviewed with our Audit Committee, are discussed in greater detail below.

### ***Revenue Recognition and Deferred Revenue***

Material sales relate to the Company's sale of its OLED materials for incorporation into its customers' commercial OLED products or for their OLED development and evaluation activities. Material sales are recognized at the time title passes, which is typically at the time of shipment or at the time of delivery, depending upon the contractual agreement between the parties.

We receive license and royalty payments under certain commercial, development and technology evaluation agreements with our customers, some of which payments are nonrefundable. These payments may include royalty and license fees made pursuant to license agreements and certain material supply agreements. Amounts received are deferred and classified as either current or non-current deferred revenue based upon current contractual remaining terms; however, based upon on-going relationships with customers, as well as future agreement extensions and other factors, amounts classified as current may not be recognized as revenue over the next

twelve months. For arrangements with extended payment terms where the fee is not fixed and determinable, we recognize revenue when the payment is due and payable. Royalty revenue and license fee revenue included as part of commercial supply agreements are recognized when earned and the amount is fixed and determinable. If we used different estimates for the useful life of the licensed technology, or if fees are fixed and determinable, reported revenue during the relevant period would differ.

Contract research services revenue is revenue earned by performing organic and organometallic synthetics research, development and commercialization on a contractual basis. These services range from intermediates for structure-activity relationship studies, reference agents and building blocks for combinatorial synthesis, re-synthesis of key intermediates, specialty organic chemistry needs, and selective toll manufacturing. These services are provided to third-party pharmaceutical and life sciences firms and other technology firms at fixed costs or on an annual contract basis. Revenue is recognized as services are performed with billing schedules and payment terms negotiated on a contract-by-contract basis. Payments received in excess of revenue recognized are recorded as deferred revenue. In other cases, services may be provided and revenue is recognized before the client is invoiced. In these cases, revenue recognized will exceed amounts billed and the difference, representing amounts which are currently unbillable to the customer pursuant to contractual terms, is recorded as an unbilled receivable.

Technology development and support revenue is revenue earned from technology evaluation and development agreements, commercialization assistance fees, and government contracts which includes reimbursements by the U.S. government for all or a portion of the research and development expenses we incur on those contracts. Revenue is recognized proportionally as research and development expenses are incurred or as defined milestones are achieved. In order to ascertain the revenue associated with these contracts for a period, we estimate the proportion of related research and development expenses incurred and whether defined milestones have been achieved. Different estimates would result in different revenues for the period.

The Company records taxes billed to customers and remitted to various governmental entities on a gross basis in both revenues and cost of material sales in the consolidated statements of income. The amounts of these pass through taxes reflected in revenues and cost of material sales were \$409,000, \$171,000, and \$1.3 million in the years ended December 31, 2017, 2016 and 2015, respectively.

### ***Inventories***

Inventories consist of raw materials, work-in-process and finished goods, including inventory consigned to our customers, and are stated at the lower of cost, determined on a first-in, first-out basis, or market. Inventory valuation and firm committed purchase order assessments are performed on a quarterly basis and those items that are identified to be obsolete or in excess of forecasted usage are written down to their estimated realizable value. Estimates of realizable value are based upon management's analyses and assumptions, including, but not limited to, forecasted sales levels by product, expected product lifecycle, product development plans and future demand requirements. A 12-month rolling forecast based on factors, including, but not limited to, our production cycles, anticipated product orders, marketing forecasts, backlog, and shipment activities is used in the analysis. If market conditions are less favorable than our forecasts or actual demand from our customers is lower than our estimates, we may require additional inventory write-downs. If demand is higher than expected, inventories that had previously been written down may be sold.

Certain of the Company's customers have assumed the responsibility for maintaining our inventory at their location based on the customers' demand forecast. Notwithstanding the fact that the Company builds and ships the inventory, the customer does not purchase the consigned inventory until the inventory is drawn or pulled by the customer to be used in the manufacture of the customer's product. Though the consigned inventory may be at the customer's physical location, it remains inventory owned by the Company until the inventory is drawn or pulled, which is the time at which the sale takes place.

### ***Accounting for Income Taxes***

We are subject to income taxes in both the U.S. and foreign jurisdictions. Significant judgments and estimates are required in evaluating our tax positions for future realization and determining our provision for income taxes. Our income tax expense, deferred tax assets and liabilities, and reserves for unrecognized tax benefits reflect management's best assessment of estimated future taxes to be paid.

Our income tax expense during the year ended December 31, 2017 primarily related to federal taxes on our U.S. income, foreign withholding taxes, and a one-time charge due to the enactment of the Tax Cuts and Jobs Act in December 2017. The foreign taxes were primarily related to foreign taxes withheld on royalty and license fees paid to the U.S. operating entity. SDC has been required to withhold tax upon payment of royalty and license fees to the U.S. operating entity at a rate of 16.5%. In assessing the realizability of deferred tax assets, we consider whether it is more likely than not that some portion or all of our deferred tax assets will not be realized. The ultimate realization of deferred tax assets is dependent on our ability to generate future taxable income to obtain benefit from the reversal of temporary differences, net operating loss carryforwards and tax credits. As part of our assessment we consider the scheduled reversal of deferred tax assets and liabilities, projected future taxable income, and tax planning strategies. After the

revaluation of the net deferred assets from 35% to 21% as required by the Tax Cuts and Jobs Act the net deferred tax assets totaled \$ 27.0 million, representing 3.5 % of total assets, as of December 31, 2017.

During the year ended December 31, 2017, based on previous earnings history, a current evaluation of expected future taxable income and other evidence, we determined to retain the valuation allowance that relates to New Jersey research and development credits. The valuation allowance that related to UDC Ireland was almost completely utilized to offset income of this subsidiary during the year; the remainder has been released. Actual results could differ from our assessments if adequate taxable income is generated in future periods. To the extent we establish a new valuation allowance or change a previously established valuation allowance in a future period, income tax expense will be impacted.

## RESULTS OF OPERATIONS

### Year Ended December 31, 2017 Compared to Year Ended December 31, 2016

We had operating income of \$146.2 million for the year ended December 31, 2017, as compared to operating income of \$68.4 million for the year ended December 31, 2016. The increase in operating income was primarily due to the following:

- an increase in material sales of \$101.0 million partially offset by an increase in the cost of material sales of \$28.4 million; and
- an increase in royalties and license fees of \$30.4 million; partially offset by
- an increase in operating expenses of \$30.5 million.

We had net income of \$103.9 million or \$2.19 per basic and \$2.18 per diluted share for the year ended December 31, 2017, as compared to net income of \$48.1 million or \$1.02 per basic and diluted share for the year ended December 31, 2016. The increase in net income was due to an increase in operating income of \$77.8 million, partially offset by an increase in income tax expense of \$25.1 million.

### Revenue

The following table details our revenues for the years ended December 31, 2017 and 2016 (amounts in thousands):

	Year Ended December 31,		Increase	
	2017	2016	\$	%
REVENUE:				
Material sales	\$ 200,259	\$ 99,285	\$ 100,974	102%
Royalty and license fees	126,503	96,132	30,371	32%
Contract research services	8,867	3,469	5,398	156%
Total revenue	<u>\$ 335,629</u>	<u>\$ 198,886</u>	<u>\$ 136,743</u>	69%

Total revenue for the year ended December 31, 2017 increased by \$136.7 million as compared to the year ended December 31, 2016. The increase in revenue was the result of an increase in material sales, royalty and license fees, and contract research services for the reasons noted below.

### Material sales

Material sales included sales of both phosphorescent emitter and host materials comprised of the following for the years ended December 31, 2017 and 2016 (amounts in thousands):

	Year Ended December 31,		Increase	
	2017	2016	\$	%
Material Sales:				
Phosphorescent emitter sales	\$ 198,705	\$ 97,894	\$ 100,811	103%
Host material sales	1,554	1,391	163	12%
Total material sales	<u>\$ 200,259</u>	<u>\$ 99,285</u>	<u>\$ 100,974</u>	102%

Phosphorescent emitter sales for the year ended December 31, 2017 increased by \$100.8 million as compared to the year ended December 31, 2016 due to an increase in sales volume resulting from higher demand for both red and green phosphorescent emitters.

Host material sales for the year ended December 31, 2017 increased by \$ 163,000 as compared to the year ended December 31, 2016 and primarily consisted of developmental host materials. Based on our current sales forecast, we anticipate that sales of existing host material will continue to be minimal. Our customers are not required to purchase our host materials in order to utilize our phosphorescent emitter materials and the host material sales business continues to be more competitive than the phosphorescent emitter material sales business.

#### ***Royalty and license fees***

Royalty and license fees were as follows for the years ended December 31, 2017 and 2016 (amounts in thousands):

	Year Ended December 31,		Increase	
	2017	2016	\$	%
Royalty and license fees	\$ 126,503	\$ 96,132	\$ 30,371	32%

Royalty and license fees for the year ended December 31, 2017 increased by \$30.4 million as compared to the year ended December 31, 2016. The increase was primarily related to the receipt and recognition of \$90.0 million of royalty and license fee payments under our patent license agreement with SDC as compared to \$75.0 million in the prior period, as well as to higher licensed sales and royalties from our customers.

#### ***Contract research services***

Contract research services revenue were as follows for the years ended December 31, 2017 and 2016 (amounts in thousands):

	Year Ended December 31,		Increase	
	2017	2016	\$	%
Contract research services	\$ 8,867	\$ 3,469	\$ 5,398	156%

Contract research services include revenue earned by our subsidiary, Adesis, which performs organic and organometallic synthetics research, development and commercialization on a contractual basis for our customers. Contract research services also include technology development and support revenue earned on government contracts, development and technology evaluation agreements and commercialization assistance fees, which includes reimbursements by the U.S. government for all or a portion of the research and development expenses we incur related to our government contracts.

Contract research services revenue for the year ended December 31, 2017 increased by \$5.4 million as compared to the year ended December 31, 2016. The increase in contract research services revenue was related to contract research sales associated with Adesis, which was acquired on July 11, 2016 and as such included less than six months of sales activity in the prior year.

#### ***Cost of material sales***

Cost of material sales were as follows for the years ended December 31, 2017 and 2016 (amounts in thousands):

	Year Ended December 31,		Increase	
	2017	2016	\$	%
Material Sales	\$ 200,259	\$ 99,285	\$ 100,974	102%
Cost of material sales	49,240	24,539	24,701	101%
Gross margin on material sales	151,019	74,746	76,273	102%
Gross margin as a % of material sales	75%	75%		

Cost of material sales for the year ended December 31, 2017 increased by \$24.7 million as compared to the year ended December 31, 2016 and was primarily due to an increase in the level of material sales. As a result, gross margin on material sales for the year ended December 31, 2017 increased by \$76.3 million as compared to the year ended December 31, 2016 with gross margin as a percentage of material sales remaining consistent at 75% during both years.

### ***Research and development***

Research and development expenses increased to \$49.1 million for the year ended December 31, 2017, as compared to \$42.7 million for the year ended December 31, 2016. The increase in research and development expenses was primarily due to higher third-party contract research services activities as well as higher employee-related costs.

### ***Selling, general and administrative***

Selling, general and administrative expenses increased to \$46.8 million for the year ended December 31, 2017, as compared to \$32.9 million for the year ended December 31, 2016. The increase in selling, general and administrative expenses was primarily due to incremental costs associated with the addition of Adesis activity, as well as higher employee-related costs and other operating expenses.

### ***Amortization of acquired technology and other intangible assets***

Amortization of acquired technology and other intangible assets increased to \$22.0 million for the year ended December 31, 2017, as compared to \$16.5 million for the year ended December 31, 2016. The increase was due to higher amortization expense of \$5.5 million associated with the acquisitions of the BASF patent portfolio and intangible assets associated with the Adesis acquisition. See Note 8 in Notes to Consolidated Financial Statements for further discussion.

### ***Patent costs***

Patent costs increased to \$7.0 million for the year ended December 31, 2017, as compared to \$6.2 million for the year ended December 31, 2016.

### ***Royalty and license expense***

Royalty and license expense increased to \$9.7 million for the year ended December 31, 2017, as compared to \$5.8 million for the year ended December 31, 2016. The increase was due to increased royalties incurred under our amended license agreement with Princeton, USC, and Michigan, resulting from an increase in royalty and license fees and qualifying material sales. See Note 10 in Notes to Consolidated Financial Statements for further discussion.

### ***Interest income, net and other expense, net***

Interest income, net, was \$3.3 million for the year ended December 31, 2017, as compared to \$2.1 million for the year ended December 31, 2016. The increase was primarily due to higher interest rates on cash equivalents and investment balances. Other expense, net primarily consisted of net exchange gains and losses on foreign currency transactions. We recorded other expense of \$4,000 for the year ended December 31, 2017, as compared to other expense of \$1.9 million for the year ended December 31, 2016. Other expense for the year ended December 31, 2016 primarily consisted of exchange losses on foreign currency associated with the BASF OLED patent acquisition.

### ***Income tax expense***

We are subject to income taxes in both the United States and foreign jurisdictions. The effective income tax rate was 30.5% and 29.9%, for the years ended December 31, 2017 and 2016, respectively, and the Company recorded income tax expense of \$45.7 million and \$20.5 million, respectively. The effective income tax rate for the year ended December 31, 2017 reflected a benefit from the utilization of a valuation allowance at UDC Ireland.

The enactment of the Tax Cuts and Jobs Act (TCJA) in December 2017 resulted in a one-time charge of \$11.5 million in the fourth quarter. The charge includes two elements, a tax on accumulated overseas profits and the revaluation of deferred tax assets and liabilities. Without the TCJA, for the year ended December 31, 2017, the effective income tax rate and income tax expense would have been 22.8% and \$34.2 million.

On January 1, 2017, we adopted ASU No. 2016-09, *Improvements to Employee Share-Based Accounting*, which includes provisions intended to simplify various aspects related to how share-based payments are accounted for and presented in the financial statements. Under the previous guidance, tax effects of deductions for employee share awards in excess of compensation cost ("windfalls") were recorded in equity in the period in which the deductions actually reduced income taxes payable and any unrecognized tax benefits were tracked separately off the balance sheet. Under the new guidance, excess tax benefits and deficiencies are recorded in the income statement in the period in which stock awards vest or are settled, and any excess tax benefits not previously recognized because the related tax deduction had not reduced current taxes payable are recorded through a cumulative-effect adjustment to retained earnings at the beginning of the period of adoption.

Without the adoption of ASU No. 2016-09 and the enactment of TCJA, for the year ended December 31, 2017, the effective income tax rate and income tax expense would have been 24.8% and \$37.2 million.

The foreign taxes are primarily related to foreign taxes withheld on royalty and license fees paid to the U.S. operating entity. SDC has been required to withhold tax upon payment of royalty and license fees to the U.S. operating entity at a rate of 16.5%. During the years ended December 31, 2017 and 2016, we paid South Korean withholding taxes of \$14.9 million and \$12.4 million, respectively.

#### Year Ended December 31, 2016 Compared to Year Ended December 31, 2015

We had operating income of \$68.4 million for the year ended December 31, 2016, as compared to operating income of \$32.3 million for the year ended December 31, 2015. The increase in operating income was primarily due to the following:

- an increase in revenue of \$7.8 million; and
- a decrease in cost of sales of \$36.7 million, due to a \$33.0 million write-down of inventory that was recorded in 2015, as well as a reduction in host material sales which possess less favorable gross margins relative to emitter sales; partially offset by
- an increase in operating expenses of \$8.4 million.

We had net income of \$48.1 million or \$1.02 per basic and diluted share for the year ended December 31, 2016, as compared to net income of \$14.7 million or \$0.31 per basic and diluted share for the year ended December 31, 2015. The increase in net income was due to an increase in operating income of \$36.1 million, partially offset by an increase in income tax expense of \$2.1 million.

For the year ended December 31, 2015, absent the inventory write-down and the associated \$2.8 million reduction of income tax expense, we had adjusted net income of \$44.8 million (or \$0.96 per share, basic and \$0.94 per share, diluted).

#### Revenue

The following table details our revenues for the years ended December 31, 2016 and 2015 (amounts in thousands):

	Year Ended December 31,		(Decrease) Increase	
	2016	2015	\$	%
<b>REVENUE:</b>				
Material sales	\$ 99,285	\$ 113,066	\$ (13,781)	(12)%
Royalty and license fees	96,132	77,773	18,359	24%
Contract research services	3,469	207	3,262	1576%
Total revenue	<u>\$ 198,886</u>	<u>\$ 191,046</u>	<u>\$ 7,840</u>	<u>4%</u>

Total revenue for the year ended December 31, 2016 increased by \$7.8 million as compared to the year ended December 31, 2015. The increase in revenue was the result of an increase in royalty and license fees and contract research services offset by a decrease in material sales.

#### Material sales

Material sales included sales of both phosphorescent emitter and host materials comprised of the following for the years ended December 31, 2016 and 2015 (amounts in thousands):

	Year Ended December 31,		Decrease	
	2016	2015	\$	%
<b>Material Sales:</b>				
Phosphorescent emitter sales	\$ 97,894	\$ 100,571	\$ (2,677)	(3)%
Host material sales	1,391	12,495	(11,104)	(89)%
Total material sales	<u>\$ 99,285</u>	<u>\$ 113,066</u>	<u>\$ (13,781)</u>	<u>(12)%</u>

Phosphorescent emitter sales for the year ended December 31, 2016 decreased by \$ 2.7 million as compared to the year ended December 31, 2015 due primarily to a decrease in average selling price per gram sold as customers purchased materials with lower selling prices per gram in 2016 compared to the prior year.

Host material sales for the year ended December 31, 2016 decreased by \$11.1 million as compared to the year ended December 31, 2015. The decline in our host material sales was primarily due to a decrease in the number of grams sold due to what we believe was a result of our customers continuing to sell new products that do not include our host materials. Based on our current sales forecast, we anticipate that sales of existing host material will continue to be minimal. Our customers are not required to purchase our host materials in order to utilize our phosphorescent emitter materials and the host material sales business continues to be more competitive than the phosphorescent emitter material sales business.

#### **Royalty and license fees**

Royalty and license fees were as follows for the years ended December 31, 2016 and 2015 (amounts in thousands):

	Year Ended December 31,		Increase	
	2016	2015	\$	%
Royalty and license fees	\$ 96,132	\$ 77,773	\$ 18,359	24%

Royalty and license fees for the year ended December 31, 2016 increased by \$18.4 million as compared to the year ended December 31, 2015. The increase was primarily related to the receipt and recognition of \$75.0 million of royalty and license fee payments under our 2011 patent license agreement with SDC as compared to \$60.0 million in the prior period.

#### **Contract research services**

Contract research services revenue were as follows for the years ended December 31, 2016 and 2015 (amounts in thousands):

	Year Ended December 31,		Increase	
	2016	2015	\$	%
Contract research services	\$ 3,469	\$ 207	\$ 3,262	1576%

Contract research services include revenue earned by our subsidiary, Adesis, which performs organic and organometallic synthetics research, development and commercialization on a contractual basis for our customers. Contract research services also include technology development and support revenue earned on government contracts, development and technology evaluation agreements and commercialization assistance fees, which includes reimbursements by the U.S. government for all or a portion of the research and development expenses we incur related to our government contracts.

Contract research services revenue for the year ended December 31, 2016 increased by \$3.3 million as compared to the year ended December 31, 2015. The increase in contract research services revenue was solely related to contract research sales associated with Adesis, which was acquired on July 11, 2016. See Note 3 to the Notes to the Consolidated Financial Statements for further discussion.

#### **Cost of material sales**

Cost of material sales were as follows for the years ended December 31, 2016 and 2015 (amounts in thousands):

	Year Ended December 31,		Decrease	
	2016	2015	\$	%
Material Sales	\$ 99,285	\$ 113,066	\$ (13,781)	(12)%
Cost of material sales	24,539	62,997	(38,458)	(61)%
Gross margin on material sales	74,746	50,069	24,677	49%
Gross margin as a % of material sales	75%	44%		

Cost of material sales for the year ended December 31, 2016 decreased by \$38.5 million as compared to the year ended December 31, 2015 and was primarily due to an inventory write-down of \$33.0 million, as well as a decrease in the level of material sales. Adjusted cost of material sales, eliminating the impact of the inventory write-down, would have been \$30.0 million for the year ended December 31, 2015, and the gross margin as percentage of material sales would have been 73% for the year ended December 31, 2015. Absent the inventory write-down, the increase in gross margin as a percentage of material sales was due to the decrease in host material sales, which have less favorable margins than our phosphorescent emitter materials.

### ***Research and development***

Research and development expenses decreased to \$42.7 million for the year ended December 31, 2016, as compared to \$44.6 million for the year ended December 31, 2015. The decrease in research and development expenses was due to a decrease in consulting and laboratory related costs from lower outsourced research and development efforts; partially offset by an increase in salaries and benefits, and other operating expenses.

### ***Selling, general and administrative***

Selling, general and administrative expenses increased to \$32.9 million for the year ended December 31, 2016, as compared to \$29.0 million for the year ended December 31, 2015. The increase in selling, general and administrative expenses was primarily due to incremental costs associated with the addition of Adesis activity.

### ***Amortization of acquired technology and other intangible assets***

Amortization of acquired technology and other intangible assets increased to \$16.5 million for the year ended December 31, 2016, as compared to \$11.0 million for the year ended December 31, 2015. The increase was due to higher amortization expense of \$5.5 million associated with the acquisitions of the BASF patent portfolio and intangible assets associated with the Adesis acquisition. See Note 8 in Notes to Consolidated Financial Statements for further discussion.

### ***Patent costs***

Patent costs increased to \$6.2 million for the year ended December 31, 2016, as compared to \$5.7 million for the year ended December 31, 2015. The increase in patent costs was primarily due to increased activities associated with the acquisition of the BASF patents.

### ***Royalty and license expense***

Royalty and license expense increased to \$5.8 million for the year ended December 31, 2016, as compared to \$5.4 million for the year ended December 31, 2015. The increase was due to increased royalties incurred under our amended license agreement with Princeton, USC, and Michigan, resulting from an increase in royalty and license fees; partially offset by a decrease in qualifying material sales. See Note 10 in Notes to Consolidated Financial Statements for further discussion.

### ***Interest income, net and other expense, net***

Interest income, net, was \$2.1 million for the year ended December 31, 2016, as compared to \$800,000 for the year ended December 31, 2015. The increase was primarily due to higher interest rates on cash equivalents and investment balances. Other expense, net primarily consisted of net exchange gains and losses on foreign currency transactions. We recorded other expense of \$1.9 million for the year ended December 31, 2016, as compared to none for the year ended December 31, 2015. The increase in other expense was due to exchange losses on foreign currency associated with the BASF OLED patent acquisition.

### ***Income taxes***

We are subject to income taxes in both the United States and foreign jurisdictions. The effective income tax rate was 29.9% and 55.6%, for the years ended December 31, 2016 and 2015, respectively, and the Company recorded income tax expense of \$20.5 million and \$18.4 million, respectively.

The foreign taxes are primarily related to foreign taxes withheld on royalty and license fees paid to the U.S. operating entity. SDC has been required to withhold tax upon payment of royalty and license fees to the U.S. operating entity at a rate of 16.5%. During the years ended December 31, 2016 and 2015, we paid South Korean withholding taxes of \$12.4 million and \$9.9 million, respectively.

## Liquidity and Capital Resources

Our principal sources of liquidity are our cash and cash equivalents and our investments. As of December 31, 2017, we had cash and cash equivalents of \$132.8 million, short-term investments of \$287.5 million and long-term investments of \$14.8 million, for a total of \$435.1 million. This compares to cash and cash equivalents of \$139.4 million, short-term investments of \$188.6 million and long-term investments of \$15.0 million, for a total of \$343.0 million, as of December 31, 2016.

Cash provided by operating activities was \$133.4 million for the year ended December 31, 2017, as compared to cash provided by operating activities of \$80.3 million for the year ended December 31, 2016. The increase in cash provided by operating activities of \$53.1 million was due to an increase in net income of \$55.8 million and an increase in non-cash adjustments to net income of \$29.7 million, partially offset by an increase in cash used in operating assets and liabilities of \$32.4 million primarily due to an increase in accounts receivable and inventory. The increase in accounts receivable and inventory was primarily due to higher revenue and increased production activity to meet higher material sales demand.

Cash used in investing activities was \$125.6 million for the year ended December 31, 2017, as compared to cash used in investing activities of \$38.5 million for the year ended December 31, 2016. The increase in cash used in investing activities of \$87.1 million was primarily due to the timing of maturities and purchases of investments resulting in net purchases of \$95.8 million for the year ended December, 2017, as compared to net sales of \$98.2 million for the year ended December 31, 2016, as well as an increase in purchases of property, plant and equipment of \$22.5 million, partially offset by purchases in the year ended December 31, 2016 that included the addition of intangible assets associated with the BASF OLED patent acquisition of \$96.0 million and the acquisition of Adesis of \$33.4 million. The increase in property, plant and equipment included the purchase of a previously leased manufacturing facility in Delaware by Adesis, as well as expansion of our OLED manufacturing capacity managed by our subcontractor, PPG, in Ohio.

Cash used in financing activities was \$14.3 million for the year ended December 31, 2017, as compared to \$14,000 for the year ended December 31, 2016. The increase in cash used in financing activities of \$14.3 million was due primarily to a cash payment of dividends in the current year of \$5.7 million as well as an increase in the payment of withholding taxes related to stock-based compensation to employees of \$4.6 million.

Working capital was \$455.4 million as of December 31, 2017, as compared to \$345.2 million as of December 31, 2016. The increase in working capital was primarily due to an increase in short-term investments, accounts receivable, and inventory, partially offset by an increase in accrued expenses and accounts payable.

We anticipate, based on our internal forecasts and assumptions relating to our operations (including, among others, assumptions regarding our working capital requirements, the progress of our research and development efforts, the availability of sources of funding for our research and development work, and the timing and costs associated with the preparation, filing, prosecution, maintenance, defense and enforcement of our patents and patent applications), that we have sufficient cash, cash equivalents and short-term investments to meet our obligations for at least the next twelve months.

We believe that potential additional financing sources for us include long-term and short-term borrowings, public and private sales of our equity and debt securities and the receipt of cash upon the exercise of outstanding stock options. It should be noted, however, that additional funding may be required in the future for research, development and commercialization of our OLED technologies and materials, to obtain, maintain and enforce patents respecting these technologies and materials, and for working capital and other purposes, the timing and amount of which are difficult to ascertain. There can be no assurance that additional funds will be available to us when needed, on commercially reasonable terms or at all, particularly in the current economic environment.

## Contractual Obligations

As of December 31, 2017, we had the following contractual commitments:

Contractual Obligations	Payments due by period (in thousands)				
	Total	Less than 1 year	1-3 years	3-5 years	More than 5 years
Estimated retirement plan benefit payments	\$ 53,365	\$ 1,214	\$ 5,218	\$ 5,923	\$ 41,010
Lease obligations	1,834	893	941	—	—
Purchasing obligations	14,174	14,174	—	—	—
Research related obligations	7,843	3,334	4,509	—	—
Minimum royalty obligation (1)	500	100	200	200	\$100/year
<b>Total (2)</b>	<b>\$ 77,716</b>	<b>\$ 19,715</b>	<b>\$ 10,868</b>	<b>\$ 6,123</b>	<b>\$ 41,010</b>

- (1) Under the 1997 Amended License Agreement, we are obligated to pay Princeton minimum royalties of \$100,000 per year until the agreement is no longer in effect. The agreement has no scheduled expiration date.
- (2) See Note 16 to the Consolidated Financial Statements for discussion of obligations upon termination of employment of executive officers as a result of a change in our control.

#### **Off-Balance Sheet Arrangements**

As of December 31, 2017, we had no off-balance sheet arrangements in the nature of guarantee contracts, retained or contingent interests in assets transferred to unconsolidated entities (or similar arrangements serving as credit, liquidity or market risk support to unconsolidated entities for any such assets), or obligations (including contingent obligations) arising out of variable interests in unconsolidated entities providing financing, liquidity, market risk or credit risk support to us, or that engage in leasing, hedging or research and development services with us.

#### **Recently Issued Accounting Pronouncements**

Recently issued accounting pronouncements are addressed in Note 2 in the Notes to Consolidated Financial Statements.

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

We do not utilize financial instruments for trading purposes and hold no derivative financial instruments, other financial instruments or derivative commodity instruments that could expose us to significant market risk other than our investments disclosed in “Fair Value Measurements” in Note 5 to the Consolidated Financial Statements included herein. We generally invest in investment grade financial instruments to reduce our exposure related to investments. Our primary market risk exposure with regard to such financial instruments is to changes in interest rates, which would impact interest income earned on investments. However, based upon the conservative nature of our investment portfolio and current experience, we do not believe a decrease in investment yields would have a material negative effect on our interest income.

Substantially all our revenue is derived from outside of North America. All revenue is primarily denominated in U.S. dollars and therefore we bear no significant foreign exchange risk.

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

Our Consolidated Financial Statements and the related notes to those statements are attached to this report beginning on page F-1.

#### **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**

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2017. Based on that evaluation, the Chief Executive Officer and Chief Financial Officer concluded that our disclosure controls and procedures, as of the end of the period covered by this report, are effective to provide reasonable assurance that the information required to be disclosed by us in reports filed or submitted under the Securities Exchange Act of 1934, as amended, is (i) recorded, processed, summarized and reported within the time periods specified in the SEC’s rules and forms, and (ii) accumulated and communicated to our management, including the Chief Executive Officer and Chief Financial Officer, as appropriate to allow timely decisions regarding disclosure. However, a controls system, no matter how well designed and operated, cannot provide absolute assurance that the objectives of the controls system are met, and no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, within a company have been detected.

##### **Management’s Report on Internal Control over Financial Reporting and Report of Independent Registered Public Accounting Firm on Internal Control over Financial Reporting**

The report of management on our internal control over financial reporting and the associated attestation report of our independent registered public accounting firm are set forth in Item 8 of this report.

**Changes in Internal Control over Financial Reporting**

There were no changes in our internal control over financial reporting during the quarter ended December 31, 2017 that have materially affected, or are 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***

Information with respect to this item is set forth in our definitive Proxy Statement for the 2018 Annual Meeting of Shareholders, which is to be filed with the Securities and Exchange Commission no later than April 30, 2018 (our "Proxy Statement"), and which is incorporated herein by reference. Information regarding our executive officers is included at the end of Part I of this report.

### **ITEM 11.     *EXECUTIVE COMPENSATION***

Information with respect to this item will be set forth in our Proxy Statement, and is incorporated herein by reference.

### **ITEM 12.     *SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS***

Information with respect to this item will be set forth in our Proxy Statement, and is incorporated herein by reference.

### **ITEM 13.     *CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE***

Information with respect to this item will be set forth in our Proxy Statement, and is incorporated herein by reference.

### **ITEM 14.     *PRINCIPAL ACCOUNTANT FEES AND SERVICES***

Information with respect to this item will be set forth in our Proxy Statement, and is incorporated herein by reference.

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

(a) The following documents are filed as part of this report:

(1) Financial Statements:

<a href="#">Management's Report on Internal Control Over Financial Reporting</a>	F-2
<a href="#">Reports of Independent Registered Public Accounting Firm</a>	F-3
<a href="#">Consolidated Balance Sheets</a>	F-5
<a href="#">Consolidated Statements of Income</a>	F-6
<a href="#">Consolidated Statements of Comprehensive Income</a>	F-7
<a href="#">Consolidated Statements of Shareholders' Equity</a>	F-8
<a href="#">Consolidated Statements of Cash Flows</a>	F-9
<a href="#">Notes to Consolidated Financial Statements</a>	F-10

(2) Financial Statement Schedules:

None.

(3) Exhibits:

The following is a list of the exhibits filed as part of this report. Where so indicated by footnote, exhibits that were previously filed are incorporated by reference. For exhibits incorporated by reference, the location of the exhibit in the previous filing is indicated parenthetically, together with a reference to the filing indicated by footnote.

Exhibit Number	Description
3.1	<a href="#">Amended and Restated Articles of Incorporation of the registrant (1)</a>
3.2	<a href="#">Amended and Restated Bylaws of the registrant (2)</a>
10.1#	<a href="#">Amended and Restated Change in Control Agreement between the registrant and Sherwin I. Seligsohn, dated as of November 4, 2008 (3)</a>
10.2#	<a href="#">Amended and Restated Change in Control Agreement between the registrant and Steven V. Abramson, dated as of November 4, 2008 (3)</a>
10.3#	<a href="#">Amended and Restated Change in Control Agreement between the registrant and Sidney D. Rosenblatt, dated as of November 4, 2008 (3)</a>
10.4#	<a href="#">Amended and Restated Change in Control Agreement between the registrant and Julia J. Brown, dated as of November 4, 2008 (3)</a>
10.5#	<a href="#">Amended and Restated Change in Control Agreement between the registrant and Janice M. DuFour, dated as of November 4, 2008 (3)</a>
10.6#	<a href="#">Non-Competition and Non-Solicitation Agreement between the registrant and Sherwin I. Seligsohn, dated as of February 23, 2007 (4)</a>
10.7#	<a href="#">Non-Competition and Non-Solicitation Agreement between the registrant and Steven V. Abramson, dated as of January 26, 2007 (4)</a>
10.8#	<a href="#">Non-Competition and Non-Solicitation Agreement between the registrant and Sidney D. Rosenblatt, dated as of February 7, 2007 (4)</a>
10.9#	<a href="#">Non-Competition and Non-Solicitation Agreement between the registrant and Julia J. Brown, dated as of February 5, 2007 (4)</a>
10.10#	<a href="#">Non-Competition and Non-Solicitation Agreement between the registrant and Janice M. DuFour, dated as of February 23, 2007 (3)</a>
10.11#	<a href="#">Equity Retention Agreement between the registrant and Steven V. Abramson, dated as of March 18, 2010 (5)</a>
10.12#	<a href="#">Equity Retention Agreement between the registrant and Sidney D. Rosenblatt, dated as of March 18, 2010 (5)</a>
10.13#	<a href="#">Equity Retention Agreement between the registrant and Julia J. Brown, dated as of January 6, 2011 (6)</a>
10.14#	<a href="#">Equity Retention Agreement between the registrant and Janice M. DuFour, dated as of January 6, 2011 (6)</a>
10.15#	<a href="#">Equity Retention Agreement between the registrant and Julia J. Brown, dated as of March 8, 2012 (7)</a>
10.16#	<a href="#">Equity Retention Agreement between the registrant and Janice M. DuFour, dated as of March 8, 2012 (7)</a>
10.17#	<a href="#">Amended and Restated Change in Control Agreement between the Registrant and Mauro Premutico, dated April 16, 2012 (8)</a>
10.18#	<a href="#">Equity Retention Agreement between the Registrant and Mauro Premutico, dated April 16, 2012 (8)</a>
10.19#	<a href="#">Supplemental Executive Retirement Plan, dated as of April 1, 2010 (5)</a>
10.20#	<a href="#">Amended and Restated Equity Compensation Plan, effective as of March 7, 2013 (9)</a>

Exhibit Number	Description
10.21	<a href="#">Sponsored Research Agreement between the registrant and the University of Southern California, dated as of May 1, 2006 (10)</a>
10.22	<a href="#">Amendment No. 1 to the Sponsored Research Agreement between the registrant and the University of Southern California, dated as of May 1, 2006 (3)</a>
10.23	<a href="#">Amendment No. 2 to the Sponsored Research Agreement between the registrant and the University of Southern California, dated as of May 7, 2009 (11)</a>
10.24	<a href="#">1997 Amended License Agreement among the registrant, The Trustees of Princeton University and the University of Southern California, dated as of October 9, 1997 (12)</a>
10.25	<a href="#">Amendment #1 to the Amended License Agreement among the registrant, the Trustees of Princeton University and the University of Southern California, dated as of August 7, 2003 (13)</a>
10.26	<a href="#">Amendment #2 to the Amended License Agreement among the registrant, the Trustees of Princeton University, the University of Southern California and the Regents of the University of Michigan, dated as of January 1, 2006 (10)</a>
10.27	<a href="#">Termination, Amendment and License Agreement by and among the registrant, PD-LD, Inc., Dr. Vladimir S. Ban, and The Trustees of Princeton University, dated as of July 19, 2000 (14)</a>
10.28	<a href="#">Letter of Clarification of UDC/GPEC Research and License Arrangements between the registrant and Global Photonic Energy Corporation, dated as of June 4, 2004 (4)</a>
10.29+	<a href="#">Amended and Restated OLED Materials Supply and Service Agreement between the registrant and PPG Industries, Inc., dated as of October 1, 2011 (15)</a>
10.30+	<a href="#">OLED Patent License Agreement between the registrant and Samsung Mobile Display Co., Ltd., dated as of August 22, 2011 (16)</a>
10.31+	<a href="#">Supplemental OLED Material Purchase Agreement between the registrant and Samsung Mobile Display Co., Ltd., dated as of August 22, 2011 (16)</a>
10.32+	<a href="#">Settlement and License Agreement between the registrant and Seiko Epson Corporation, dated as of July 31, 2006 (17)</a>
10.33+	<a href="#">Amendment No. 1 to the Settlement and License Agreement between the registrant and Seiko Epson Corporation, dated as of March 30, 2009 (18)</a>
10.33+	<a href="#">OLED Technology License Agreement between the registrant and Konica Minolta Holdings, Inc., dated as of August 11, 2008 (19)</a>
10.34+	<a href="#">Limited-Term OLED Technology License Agreement between the registrant and Panasonic Idemitsu OLED Lighting Co., Ltd., dated as of August 1, 2011 (15)</a>
10.35+	<a href="#">OLED Technology License Agreement between the registrant and Pioneer Corporation, dated as of May 1, 2011 (20)</a>
10.36+	<a href="#">OLED Technology License Agreement between the registrant and Lumiotec, Inc., dated as of January 1, 2012 (7)</a>
10.37+	<a href="#">Patent Sale Agreement, dated as of July 23, 2012 by and between FUJIFILM Corporation and the Company (21)</a>
10.38	<a href="#">Amendment No. 3 to the Sponsored Research Agreement between the registrant and the University of Southern California, dated as of June 1, 2013 (22)</a>
10.39#	<a href="#">Universal Display Corporation Annual Incentive Plan (23)</a>
10.40#	<a href="#">Form Agreement - Restricted Stock Unit Grant Letter (24)</a>
10.41#	<a href="#">Form Agreement - Performance Unit Grant Letter (24)</a>
10.42#	<a href="#">Universal Display Corporation Equity Compensation Plan (25)</a>
10.43#	<a href="#">Amendment 2015-1, dated March 3, 2015, to Universal Display Corporation Supplemental Executive Retirement Plan (26)</a>
10.44#	<a href="#">Equity Retention Agreement between the Registrant and Steven V. Abramson, dated April 7, 2015 (27)</a>
10.45#	<a href="#">Equity Retention Agreement between the Registrant and Sidney D. Rosenblatt, dated April 7, 2015 (27)</a>
10.46#	<a href="#">Equity Retention Agreement between the Registrant and Julia J. Brown, dated September 10, 2015 (28)</a>
10.47#	<a href="#">Equity Retention Agreement between the Registrant and Mauro Premutico, dated September 10, 2015 (28)</a>
10.48+	<a href="#">IP Transfer Agreement, dated June 28, 2016 by and between UDC Ireland Limited and BASF SE (29)</a>
21*	<a href="#">Subsidiaries of the registrant</a>
23.1*	<a href="#">Consent of KPMG LLP</a>
31.1*	<a href="#">Certifications of Steven V. Abramson, Chief Executive Officer, as required by Rule 13a-14(a) or Rule 15d-14(a)</a>
31.2*	<a href="#">Certifications of Sidney D. Rosenblatt, Chief Financial Officer, as required by Rule 13a-14(a) or Rule 15d-14(a)</a>
32.1**	<a href="#">Certifications of Steven V. Abramson, Chief Executive Officer, as required by Rule 13a-14(b) or Rule 15d-14(b), and by 18 U.S.C. Section 1350. (This exhibit shall not be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, or otherwise subject to the liability of that section. Further, this exhibit shall not be deemed to be incorporated by reference into any filing under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended.)</a>
32.2**	<a href="#">Certifications of Sidney D. Rosenblatt, Chief Financial Officer, as required by Rule 13a-14(b) or Rule 15d-14(b), and by 18 U.S.C. Section 1350. (This exhibit shall not be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, or otherwise subject to the liability of that section. Further, this exhibit shall not be deemed to be incorporated by reference into any filing under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended.)</a>

Exhibit Number	Description
101.INS*	XBRL Instance Document
101.SCH*	XBRL Taxonomy Extension Schema Document
101.CAL*	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF*	XBRL Taxonomy Extension Definition Linkbase Document
101.LAB*	XBRL Taxonomy Extension Label Linkbase Document
101.PRE*	XBRL Taxonomy Extension Presentation Linkbase Document

Explanation of footnotes to listing of exhibits:

- \* Filed herewith.
  - \*\* Furnished herewith.
  - # Management contract or compensatory plan or arrangement.
  - + Confidential treatment has been accorded to certain portions of this exhibit pursuant to Rule 406 under the Securities Act of 1933, as amended, or Rule 24b-2 under the Securities Exchange Act of 1934, as amended.
- (1) Filed as an Exhibit to the Quarterly Report on Form 10-Q for the quarter ended June 30, 2013, filed with the SEC on August 8, 2013.
  - (2) Filed as an Exhibit to the Annual Report on Form 10-K for the year ended December 31, 2003, filed with the SEC on March 1, 2004.
  - (3) Filed as an Exhibit to the Annual Report on Form 10-K for the year ended December 31, 2008, filed with the SEC on March 12, 2009.
  - (4) Filed as an Exhibit to the Annual Report on Form 10-K for the year ended December 31, 2006, filed with the SEC on March 15, 2007.
  - (5) Filed as an Exhibit to the Quarterly Report on Form 10-Q for the quarter ended March 31, 2010, filed with the SEC on May 10, 2010.
  - (6) Filed as an Exhibit to a Current Report on Form 8-K, filed with the SEC on March 21, 2011.
  - (7) Filed as an Exhibit to the Quarterly Report on Form 10-Q for the quarter ended March 31, 2012, filed with the SEC on May 9, 2012.
  - (8) Filed as an Exhibit to the Quarterly Report on Form 10-Q for the quarter ended June 30, 2012, filed with the SEC on August 8, 2012.
  - (9) Filed as an Exhibit to the Quarterly Report on Form 10-Q for the quarter ended March 31, 2013, filed with the SEC on May 9, 2013.
  - (10) Filed as an Exhibit to the Quarterly Report on Form 10-Q for the quarter ended June 30, 2006, filed with the SEC on August 9, 2006.
  - (11) Filed as an Exhibit to the Quarterly Report on Form 10-Q for the quarter ended June 30, 2009, filed with the SEC on August 10, 2009.
  - (12) Filed as an Exhibit to the Annual Report on Form 10K-SB for the year ended December 31, 1997, filed with the SEC on March 31, 1998.
  - (13) Filed as an Exhibit to the Quarterly Report on Form 10-Q for the quarter ended September 30, 2003, filed with the SEC on November 10, 2003.
  - (14) Filed as an Exhibit to the amended Quarterly Report on Form 10-Q for the quarter ended September 30, 2000, filed with the SEC on November 20, 2001.
  - (15) Filed as an Exhibit to the Quarterly Report on Form 10-Q for the quarter ended September 30, 2011, filed with the SEC on November 8, 2011.
  - (16) Filed as an Exhibit to an Amended Current Report on Form 8-K/A, filed with the SEC on December 19, 2011.
  - (17) Filed as an Exhibit to the Quarterly Report on Form 10-Q for the quarter ended September 30, 2006, filed with the SEC on November 6, 2006.
  - (18) Filed as an Exhibit to the Quarterly Report on Form 10-Q for the quarter ended March 31, 2009, filed with the SEC on May 7, 2009.
  - (19) Filed as an Exhibit to the Quarterly Report on Form 10-Q for the quarter ended September 30, 2008, filed with the SEC on November 6, 2008.
  - (20) Filed as an Exhibit to Amendment No. 1 to the Quarterly Report on Form 10-Q for the quarter ended September 30, 2011, filed with the SEC on January 27, 2012.
  - (21) Filed as an Exhibit to a Current Report on Form 8-K, filed with the SEC on July 27, 2012.
  - (22) Filed as an Exhibit to the Quarterly Report on Form 10-Q for the quarter ended September 30, 2013, filed with the SEC on November 7, 2013.
  - (23) Filed as an Exhibit to a Current Report on Form 8-K, filed with the SEC on June 24, 2013.
  - (24) Filed as an Exhibit to the Annual Report on Form 10-K for the year ended December 31, 2013, filed with the SEC on February 28, 2014.

- (25) Filed as Exhibit A to the Company's Definitive Proxy Statement for the 2014 Annual Meeting filed with the SEC on April 25, 2014.
- (26) Filed as an exhibit to the Current Report on Form 8-K filed with the SEC on March 9, 2015.
- (27) Filed as an Exhibit to the Quarterly Report on Form 10-Q for the quarter ended June 30, 2015, filed with the SEC on August 6, 2015.
- (28) Filed as an Exhibit to the Quarterly Report on Form 10-Q for the quarter ended September 30, 2015, filed with the SEC on November 5, 2015.
- (29) Filed as an Exhibit to the Quarterly Report on Form 10-Q for the quarter ended June 30, 2016, filed with the SEC on August 4, 2016.

**Note:** Any of the exhibits listed in the foregoing index not included with this report may be obtained, without charge, by writing to Mr. Sidney D. Rosenblatt, Corporate Secretary, Universal Display Corporation, 375 Phillips Boulevard, Ewing, New Jersey 08618.

- (b) The exhibits required to be filed by us with this report are listed above.
- (c) The consolidated financial statement schedules required to be filed by us with this report are listed above.

**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.

**UNIVERSAL DISPLAY CORPORATION**

By: /s/ Sidney D. Rosenblatt

Sidney D. Rosenblatt

Executive Vice President, Chief Financial Officer,  
Treasurer and Secretary

Date: February 22, 2018

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

<u>Name</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Sherwin I. Seligsohn</u> Sherwin I. Seligsohn	Founder and Chairman of the Board of Directors	February 22, 2018
<u>/s/ Steven V. Abramson</u> Steven V. Abramson	President, Chief Executive Officer and Director (principal executive officer)	February 22, 2018
<u>/s/ Sidney D. Rosenblatt</u> Sidney D. Rosenblatt	Executive Vice President, Chief Financial Officer, Treasurer, Secretary and Director (principal financial and accounting officer)	February 22, 2018
<u>/s/ Richard C. Elias</u> Richard C. Elias	Director	February 22, 2018
<u>/s/ Elizabeth H. Gemmill</u> C. Elizabeth H. Gemmill	Director	February 22, 2018
<u>/s/ Rosemarie B. Greco</u> Rosemarie B. Greco	Director	February 22, 2018
<u>/s/ C. Keith Hartley</u> C. Keith Hartley	Director	February 22, 2018
<u>/s/ Lawrence Lacerte</u> Lawrence Lacerte	Director	February 22, 2018

**UNIVERSAL DISPLAY CORPORATION AND SUBSIDIARIES**  
**INDEX TO CONSOLIDATED FINANCIAL STATEMENTS**

**Consolidated Financial Statements:**

<a href="#">Management's Report on Internal Control Over Financial Reporting</a>	F-2
<a href="#">Reports of Independent Registered Public Accounting Firm</a>	F-3
<a href="#">Consolidated Balance Sheets</a>	F-5
<a href="#">Consolidated Statements of Income</a>	F-6
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## MANAGEMENT'S REPORT ON INTERNAL CONTROL OVER FINANCIAL REPORTING

Our management is responsible for establishing and maintaining adequate internal control over financial reporting for the Company. Internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of consolidated financial statements for external purposes in accordance with generally accepted accounting principles. Our system of 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.

Management performed an assessment of the effectiveness of our internal control over financial reporting as of December 31, 2017 based upon criteria in *Internal Control — Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on this assessment, management determined that the Company's internal control over financial reporting was effective as of December 31, 2017, based on the criteria in *Internal Control-Integrated Framework (2013)* issued by COSO.

The effectiveness of our internal control over financial reporting as of December 31, 2017, has been attested to by KPMG LLP, an independent registered public accounting firm, as stated in its report which appears on the following page.

Steven V. Abramson  
President and Chief Executive Officer

Sidney D. Rosenblatt  
Executive Vice President and Chief Financial Officer

February 22, 2018

## REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and Shareholders

Universal Display Corporation:

### ***Opinion on Internal Control Over Financial Reporting***

We have audited Universal Display Corporation and subsidiaries' (the Company) internal control over financial reporting as of December 31, 2017, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2017, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of December 31, 2017 and 2016, the related consolidated statements of income, comprehensive income, shareholders' equity, and cash flows for each of the years in the three-year period ended December 31, 2017, and the related notes (collectively, the consolidated financial statements), and our report dated February 22, 2018 expressed an unqualified opinion on those consolidated financial statements.

### ***Basis for Opinion***

The Company's management is responsible for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management's Report on Internal Control over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the 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 audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. 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 audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

### ***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 (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) 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 (3) 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/ KPMG LLP

Philadelphia, Pennsylvania

February 22, 2018

## REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and Shareholders

Universal Display Corporation:

### ***Opinion on the Consolidated Financial Statements***

We have audited the accompanying consolidated balance sheets of Universal Display Corporation and subsidiaries (the Company) as of December 31, 2017 and 2016, and the related consolidated statements of income, comprehensive income, shareholders' equity, and cash flows for each of the years in the three-year period ended December 31, 2017, and the related notes (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2017 and 2016, and the results of its operations and its cash flows for each of the years in the three-year period ended December 31, 2017, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2017, based on criteria established in *Internal Control — Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission, and our report dated February 22, 2018 expressed an unqualified opinion on the effectiveness of the Company's internal control over financial reporting.

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

As discussed in Note 2 to the consolidated financial statements, the Company has elected to change its method of accounting for share-based payment transactions in 2017 due to the adoption of amendments to the FASB Accounting Standards Codification resulting from Accounting Standards Update (ASU) No. 2016-09, *Compensation – Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting*, effective January 1, 2017.

### ***Basis for Opinion***

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We are a public accounting firm registered with the 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 audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. Our audits 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. We believe that our audits provide a reasonable basis for our opinion.

/s/ KPMG LLP

We have served as the Company's auditor since 2002.

Philadelphia, Pennsylvania

February 22, 2018

**UNIVERSAL DISPLAY CORPORATION AND SUBSIDIARIES**

**CONSOLIDATED BALANCE SHEETS**

*(in thousands, except share and per share data)*

	<u>December 31, 2017</u>	<u>December 31, 2016</u>
<b>ASSETS</b>		
<b>CURRENT ASSETS:</b>		
Cash and cash equivalents	\$ 132,840	\$ 139,365
Short-term investments	287,446	188,644
Accounts receivable	52,355	24,994
Inventory	36,265	17,314
Deferred income taxes	—	8,661
Other current assets	10,276	6,392
Total current assets	<u>519,182</u>	<u>385,370</u>
PROPERTY AND EQUIPMENT, net of accumulated depreciation of \$36,368 and \$32,167	56,450	27,203
ACQUIRED TECHNOLOGY, net of accumulated amortization of \$91,312 and \$70,714	131,529	152,127
OTHER INTANGIBLE ASSETS, net of accumulated amortization of \$2,000 and \$615	14,840	16,225
GOODWILL	15,535	15,535
INVESTMENTS	14,794	14,960
DEFERRED INCOME TAXES	27,022	15,832
OTHER ASSETS	604	307
<b>TOTAL ASSETS</b>	<u><u>\$ 779,956</u></u>	<u><u>\$ 627,559</u></u>
<b>LIABILITIES AND SHAREHOLDERS' EQUITY</b>		
<b>CURRENT LIABILITIES:</b>		
Accounts payable	\$ 13,774	\$ 8,112
Accrued expenses	35,019	19,845
Deferred revenue	14,981	10,282
Other current liabilities	50	1,967
Total current liabilities	<u>63,824</u>	<u>40,206</u>
DEFERRED REVENUE	23,902	31,322
RETIREMENT PLAN BENEFIT LIABILITY	33,176	27,563
Total liabilities	<u>120,902</u>	<u>99,091</u>
<b>COMMITMENTS AND CONTINGENCIES (Note 16)</b>		
<b>SHAREHOLDERS' EQUITY:</b>		
Preferred Stock, par value \$0.01 per share, 5,000,000 shares authorized, 200,000 shares of Series A Nonconvertible Preferred Stock issued and outstanding (liquidation value of \$7.50 per share or \$1,500)	2	2
Common Stock, par value \$0.01 per share, 100,000,000 shares authorized, 48,476,034 and 48,270,990 shares issued, and 47,118,171 and 46,913,127 shares outstanding at December 31, 2017 and December 31, 2016, respectively	485	483
Additional paid-in capital	611,063	604,364
Retained earnings (accumulated deficit)	99,126	(25,557)
Accumulated other comprehensive loss	(11,464)	(10,666)
Treasury stock, at cost (1,357,863 shares at December 31, 2017 and December 31, 2016)	<u>(40,158)</u>	<u>(40,158)</u>
Total shareholders' equity	<u>659,054</u>	<u>528,468</u>
<b>TOTAL LIABILITIES AND SHAREHOLDERS' EQUITY</b>	<u><u>\$ 779,956</u></u>	<u><u>\$ 627,559</u></u>

*The accompanying notes are an integral part of these consolidated financial statements.*

**UNIVERSAL DISPLAY CORPORATION AND SUBSIDIARIES**

**CONSOLIDATED STATEMENTS OF INCOME**

*(in thousands, except share and per share data)*

	Year Ended December 31,		
	2017	2016	2015
<b>REVENUE:</b>			
Material sales	\$ 200,259	\$ 99,285	\$ 113,066
Royalty and license fees	126,503	96,132	77,773
Contract research services	8,867	3,469	207
Total revenue	335,629	198,886	191,046
<b>COST OF SALES</b>	54,698	26,288	62,997
Gross margin	280,931	172,598	128,049
<b>OPERATING EXPENSES:</b>			
Research and development	49,144	42,744	44,641
Selling, general and administrative	46,808	32,876	29,046
Amortization of acquired technology and other intangible assets	21,983	16,493	10,999
Patent costs	7,010	6,249	5,717
Royalty and license expenses	9,739	5,823	5,370
Total operating expenses	134,684	104,185	95,773
<b>OPERATING INCOME</b>	146,247	68,413	32,276
Interest income, net	3,294	2,113	783
Other expense, net	(4)	(1,928)	—
Interest and other expense, net	3,290	185	783
<b>INCOME BEFORE INCOME TAXES</b>	149,537	68,598	33,059
<b>INCOME TAX EXPENSE</b>	(45,652)	(20,528)	(18,381)
<b>NET INCOME</b>	\$ 103,885	\$ 48,070	\$ 14,678
<b>NET INCOME PER COMMON SHARE:</b>			
BASIC	\$ 2.19	\$ 1.02	\$ 0.31
DILUTED	\$ 2.18	\$ 1.02	\$ 0.31
<b>WEIGHTED AVERAGE SHARES USED IN COMPUTING NET INCOME PER COMMON SHARE:</b>			
BASIC	46,725,289	46,408,460	46,816,394
DILUTED	46,805,194	46,535,980	47,494,188
<b>CASH DIVIDEND DECLARED PER COMMON SHARE</b>	\$ 0.12	\$ —	\$ —

*The accompanying notes are an integral part of these consolidated financial statements.*

**UNIVERSAL DISPLAY CORPORATION AND SUBSIDIARIES**  
**CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME**

*(in thousands)*

	For the Year Ended		
	2017	2016	2015
NET INCOME	\$ 103,885	\$ 48,070	\$ 14,678
OTHER COMPREHENSIVE LOSS, NET OF TAX:			
Unrealized loss on available-for-sale securities, net of tax of \$7, \$72 and \$46, respectively	(12)	(135)	(83)
Employee benefit plan:			
Actuarial loss on retirement plan, net of tax of \$1,047, \$945 and \$218, respectively	(1,904)	(1,731)	(388)
Plan amendment cost, net of tax of \$154, none and \$3,305, respectively	(280)	—	(5,963)
Amortization of plan amendment cost, prior service cost and actuarial loss for retirement plan included in net periodic pension costs, net of tax of \$754, \$591 and \$553, respectively	1,370	1,084	997
Net change for employee benefit plan	(814)	(647)	(5,354)
Change in cumulative foreign currency translation adjustment	28	(65)	—
TOTAL OTHER COMPREHENSIVE LOSS	(798)	(847)	(5,437)
COMPREHENSIVE INCOME	\$ 103,087	\$ 47,223	\$ 9,241

*The accompanying notes are an integral part of these consolidated financial statements.*

**UNIVERSAL DISPLAY CORPORATION AND SUBSIDIARIES**  
**CONSOLIDATED STATEMENTS OF SHAREHOLDERS' EQUITY**

*(in thousands, except for share data)*

	Series A Nonconvertible Preferred Stock		Common Stock		Additional Paid-in Capital	Retained Earnings	Accumulated Other Comprehensive Loss	Treasury Stock		Total Shareholders' Equity
	Shares	Amount	Shares	Amount				Shares	Amount	
BALANCE, JANUARY 1, 2015	200,000	\$ 2	47,061,826	\$ 471	\$ 581,114	\$ (88,305)	\$ (4,382)	1,357,863	\$ (40,158)	\$ 448,742
Net income	—	—	—	—	—	14,678	—	—	—	14,678
Other comprehensive loss	—	—	—	—	—	—	(5,437)	—	—	(5,437)
Exercise of common stock options	—	—	340,725	3	2,031	—	—	—	—	2,034
Issuance of common stock to employees	—	—	798,036	8	10,039	—	—	—	—	10,047
Shares withheld for employee taxes	—	—	(124,961)	—	(5,337)	—	—	—	—	(5,337)
Issuance of common stock to Board of Directors and Scientific Advisory Board	—	—	44,351	—	1,591	—	—	—	—	1,591
Issuance of common stock to employees under an ESPP	—	—	12,246	—	447	—	—	—	—	447
BALANCE, DECEMBER 31, 2015	200,000	2	48,132,223	482	589,885	(73,627)	(9,819)	1,357,863	(40,158)	466,765
Net income	—	—	—	—	—	48,070	—	—	—	48,070
Other comprehensive loss	—	—	—	—	—	—	(847)	—	—	(847)
Exercise of common stock options	—	—	12,750	—	185	—	—	—	—	185
Issuance of common stock to employees	—	—	165,826	2	12,354	—	—	—	—	12,356
Shares withheld for employee taxes	—	—	(92,241)	(1)	(4,870)	—	—	—	—	(4,871)
Excess tax benefits from share-based payment arrangements	—	—	—	—	4,232	—	—	—	—	4,232
Issuance of common stock to Board of Directors and Scientific Advisory Board	—	—	43,046	—	2,012	—	—	—	—	2,012
Issuance of common stock to employees under an ESPP	—	—	9,386	—	566	—	—	—	—	566
BALANCE, DECEMBER 31, 2016	200,000	2	48,270,990	483	604,364	(25,557)	(10,666)	1,357,863	(40,158)	528,468
Cumulative effect of recording excess tax benefits from share-based payment arrangements	—	—	—	—	—	26,450	—	—	—	26,450
Net income	—	—	—	—	—	103,885	—	—	—	103,885
Other comprehensive loss	—	—	—	—	—	—	(798)	—	—	(798)
Cash dividend	—	—	—	—	—	(5,652)	—	—	—	(5,652)
Exercise of common stock options	—	—	2,250	—	38	—	—	—	—	38
Issuance of common stock to employees	—	—	265,233	3	12,239	—	—	—	—	12,242
Shares withheld for employee taxes	—	—	(109,483)	(1)	(9,431)	—	—	—	—	(9,432)
Issuance of common stock to Board of Directors and Scientific Advisory Board	—	—	37,314	—	2,909	—	—	—	—	2,909
Issuance of common stock to employees under an ESPP	—	—	9,730	—	944	—	—	—	—	944
BALANCE, DECEMBER 31, 2017	<u>200,000</u>	<u>\$ 2</u>	<u>48,476,034</u>	<u>\$ 485</u>	<u>\$ 611,063</u>	<u>\$ 99,126</u>	<u>\$ (11,464)</u>	<u>1,357,863</u>	<u>\$ (40,158)</u>	<u>\$ 659,054</u>

*The accompanying notes are an integral part of these consolidated financial statements.*

**UNIVERSAL DISPLAY CORPORATION AND SUBSIDIARIES**  
**CONSOLIDATED STATEMENTS OF CASH FLOWS**  
*(in thousands)*

	Year Ended December 31,		
	2017	2016	2015
<b>CASH FLOWS FROM OPERATING ACTIVITIES:</b>			
Net income	\$ 103,885	\$ 48,070	\$ 14,678
Adjustments to reconcile net income to net cash provided by operating activities:			
Amortization of deferred revenue	(11,122)	(7,406)	(8,994)
Depreciation	4,919	4,270	3,086
Amortization of intangibles	21,983	16,492	10,999
Inventory write-down	—	—	33,000
Amortization of premium and discount on investments, net	(2,871)	(1,830)	(697)
Stock-based compensation to employees	12,284	11,374	9,173
Stock-based compensation to Board of Directors and Scientific Advisory Board	2,609	1,715	1,291
Change in earnout liability recorded for Adesis acquisition	519	—	—
Deferred income tax expense	24,396	3,094	7,137
Excess tax benefits from share-based payment arrangements	—	(4,232)	—
Retirement plan benefit expense	4,351	3,965	3,354
Decrease (increase) in assets, net of effect of acquisition:			
Accounts receivable	(27,361)	1,205	(2,654)
Inventory	(18,951)	(4,460)	(8,639)
Other current assets	(3,884)	(3,870)	1,969
Other assets	(297)	(133)	251
Increase (decrease) in liabilities:			
Accounts payable and accrued expenses	16,420	4,362	790
Other current liabilities	(1,917)	4,362	56
Deferred revenue	8,402	3,360	48,812
Net cash provided by operating activities	<u>133,365</u>	<u>80,338</u>	<u>113,612</u>
<b>CASH FLOWS FROM INVESTING ACTIVITIES:</b>			
Purchases of property and equipment	(29,803)	(7,300)	(5,103)
Purchase of intangibles	—	(95,989)	—
Purchase of business, net of cash acquired	—	(33,380)	—
Purchases of investments	(594,283)	(450,277)	(691,876)
Proceeds from sale of investments	498,508	548,474	638,411
Net cash used in investing activities	<u>(125,578)</u>	<u>(38,472)</u>	<u>(58,568)</u>
<b>CASH FLOWS FROM FINANCING ACTIVITIES:</b>			
Proceeds from issuance of common stock	734	439	354
Proceeds from the exercise of common stock options	38	185	2,034
Payment of withholding taxes on stock-based compensation to employees	(9,432)	(4,870)	(5,337)
Excess tax benefits from share-based payment arrangements	—	4,232	—
Cash dividends paid	(5,652)	—	—
Net cash used in financing activities	<u>(14,312)</u>	<u>(14)</u>	<u>(2,949)</u>
<b>INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS</b>	<b>(6,525)</b>	<b>41,852</b>	<b>52,095</b>
CASH AND CASH EQUIVALENTS, BEGINNING OF YEAR	139,365	97,513	45,418
CASH AND CASH EQUIVALENTS, END OF YEAR	<u>\$ 132,840</u>	<u>\$ 139,365</u>	<u>\$ 97,513</u>
The following non-cash activities occurred:			
Unrealized loss on available-for-sale securities	\$ (19)	\$ (207)	\$ (129)
Common stock issued to the Board of Directors and Scientific Advisory Board earned and accrued in a previous period	300	300	300
Common stock issued to employees earned and accrued in a previous period	174	1,105	967
Net change in accruals for purchases of property and equipment	4,363	(103)	467
Earnout liability recorded for Adesis acquisition	—	1,670	—
Excess tax benefits accrued in other current liabilities	—	(4,232)	—
Cash paid for income tax	23,248	12,870	10,364

*The accompanying notes are an integral part of these consolidated financial statements.*

**UNIVERSAL DISPLAY CORPORATION AND SUBSIDIARIES**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**1. BUSINESS:**

Universal Display Corporation (the Company) is a leader in the research, development and commercialization of organic light emitting diode (OLED) technologies and materials for use in display and solid-state lighting applications. OLEDs are thin, lightweight and power-efficient solid-state devices that emit light that can be manufactured on both flexible and rigid substrates, making them highly suitable for use in full-color displays and as lighting products. OLED displays are capturing a growing share of the display market. The Company believes this is because OLEDs offer potential advantages over competing display technologies with respect to power efficiency, contrast ratio, viewing angle, video response time, form factor and manufacturing cost. The Company also believes that OLED lighting products have the potential to replace many existing light sources in the future because of their high power efficiency, excellent color rendering index, low operating temperature and novel form factor. The Company's technology leadership and intellectual property position should enable it to share in the revenues from OLED displays and lighting products as they enter mainstream consumer and other markets.

The Company's primary business strategy is to (1) further develop and license its proprietary OLED technologies to manufacturers of products for display applications, such as mobile phones, televisions, tablets, wearables, portable media devices, notebook computers, personal computers, and automotive interiors, and specialty and general lighting products; and (2) develop new OLED materials and sell existing and any new materials to those product manufacturers. The Company has established a significant portfolio of proprietary OLED technologies and materials, primarily through internal research and development efforts and acquisitions of patents and patent applications, as well as maintaining its relationships with world-class partners such as Princeton University (Princeton), the University of Southern California (USC), the University of Michigan (Michigan) and PPG Industries, Inc. (PPG Industries). The Company currently owns, exclusively licenses or has the sole right to sublicense more than 4,500 patents issued and pending worldwide.

The Company sells its proprietary OLED materials to customers for evaluation and use in commercial OLED products. The Company also enters into agreements with manufacturers of OLED display and lighting products under which it grants them licenses to practice under its patents and to use the Company's proprietary know-how. At the same time, the Company works with these and other companies who are evaluating the Company's OLED technologies and materials for possible use in commercial OLED display and lighting products.

**2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES:**

***Principles of Consolidation***

The consolidated financial statements include the accounts of Universal Display Corporation and its wholly owned subsidiaries, UDC, Inc., UDC Ireland Limited, Universal Display Corporation Hong Kong, Limited, Universal Display Corporation Korea, Y.H., Universal Display Corporation Japan GK, Universal Display Corporation China, Ltd. and Adesis, Inc. (Adesis). All intercompany transactions and accounts have been eliminated.

***Business Combinations***

Accounting for acquisitions requires the Company to recognize separately from goodwill the assets acquired and the liabilities assumed at the acquisition date fair values. Goodwill as of the acquisition date is measured as the excess of consideration transferred over the net of the acquisition date fair values of the assets acquired and the liabilities assumed. While the Company uses its best estimates and assumptions to accurately value assets acquired and liabilities assumed at the acquisition date as well as contingent consideration, where applicable, the estimates are inherently uncertain and subject to refinement. As a result, during the measurement period, which is when all information necessary is obtained not to exceed one year, adjustments may be recorded 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 recorded to the consolidated statements of income.

***Management's Use of Estimates***

The preparation of financial statements in conformity with U.S. generally accepted accounting principles (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 reporting period. The estimates made are principally in the areas of the use and recoverability of inventories, intangibles and income taxes including realization of deferred tax assets, and retirement benefit plan liabilities. Actual results could differ from those estimates.

### ***Cash and Cash Equivalents***

The Company considers all highly liquid debt instruments purchased with an original maturity of three months or less to be cash equivalents. The Company classifies its remaining investments as available-for-sale. These securities are carried at fair market value, with unrealized gains and losses reported in shareholders' equity. Gains or losses on securities sold are based on the specific identification method.

### ***Trade Accounts Receivable***

Trade accounts receivable are stated at the amount the Company expects to collect and do not bear interest. The Company considers the following factors when determining the collectability of specific customer accounts: customer credit-worthiness, past transaction history with the customer, current economic industry trends, and changes in customer payment terms. The Company's accounts receivable balance is a result of chemical sales, royalties and license fees. These receivables have historically been paid timely. Due to the nature of the accounts receivable balance, the Company believes there is no significant risk of collection. If the financial condition of the Company's customers were to deteriorate, adversely affecting their ability to make payments, allowances for doubtful accounts would be required. The allowance for doubtful accounts was none, \$100,000 and none at December 31, 2017, 2016 and 2015, respectively.

### ***Inventories***

Inventories consist of raw materials, work-in-process and finished goods, including inventory consigned to customers, and are stated at the lower of cost, determined on a first-in, first-out basis, or market. Inventory valuation and firm committed purchase order assessments are performed on a quarterly basis and those items that are identified to be obsolete or in excess of forecasted usage are written down to their estimated realizable value. Estimates of realizable value are based upon management's analyses and assumptions, including, but not limited to, forecasted sales levels by product, expected product lifecycle, product development plans and future demand requirements. A 12-month rolling forecast based on factors, including, but not limited to, production cycles, anticipated product orders, marketing forecasts, backlog, and shipment activities is used in the inventory analysis. If market conditions are less favorable than forecasts or actual demand from customers is lower than estimates, additional inventory write-downs may be required. If demand is higher than expected, inventories that had previously been written down may be sold.

Certain of the Company's customers have assumed the responsibility for maintaining the Company's inventory at their location based on the customers' demand forecast. Notwithstanding the fact that the Company builds and ships the inventory, the customer does not purchase the consigned inventory until the inventory is drawn or pulled by the customer to be used in the manufacture of the customer's product. Though the consigned inventory may be at the customer's physical location, it remains inventory owned by the Company until the inventory is drawn or pulled, which is the time at which the sale takes place.

### ***Property and Equipment***

Property and equipment are stated at cost and depreciated on a straight-line basis over the estimated useful life of thirty years for building, fifteen years for building improvements, and three to seven years for office and lab equipment and furniture and fixtures. Repair and maintenance costs are charged to expense as incurred. Additions and betterments are capitalized.

Major renewals and improvements are capitalized and minor replacements, maintenance, and repairs are charged to current operations as incurred. Upon retirement or disposal of assets, the cost and related accumulated depreciation are removed from the consolidated balance sheet and any gain or loss is reflected in other operating expenses.

Certain costs of computer software obtained for internal use are capitalized and amortized on a straight-line basis over three years. Costs for maintenance and training, as well as the cost of software that does not add functionality to an existing system, are expensed as incurred.

### ***Impairment of Long-Lived Assets***

Company management continually evaluates whether events or changes in circumstances might indicate that the remaining estimated useful life of long-lived assets may warrant revision, or that the remaining balance may not be recoverable. When factors indicate that long-lived assets should be evaluated for possible impairment, the Company uses an estimate of the related undiscounted cash flows in measuring whether the long-lived asset should be written down to fair value. Measurement of the amount of impairment would be based on generally accepted valuation methodologies, as deemed appropriate. As of December 31, 2017, Company management believed that no revision to the remaining useful lives or write-down of the Company's long-lived assets was required, and similarly, no such revisions were required for the years ended December 31, 2016 or 2015.

### ***Goodwill and Purchased Intangible Assets***

Goodwill is tested for impairment in the fourth fiscal quarter and, when specific circumstances dictate, between annual tests. If it is determined that goodwill has been impaired, then its carrying value is written down to fair value. The goodwill impairment test involves a two-step process. The first step, identifying a potential impairment, compares the fair value of a reporting unit with its carrying amount, including goodwill. If the carrying value of the reporting unit exceeds its fair value, the second step would need to be conducted; otherwise, no further steps are necessary as no potential impairment exists. If necessary, the second step to measure the impairment loss would be to compare the implied fair value of the reporting unit goodwill with the carrying amount of that goodwill. Any excess of the reporting unit goodwill carrying value over the respective implied fair value is recognized as an impairment loss. The Company performed its annual impairment assessment as of December 31, 2017 utilizing a qualitative evaluation and concluded that it was more likely than not that the fair value of Adesis (see Note 3) is greater than its carrying value. Company management believes it has made reasonable estimates and assumptions to calculate the fair value of the reporting unit. Future impairment tests will continue to be performed annually in the fiscal fourth quarter, or sooner if a triggering event occurs. As of December 31, 2017, no indications of impairment exist.

Purchased intangible assets with finite lives are carried at cost, less accumulated amortization. Amortization is computed over the estimated useful lives of the respective assets.

### ***Fair Value of Financial Instruments***

The carrying values of accounts receivable, other current assets, and accounts payable approximate fair value in the accompanying financial statements due to the short-term nature of those instruments. The Company's other financial instruments, which include cash equivalents and investments, are carried at fair value.

### ***Fair Value Measurements***

Fair value is defined as an exit price, representing the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants based on the highest and best use of the asset or liability. The Company uses valuation techniques to measure fair value that maximize the use of observable inputs and minimize the use of unobservable inputs. Observable inputs are inputs that market participants would use in pricing the asset or liability, and are based on market data obtained from sources independent of the Company. Unobservable inputs reflect assumptions market participants would use in pricing the asset or liability based on the best information available in the circumstances.

### ***Revenue Recognition and Deferred Revenue***

Material sales relate to the Company's sale of its OLED materials for incorporation into its customers' commercial OLED products or for their OLED development and evaluation activities. Material sales are recognized at the time title passes, which is typically at the time of shipment or at the time of delivery, depending upon the contractual agreement between the parties.

The Company receives license and royalty payments under certain commercial, development and technology evaluation agreements, some of which are non-refundable. These payments may include royalty and license fees made pursuant to license agreements and certain commercial supply agreements. Amounts received are deferred and classified as either current or non-current deferred revenue based upon current contractual remaining terms; however, based upon ongoing relationships with customers, as well as future agreement extensions and other factors, amounts classified as current as of December 31, 2017 may not be recognized as revenue over the next twelve months. For arrangements with extended payment terms where the fee is not fixed and determinable, the Company recognizes revenue when the payment is due and payable. Royalty revenue and license fees included as part of commercial supply agreements are recognized when earned and the amount is fixed and determinable. If the Company used different estimates for the useful life of the licensed technology, or if fees are fixed and determinable, reported revenue during the relevant period would differ.

Contract research services revenue is revenue earned by performing organic and organometallic synthetics research, development and commercialization on a contractual basis. These services range from intermediates for structure-activity relationship studies, reference agents and building blocks for combinatorial synthesis, re-synthesis of key intermediates, specialty organic chemistry needs, and selective toll manufacturing. These services are provided to third-party pharmaceutical and life sciences firms and other technology firms at fixed costs or on an annual contract basis. Revenue is recognized as services are performed with billing schedules and payment terms negotiated on a contract-by-contract basis. Payments received in excess of revenue recognized are recorded as deferred revenue. In other cases, services may be provided and revenue is recognized before the client is invoiced. In these cases, revenue recognized will exceed amounts billed and the difference, representing amounts which are currently unbillable to the customer pursuant to contractual terms, is recorded as an unbilled receivable.

Technology development and support revenue is revenue earned from government contracts, development and technology evaluation agreements and commercialization assistance fees, which includes reimbursements by government entities for all or a portion of the research and development costs the Company incurs in relation to its government contracts. Revenues are recognized proportionally as research and development costs are incurred, or as defined milestones are achieved.

In 2017, the Company's most significant commercial license agreement was a 2011 license agreement with Samsung Display Co., Ltd. (SDC) covering the manufacture and sale of specified OLED display materials. Under the 2011 agreement, the Company was being paid a license fee, payable in semi-annual installments over the agreement term of 6.4 years. The installments, which were due in the second and fourth quarter of each year, increased on an annual basis over the term of the 2011 agreement. The 2011 agreement conveyed to SDC the non-exclusive right to use certain of the Company's intellectual property assets for a limited period of time that were less than the estimated life of the assets. Ratable recognition of revenue was impacted by the agreement's extended increasing payment terms in light of the Company's limited history with similar agreements. As a result, revenue was recognized at the lesser of the proportional performance approach (ratable) and the amount of due and payable fees from SDC. Given the increasing contractual payment schedule, license fees under the 2011 agreement were recognized as revenue when they became due and payable in the second and fourth quarter of each year.

At the same time the Company entered into the 2011 patent license agreement with SDC, the Company also entered into a supplemental material purchase agreement with SDC. Under the 2011 supplemental material purchase agreement, SDC agreed to purchase from the Company a minimum dollar amount of phosphorescent emitter materials for use in the manufacture of licensed products. This minimum purchase commitment was subject to SDC's requirements for phosphorescent emitter materials and the Company's ability to meet these requirements over the term of the supplemental agreement.

The 2011 license and purchase agreements with SDC expired on December 31, 2017, and on February 13, 2018, the Company entered into a new patent license agreement and supplemental purchase agreement, with an effective date of January 1, 2018. These 2018 agreements extend for a five-year term and provide SDC with an option to extend the agreements for two additional years. Under the 2018 license agreement, SDC has a non-exclusive license to make and sell certain OLED displays under the Company's patent portfolio, and pays license fees to the Company. The 2018 supplemental purchase agreement provides for certain minimum annual purchase obligations of phosphorescent emitter material from the Company for use in the manufacture of licensed products. SDC is currently the largest manufacturer of AMOLED displays for handset and other personal electronic devices.

In 2015, the Company entered into an OLED patent license agreement and an OLED commercial supply agreement with LG Display Co., Ltd. (LG Display) which were effective as of January 1, 2015 and superseded the 2007 commercial supply agreement between the parties. The new agreements have a term that is set to expire by the end of 2022. The patent license agreement provides LG Display a non-exclusive, royalty bearing portfolio license to make and sell OLED displays under the Company's patent portfolio. The patent license calls for license fees, prepaid royalties and running royalties on licensed products. The prepaid royalty amount is included in deferred revenue and a portion of this amount can be credited against total royalties due over the life of the contract. The agreements include customary provisions relating to warranties, indemnities, confidentiality, assignability and business terms. The agreements provide for certain other minimum obligations relating to the volume of material sales anticipated over the term of the agreements, as well as minimum royalty revenue to be generated under the patent license agreement. The Company expects to generate revenue under these agreements that are predominantly tied to LG Display's sales of OLED licensed products. The OLED commercial supply agreement provides for the sale of materials for use by LG Display, which may include phosphorescent emitters and host materials.

In 2016, the Company entered into an OLED Technology License Agreement and Commercial Material Supply Agreement with Tianma Micro-electronics Co., Ltd. (Tianma) which were both effective July 21, 2016 and run for five years. Under the license agreement, the Company, through its wholly-owned subsidiary UDC Ireland Limited, has granted Tianma non-exclusive license rights under various patents owned or controlled by the Company to manufacture and sell OLED display products. The license agreement calls for license fees and running royalties on licensed products. Additionally, the agreement provides for the sale of phosphorescent OLED materials to Tianma for use in its licensed products.

In 2017, the Company entered into long-term, multi-year agreements with BOE Technology Group Co., Ltd. (BOE). Under these agreements, the Company granted BOE non-exclusive license rights under various patents owned or controlled by the Company to manufacture and sell OLED display products. The Company has also agreed to supply phosphorescent OLED materials to BOE.

The Company records taxes billed to customers and remitted to various governmental entities on a gross basis in both revenues and cost of material sales in the consolidated statements of income. The amounts of these pass through taxes reflected in revenues and cost of material sales were \$409,000, \$171,000 and \$1.3 million for the years ended December 31, 2017, 2016 and 2015, respectively.

All sales transactions are billed and due within 90 days and substantially all are transacted in U.S. dollars.

See Recent Accounting Pronouncements for discussion of revenue recognition under the new standard effective January 1, 2018.

### ***Cost of Sales***

Cost of sales consists of labor and material costs associated with the production of materials processed at the Company's manufacturing partners and at the Company's internal manufacturing processing facilities. The Company's portion of cost of sales also includes depreciation of manufacturing equipment, as well as manufacturing overhead costs and inventory adjustments for excess and obsolete inventory.

### ***Research and Development***

Expenditures for research and development are charged to operations as incurred.

### ***Patent Costs***

Costs associated with patent applications, patent prosecution, patent defense and the maintenance of patents are charged to expense as incurred. Costs to successfully defend a challenge to a patent are capitalized to the extent of an evident increase in the value of the patent. Costs that relate to an unsuccessful outcome are charged to expense.

### ***Amortization of Acquired Technology***

Amortization costs relate to technology acquired from BASF, Fujifilm and Motorola. These acquisitions were completed in the years ended December 31, 2016, 2012 and 2011, respectively. Acquisition costs are being amortized over a period of 10 years for the BASF and Fujifilm patents and 7.5 years for the Motorola patents.

### ***Amortization of Other Intangible Assets***

Other intangible assets from the Adesis acquisition are being amortized over a period of 10 to 15 years. See Note 8 for further discussion.

### ***Translation of Foreign Currency Financial Statements and Foreign Currency Transactions***

The Company's reporting currency is the U.S. dollar. The functional currency for the Company's Ireland subsidiary is also the U.S. dollar and the functional currency for each of the Company's Asia-Pacific foreign subsidiaries is its local currency. The Company translates the amounts included in the consolidated statements of income from its Asia-Pacific foreign subsidiaries into U.S. dollars at weighted-average exchange rates, which the Company believes are representative of the actual exchange rates on the dates of the transactions. The Company's foreign subsidiaries' assets and liabilities are translated into U.S. dollars from the local currency at the actual exchange rates as of the end of each reporting date, and the Company records the resulting foreign exchange translation adjustments in the consolidated balance sheets as a component of accumulated other comprehensive loss. The overall effect of the translation of foreign currency and foreign currency transactions to date has been insignificant.

### ***Income Taxes***

Income taxes are accounted for under the asset and liability method. Deferred tax assets and liabilities are recognized for the future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases and operating loss and tax credit carryforwards. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in income in the period that includes the enactment date. The Company recognizes the effect of income tax positions only if those positions are more likely than not of being sustained. Recognized income tax positions are measured at the largest amount of which the likelihood of realization is greater than 50%. Changes in recognition or measurement are reflected in the period in which the change in judgment occurs. The Company records interest and penalties, if any, related to unrecognized tax benefits as a component of tax expense.

### ***Share-Based Payment Awards***

The Company recognizes in the consolidated statements of income the grant-date fair value of equity based awards such as shares issued under employee stock purchase plans, restricted stock awards, restricted stock units and performance unit awards issued to employees and directors.

The grant-date fair value of stock awards is based on the closing price of the stock on the date of grant. The fair value of share-based awards is recognized as compensation expense on a straight-line basis over the requisite service period, net of forfeitures. The Company issues new shares upon the respective grant, exercise or vesting of the share-based payment awards, as applicable.

Performance unit awards are subject to either a performance-based or market-based vesting requirement. For performance-based vesting, the grant-date fair value of the award, based on fair value of the Company's common stock, is recognized over the service period, based on an assessment of the likelihood that the applicable performance goals will be achieved and compensation expense is periodically adjusted based on actual and expected performance. Compensation expense for performance unit awards with market-based vesting is calculated based on the estimated fair value as of the grant date utilizing a Monte Carlo simulation model and is recognized over the service period on a straight-line basis.

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

In May 2014, the Financial Accounting Standards Board (FASB) issued a new revenue recognition standard entitled Accounting Standards Codification ("ASC") Topic 606, *Revenue from Contracts with Customers*. The objective of the standard is to establish the principles that an entity shall apply to report useful information to users of financial statements about the nature, amount, timing, and uncertainty of revenue and cash flows from a contract with a customer. The standard is effective for annual reporting periods beginning after December 15, 2017. Early adoption as of the original date is optional; however, the Company will adopt the standard beginning January 1, 2018. The standard allows for either "full retrospective" adoption, meaning the standard is applied to all periods presented, or "modified retrospective" adoption, meaning the standard is applied only to the most current period presented in the financial statements, with a cumulative adjustment to retained earnings.

The new standard will mainly impact how the Company recognizes revenue on its commercial license and material supply agreements with customers. Currently, the Company recognizes revenue on license agreements with fixed-fee arrangements on a straight-line basis over the term of the contract agreement. In addition, the Company recognizes royalty revenue one quarter in arrears based on sales information received from its customers typically received after disclosing that quarter's results.

The rights and benefits to the Company's OLED technology are conveyed to the customer through technology license agreements and material supply agreements. The Company has determined under the new standard that these agreements can be combined and that the licenses and materials sold under these combined agreements are not distinct from each other for financial reporting purposes and as such, will be accounted for as a single performance obligation. The Company also acknowledges that the rights to future patents or licenses would be distinct from existing patent rights. Accordingly, the total contract consideration will be estimated and recognized over the contract term based on material units sold.

Under the new guidance, various estimates will need to be relied upon to recognize revenue. The Company will estimate total material fees to be purchased by its customers over the contract term based on historical trends and its forecast process. Additionally, management will estimate the total sales-based royalties based on the estimated net sales revenue of its customers.

The Company is using the "modified retrospective" adoption method. The Company estimates that adoption of the new standard will result in an increase in deferred revenue of \$21.3 million offset by a reduction of retained earnings of \$21.0 million and unbilled receivables of \$0.3 million.

In November 2015, the FASB issued ASU No. 2015-17, *Balance Sheet Classification of Deferred Taxes*, which requires the classification of all deferred tax assets and liabilities as noncurrent rather than separately disclosing deferred taxes as current and noncurrent. The standard is effective for annual reporting periods beginning after December 15, 2016. The standard allows for either "prospective" adoption, meaning the standard is applied to the most current period presented in the financial statements or "full retrospective" adoption, meaning the standard is applied to all periods presented. The Company adopted ASU 2015-17 effective January 1, 2017 on a "prospective" basis.

In February 2016, the FASB issued ASU No. 2016-02, *Leases*, which addresses the classification and recognition of lease assets and liabilities formerly classified as operating leases under generally accepted accounting principles. The guidance will address certain aspects of recognition and measurement, and quantitative and qualitative aspects of presentation and disclosure. The guidance is effective for fiscal years beginning after December 15, 2018, including interim periods within those fiscal years. The Company is evaluating the effect that ASU 2016-02 may have on its consolidated financial statements and related disclosures.

In March 2016, the FASB issued ASU No. 2016-09, *Improvements to Employee Share-Based Accounting*. The objective of the standard is to simplify the accounting and related disclosures associated with employee share-based accounting. The standard is effective for annual reporting periods beginning after December 15, 2016. The ASU requires prospective adoption, meaning the standard is applied to the most current period presented in the financial statements. The Company adopted ASU 2016-09 effective January 1, 2017 and recorded a deferred tax asset and offsetting credit to retained earnings of \$26.5 million (see Note 12).

In August 2016, the FASB issued ASU No. 2016-15, *Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments*. The objective of the standard is to reduce diversity in practice in how certain transactions are classified in the consolidated statements of cash flows. The ASU provides additional clarification guidance on the classification of certain cash receipts and payments in the consolidated statements of cash flows. The new guidance is effective for fiscal years and interim periods within those years beginning after December 15, 2017, with early adoption permitted. The Company is evaluating the effect that ASU 2016-15 may have on its consolidated financial statements and related disclosures.

In October 2016, the FASB issued ASU No. 2016-16, *Income Taxes (Topic 740): Intra-Entity Transfers of Assets Other Than Inventory*. ASU 2016-16 clarifies the accounting for the current and deferred income taxes for an intra-entity transfer of an asset other than inventory. ASU 2016-16 is effective for fiscal years beginning after December 15, 2017, including interim periods within those fiscal years, with early adoption permitted. The Company is evaluating the effect that ASU 2016-16 may have on its consolidated financial statements and related disclosures.

### 3. BUSINESS COMBINATIONS:

On June 23, 2016, the Company entered into an agreement to acquire Adesis, Inc., a privately held contract research organization (CRO) with then 43 employees specializing in organic and organometallic synthetic research, development, and commercialization. Adesis is a technology vendor to companies in the pharmaceutical, fine chemical, biomaterials, and catalyst industries, and has worked with the Company over the last few years to help advance and accelerate a number of the Company's product offerings. The transaction closed on July 11, 2016. Under the terms of the agreement, the Company's subsidiary, UDC, Inc., acquired all outstanding shares of Adesis in a merger for \$33.9 million in cash, and up to an additional \$2.4 million in cash contingent upon Adesis' achievement of certain milestones within two years of the acquisition. The acquisition was funded through use of existing cash and investments.

#### *Purchase Price Allocation*

The Company accounted for Adesis using the acquisition method of accounting in accordance with applicable U.S. GAAP whereby the total purchase price was allocated to tangible and intangible assets acquired and liabilities assumed based on respective fair values. The contingent consideration arrangement requires the Company to pay up to \$1.2 million of additional consideration to the former shareholders of Adesis if revenues exceed certain threshold levels at the end of each twelve-month period ended December 31, 2016 and December 31, 2017. For both of the years ended December 31, 2017 and 2016, the additional cash consideration earned by the former shareholders of Adesis was \$1.2 million. The fair value of the contingent consideration was derived using a Monte Carlo simulation model based on management's projections of future revenue levels. The following table summarizes the values of the assets acquired and liabilities assumed at the date of acquisition (in thousands):

Cash consideration	\$	33,872
Contingent consideration		1,670
	\$	<u>35,542</u>
<b>Allocation of purchase price:</b>		
Current assets, including cash of \$492	\$	2,204
Property and equipment		1,869
Accounts payable and accrued liabilities		<u>(906)</u>
Net tangible assets		3,167
Identifiable intangible assets		16,840
Goodwill		15,535
Total purchase price	\$	<u>35,542</u>

The purchase price exceeded the fair value of the net tangible assets and identifiable intangible assets acquired and, as a result, the Company recorded goodwill in connection with this transaction. This difference includes a going concern element that represents the Company's ability to earn a higher rate of return on this group of assets than would be expected on the separate assets as determined during the valuation process.

Transaction costs of \$360,000 were recorded and charged to selling, general and administrative expense on the accompanying consolidated statements of income during 2016.

### Intangible Assets Identified

The following table presents the intangible assets identified in the transaction:

Category	Estimated fair value (in thousands)	Estimated useful life (in years)
Customer relationships	\$ 10,520	11.5
Internally-developed IP, processes and recipes	4,820	15.0
Trade name/Trademarks	1,500	10.0
Total identifiable intangible assets	\$ 16,840	

The fair value of the customer relationships asset was determined using the income approach through an excess earnings analysis which estimates value based on the present value of future economic benefits. The customer relationships intangible asset represents relationships between Adesis and its customers. The fair value of the internally-developed IP, processes and recipes was determined by utilizing the relief-from-royalty methodology. The fair value of the Adesis trade name asset was determined using the income approach through a relief-from-royalty analysis. The determination of useful lives was based upon consideration of market participant assumptions and transaction specific factors.

### Impact on Operating Results

The results of Adesis' operations have been included in the Company's consolidated financial statements since the July 11, 2016 date of acquisition. The following unaudited pro forma information assumes the acquisition of Adesis occurred at the beginning of the respective periods presented (in thousands):

	2016	2015
Revenue	\$ 202,547	\$ 197,375
Net income	44,718	12,661

The unaudited pro forma information presented is for illustrative purposes only and does not reflect future events that may occur after December 31, 2017, or any operating efficiencies or inefficiencies that may result from the Adesis acquisition. Additionally, this unaudited pro forma information includes certain one-time costs associated with the Company's integration of the acquired Adesis operations. Therefore, the information is not necessarily indicative of the results that would have been achieved had the business been combined during the periods presented or the results that the Company will experience going forward.

## 4. CASH, CASH EQUIVALENTS AND INVESTMENTS:

The Company considers all highly liquid debt instruments purchased with an original maturity of three months or less to be cash equivalents. The Company classifies its remaining investments as available-for-sale. These securities are carried at fair market value, with unrealized gains and losses reported in shareholders' equity. Gains or losses on securities sold are based on the specific identification method. Investments as of December 31, 2017 and December 31, 2016 consisted of the following (in thousands):

Investment Classification	Amortized Cost	Unrealized		Aggregate Fair Market Value
		Gains	(Losses)	
December 31, 2017				
Certificates of deposit	\$ 1,296	\$ 1	\$ (1)	\$ 1,296
Corporate bonds	104,626	—	(252)	104,374
U.S. Government bonds	214,641	—	(139)	214,502
	<u>\$ 320,563</u>	<u>\$ 1</u>	<u>\$ (392)</u>	<u>\$ 320,172</u>
December 31, 2016				
Certificates of deposit	\$ 3,362	\$ 3	\$ —	\$ 3,365
Money market instruments	2,998	—	(2)	2,996
Corporate bonds	209,595	6	(377)	209,224
U.S. Government bonds	32,996	1	(3)	32,994
	<u>\$ 248,951</u>	<u>\$ 10</u>	<u>\$ (382)</u>	<u>\$ 248,579</u>

As of December 31, 2017 and 2016, corporate bonds of \$17.9 million and \$15.0 million, respectively, and U.S. government bonds of none and \$30.0 million, respectively, were included in cash equivalents on the consolidated balance sheet.

**5. FAIR VALUE MEASUREMENTS :**

The following table provides the assets and liabilities carried at fair value measured on a recurring basis as of December 31, 2017 (in thousands):

	Total carrying value as of December 31, 2017	Fair Value Measurements, Using		
		Quoted prices in active markets (Level 1)	Significant other observable inputs (Level 2)	Significant unobservable inputs (Level 3)
Cash equivalents	\$ 27,532	\$ 27,532	\$ —	\$ —
Short-term investments	287,446	287,446	—	—
Long-term investments	14,794	14,794	—	—

The following table provides the assets and liabilities carried at fair value measured on a recurring basis as of December 31, 2016 (in thousands):

	Total carrying value as of December 31, 2016	Fair Value Measurements, Using		
		Quoted prices in active markets (Level 1)	Significant other observable inputs (Level 2)	Significant unobservable inputs (Level 3)
Cash equivalents	\$ 71,773	\$ 71,773	\$ —	\$ —
Short-term investments	188,644	188,644	—	—
Long-term investments	14,960	14,960	—	—

Level 1 inputs are quoted prices (unadjusted) in active markets for identical assets or liabilities. Level 2 inputs are 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 inputs are unobservable inputs based on management's own assumptions used to measure assets and liabilities at fair value. A financial asset's or liability's classification is determined based on the lowest level input that is significant to the fair value measurement.

Changes in fair value of the investments are recorded as unrealized gains and losses in other comprehensive income (loss). If a decline in fair value of an investment is deemed to be other than temporary, the cost of the Company's investment will be written down by the amount of the other-than-temporary impairment with a resulting charge to net income. There were no other-than-temporary impairments of investments as of December 31, 2017 or December 31, 2016.

**6. INVENTORY:**

Inventory consisted of the following (in thousands):

	December 31, 2017	December 31, 2016
Raw materials	\$ 17,464	\$ 6,539
Work-in-process	2,977	3,719
Finished goods	15,824	7,056
Inventory	<u>\$ 36,265</u>	<u>\$ 17,314</u>

**7. PROPERTY AND EQUIPMENT:**

Property and equipment consist of the following (in thousands):

	December 31,	
	2017	2016
Land	\$ 1,006	\$ 820
Building and improvements	24,101	20,384
Office and lab equipment	33,269	30,728
Furniture, fixtures and computer related assets	4,431	3,097
Construction-in-progress	30,011	4,341
	92,818	59,370
Less: Accumulated depreciation	(36,368)	(32,167)
Property and equipment, net	<u>\$ 56,450</u>	<u>\$ 27,203</u>

Depreciation expense was \$ 4.9 million, \$ 4.3 million and \$ 3.1 million for the years ended December 31, 2017, 2016 and 2015, respectively.

## 8. GOODWILL AND INTANGIBLE ASSETS:

The Company monitors the recoverability of goodwill annually or whenever events or changes in circumstances indicate the carrying value may not be recoverable. Purchased intangible assets subject to amortization consist primarily of acquired technology and other intangible assets that include trade names, customer relationships and internally developed IP processes.

### Acquired Technology

Acquired technology consists of acquired license rights for patents and know-how obtained from PD-LD, Inc., Motorola, BASF SE (BASF) and Fujifilm. These intangible assets consist of the following (in thousands):

	December 31,	
	2017	2016
PD-LD, Inc.	\$ 1,481	\$ 1,481
Motorola	15,909	15,909
BASF	95,989	95,989
Fujifilm	109,462	109,462
	<u>222,841</u>	<u>222,841</u>
Less: Accumulated amortization	(91,312)	(70,714)
Acquired technology, net	<u>\$ 131,529</u>	<u>\$ 152,127</u>

Amortization expense related to acquired technology was \$20.6 million, \$15.9 million and \$11.0 million for the years ended December 31, 2017, 2016 and 2015, respectively. Amortization expense is included in amortization of acquired technology and other intangible assets expense line item on the consolidated statements of income and is expected to be \$20.6 million in the year ended December 31, 2018, \$20.5 million in each of the years ended December 31, 2019 through 2021 and \$15.8 million in the year ended December 31, 2022.

### Motorola Patent Acquisition

In 2000, the Company entered into a royalty-bearing license agreement with Motorola whereby Motorola granted the Company perpetual license rights to what are now 74 issued U.S. patents relating to Motorola's OLED technologies, together with foreign counterparts in various countries. These patents will all expire in the U.S. by 2018.

On March 9, 2011, the Company purchased these patents from Motorola, including all existing and future claims and causes of action for any infringement of the patents, pursuant to a Patent Purchase Agreement. The Patent Purchase Agreement effectively terminated the Company's license agreement with Motorola, including any obligation to make royalty payments to Motorola. The technology acquired from Motorola is being amortized over a period of 7.5 years.

### Fujifilm Patent Acquisition

On July 23, 2012, the Company entered into a Patent Sale Agreement with Fujifilm. Under the agreement, Fujifilm sold more than 1,200 OLED-related patents and patent applications in exchange for a cash payment of \$105.0 million, plus costs incurred in connection with the purchase. The agreement contains customary representations and warranties and covenants, including respective covenants not to sue by both parties thereto. The agreement permitted the Company to assign all of its rights and obligations under the agreement to its affiliates, and the Company assigned, prior to the consummation of the transactions contemplated by the agreement, its rights and obligations to UDC Ireland Limited (UDC Ireland), a wholly-owned subsidiary of the Company formed under the laws of the Republic of Ireland. The transactions contemplated by the agreement were consummated on July 26, 2012. The Company recorded the \$105.0 million plus \$4.5 million of purchase costs as acquired technology, which is being amortized over a period of 10 years.

### BASF Patent Acquisition

On June 28, 2016, UDC Ireland entered into and consummated an IP Transfer Agreement with BASF. Under the IP Transfer Agreement, BASF sold to UDC Ireland all of its rights, title and interest to certain of its owned and co-owned intellectual property rights relating to the composition of, development, manufacture and use of OLED materials, including OLED lighting and display stack technology, as well as certain tangible assets. The intellectual property includes knowhow and more than 500 issued and pending

patents in the area of phosphorescent materials and technologies. These assets were acquired in exchange for a cash payment of € 86.8 million (\$95.8 million). In addition, UDC Ireland also took on certain rights and obligations under three joint research and development agreements to which BASF was a party. The IP Transfer Agreement also contains customary representations, warranties and covenants of the parties. UDC Ireland recorded the payment of € 86.8 million (\$95.8 million) and acquisition costs incurred of \$217,000 as acquired technology, which is being amortized over a period of 10 years.

### Other Intangible Assets

As a result of the Adesis acquisition, the Company recorded \$16.8 million of other intangible assets, including \$10.5 million assigned to customer relationships with a weighted average life of 11.5 years, \$4.8 million of internally developed IP, processes and recipes with a weighted average life of 15 years, and \$1.5 million assigned to trade name and trademarks with a weighted average life of 10 years.

	December 31, 2017		
	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
Customer relationships	\$ 10,520	\$ (1,314)	\$ 9,206
Internally-developed IP, processes and recipes	4,820	(468)	4,352
Trade name/Trademarks	1,500	(218)	1,282
Total identifiable intangible assets	<u>\$ 16,840</u>	<u>\$ (2,000)</u>	<u>\$ 14,840</u>

Amortization expense related to other intangible assets was \$1.4 million, \$615,000 and none for the years ended December 31, 2017, 2016, and 2015, respectively. Amortization expense is included in amortization of acquired technology and other intangible assets expense line item on the consolidated statements of income and is expected to be \$1.4 million for each of the next five fiscal years.

### Goodwill

As a result of the Adesis acquisition, the Company recorded \$15.5 million of goodwill. The Company performs its annual assessment of goodwill during the fourth quarter of the fiscal year unless events suggest an impairment may have been incurred in an interim period. Application of the goodwill impairment test requires the exercise of judgment, including the determination of the fair value of each reporting unit. The Company estimates the fair value of reporting units using an income approach based on the present value of estimated future cash flows. As part of the annual assessment of goodwill completed during the fourth quarter ended December 31, 2017, there were no significant indicators to conclude that an impairment of the goodwill associated with the acquisition of Adesis had occurred.

### 9. ACCRUED EXPENSES:

Accrued expenses consist of the following (in thousands):

	December 31,	
	2017	2016
Compensation	\$ 20,997	\$ 10,833
Royalties	9,746	5,823
Research and development agreements	48	757
Professional fees	748	238
Consulting	491	524
Other	2,989	1,670
	<u>\$ 35,019</u>	<u>\$ 19,845</u>

### 10. RESEARCH AND LICENSE AGREEMENTS WITH PRINCETON UNIVERSITY, UNIVERSITY OF SOUTHERN CALIFORNIA AND THE UNIVERSITY OF MICHIGAN:

The Company funded OLED technology research at Princeton University and, on a subcontractor basis, at the University of Southern California for 10 years under a Research Agreement executed with Princeton University in August 1997 (the 1997 Research Agreement). The principal investigator conducting work under the 1997 Research Agreement transferred to the University of Michigan in January 2006. Following this transfer, the 1997 Research Agreement was allowed to expire on July 31, 2007.

As a result of the transfer, the Company entered into a new Sponsored Research Agreement with the University of Southern California to sponsor OLED technology research and, on a subcontractor basis, with the University of Michigan. This new Sponsored Research Agreement (as amended, the 2006 Research Agreement) was effective as of May 1, 2006 and had an original term of three years. On May 1, 2009, the Company amended the 2006 Research Agreement to extend the term of the agreement for an additional four years. The 2006 Research Agreement superseded the 1997 Research Agreement with respect to all work being performed at the University of Southern California and the University of Michigan. Payments under the 2006 Research Agreement were made to the University of Southern California on a quarterly basis as actual expenses were incurred. The Company incurred a total of \$5.0 million in research and development expense for work performed under the 2006 Research Agreement, which ended on April 30, 2013.

Effective June 1, 2013, the Company amended the 2006 Research Agreement again to extend the term of the agreement for an additional four years. The Company incurred a total of \$4.6 million in research and development expense for work performed under the 2006 Research Agreement during the extended term.

Effective May 1, 2017, the Company amended the 2006 Research Agreement once again to extend the term of the agreement for an additional three years. As of December 31, 2017, in connection with this amendment, the Company was obligated to pay the University of Southern California up to \$6.6 million for work to be performed during the remaining extended term, which expires April 30, 2020. From May 1, 2017 through December 31, 2017, the Company incurred \$520,000 in research and development expense for work performed under the 2006 Research Agreement.

In connection with entering into the 2006 Research Agreement, the Company amended the 1997 Amended License Agreement to include the University of Michigan as a party to that agreement effective as of January 1, 2006. Under this amendment, Princeton University, the University of Southern California and the University of Michigan have granted the Company a worldwide exclusive license, with rights to sublicense, to make, have made, use, lease and/or sell products and to practice processes based on patent applications and issued patents arising out of work performed under the 2006 Research Agreement. The financial terms of the 1997 Amended License Agreement were not impacted by this amendment.

On October 9, 1997, the Company, Princeton University and the University of Southern California entered into an Amended License Agreement (as amended, the 1997 Amended License Agreement) under which Princeton University and the University of Southern California granted the Company worldwide, exclusive license rights, with rights to sublicense, to make, have made, use, lease and/or sell products and to practice processes based on patent applications and issued patents arising out of work performed by Princeton University and the University of Southern California under the 1997 Research Agreement. Under this 1997 Amended License Agreement, the Company is required to pay Princeton University royalties for licensed products sold by the Company or its sublicensees. For licensed products sold by the Company, the Company is required to pay Princeton University 3% of the net sales price of these products. For licensed products sold by the Company's sublicensees, the Company is required to pay Princeton 3% of the revenues received by the Company from these sublicensees. These royalty rates are subject to renegotiation for products not reasonably conceivable as arising out of the 1997 Research Agreement if Princeton University reasonably determines that the royalty rates payable with respect to these products are not fair and competitive.

The Company is obligated, under the 1997 Amended License Agreement, to pay to Princeton University minimum annual royalties. The minimum royalty payment is \$100,000 per year. The Company recorded royalty expense in connection with this agreement of \$9.7 million, \$5.8 million, and \$5.4 million for the years ended December 31, 2017, 2016, and 2015, respectively.

The Company also is required, under the 1997 Amended License Agreement, to use commercially reasonable efforts to bring the licensed OLED technology to market. However, this requirement is deemed satisfied if the Company invests a minimum of \$800,000 per year in research, development, commercialization or patenting efforts respecting the patent rights licensed to the Company.

#### **11. EQUITY AND CASH COMPENSATION UNDER THE PPG AGREEMENTS:**

On September 22, 2011, the Company entered into an Amended and Restated OLED Materials Supply and Service Agreement with PPG Industries (the New OLED Materials Agreement), which replaced the original OLED Materials Agreement with PPG Industries effective as of October 1, 2011. The term of the New OLED Materials Agreement ran through December 31, 2015 and shall be automatically renewed for additional one year terms, unless terminated by the Company by providing prior notice of one year or terminated by PPG by providing prior notice of two years. The agreement was automatically renewed through December 31, 2018. The New OLED Materials Agreement contains provisions that are substantially similar to those of the original OLED Materials Agreement. Under the New OLED Materials Agreement, PPG Industries continues to assist the Company in developing its proprietary OLED materials and supplying the Company with those materials for evaluation purposes and for resale to its customers.

Under the New OLED Materials Agreement, the Company compensates PPG Industries on a cost-plus basis for the services provided during each calendar quarter. The Company is required to pay for some of these services in all cash. Up to 50% of the

remaining services are payable, at the Company's sole discretion, in cash or shares of the Company's common stock, with the balance payable in cash. The actual number of shares of common stock issuable to PPG Industries is determined based on the average closing price for the Company's common stock during a specified number of days prior to the end of each calendar half-year period ending on March 31 and September 30. If, however, this average closing price is less than \$20.00, the Company is required to compensate PPG Industries in cash. No shares were issued for services to PPG for the years ended December 31, 2017, 2016 and 2015.

The Company is also required to reimburse PPG Industries for raw materials used for research and development. The Company records the purchases of these raw materials as a current asset until such materials are used for research and development efforts.

The Company recorded research and development expense of \$1.7 million, \$2.3 million and \$7.9 million for the years ended December 31, 2017, 2016 and 2015, respectively, in relation to the cash portion of the reimbursement of expenses and work performed by PPG Industries, excluding amounts paid for commercial chemicals.

## **12. SHAREHOLDERS' EQUITY:**

### *Preferred Stock*

The Company's Articles of Incorporation authorize it to issue up to 5,000,000 shares of preferred stock with designations, rights and preferences determined from time-to-time by the Company's Board of Directors. Accordingly, the Company's Board of Directors is empowered, without shareholder approval, to issue preferred stock with dividend, liquidation, conversion, voting or other rights superior to those of shareholders of the Company's common stock.

In 1995, the Company issued 200,000 shares of Series A Nonconvertible Preferred Stock (Series A) to American Biomimetics Corporation (ABC) pursuant to a certain Technology Transfer Agreement between the Company and ABC. The Series A shares have a liquidation value of \$7.50 per share. Series A shareholders, as a single class, have the right to elect two members of the Company's Board of Directors. This right has never been exercised. Holders of the Series A shares are entitled to one vote per share on matters which shareholders are generally entitled to vote. The Series A shareholders are not entitled to any dividends.

As of December 31, 2017, the Company had issued 200,000 shares of preferred stock, all of which were outstanding.

### *Common Stock*

The Company is authorized to issue 100,000,000 shares of \$0.01 par value common stock. Each share of the Company's common stock entitles the holder to one vote on all matters to be voted upon by the shareholders. As of December 31, 2017, the Company had issued 48,476,034 shares of common stock of which 47,118,171 were outstanding.

### *Scientific Advisory Board and Employee Awards*

During the first quarters of 2017 and 2016, the Company granted a total of 5,590 and 27,967 shares, respectively, of fully vested common stock to employees and non-employee members of the Scientific Advisory Board for services performed in 2016 and 2015, respectively. The fair value of the shares issued was \$165,000 and \$1.1 million respectively, for shares issued to employees and \$300,000 for both quarters for shares issued to members of the Scientific Advisory Board, which amounts were accrued at December 31, 2016 and 2015, respectively. In connection with the issuance of these grants, 605 and 8,106 shares, with fair values of \$55,000 and \$410,000, were withheld in satisfaction of employee tax withholding obligations in 2017 and 2016, respectively.

### *Dividends*

During the year ended December 31, 2017, the Company declared and paid cash dividends of \$0.12 per common share or \$5.7 million, on the Company's outstanding common stock.

On February 20, 2018, the Company's Board of Directors declared a dividend of \$0.06 per share of common stock. Payment of the dividend will be made on March 30, 2018 to shareholders of record at the close of business on March 15, 2018.

### 13. ACCUMULATED OTHER COMPREHENSIVE LOSS:

Amounts related to the changes in accumulated other comprehensive loss were as follows (in thousands):

	Unrealized loss on available-for- sale-securities	Net unrealized gain (loss) on retirement plan <sup>(2)</sup>	Change in cumulative foreign currency translation adjustment	Total	Affected line items in the consolidated statements of operations
Balance January 1, 2015, net of tax	\$ (28)	\$ (4,354)	\$ —	\$ (4,382)	
Other comprehensive loss before reclassification	(83)	(388)	—	(471)	
Plan amendment cost	—	(5,963)	—	(5,963)	
Reclassification to net income <sup>(1)</sup>	—	997	—	997	Selling, general and administrative, research and development
Change during period	(83)	(5,354)	—	(5,437)	
Balance December 31 2015, net of tax	(111)	(9,708)	—	(9,819)	
Other comprehensive loss before reclassification	(135)	(1,731)	(65)	(1,931)	
Reclassification to net income <sup>(1)</sup>	—	1,084	—	1,084	Selling, general and administrative, research and development, and cost of material sales
Change during period	(135)	(647)	(65)	(847)	
Balance December 31, 2016, net of tax	(246)	(10,355)	(65)	(10,666)	
Other comprehensive loss before reclassification	(12)	(2,184)	28	(2,168)	
Reclassification to net income <sup>(1)</sup>	—	1,370	—	1,370	Selling, general and administrative, research and development, and cost of material sales
Change during period	(12)	(814)	28	(798)	
Balance December 31, 2017, net of tax	\$ (258)	\$ (11,169)	\$ (37)	\$ (11,464)	

(1) The Company reclassified amortization of plan amendment cost, prior service cost, and actuarial loss for its retirement plan from accumulated other comprehensive loss to net income of \$1.4 million, \$1.1 million and \$1.0 million for the years ended December 31, 2017, 2016 and 2015, respectively.

(2) Refer to Note 15: Employee Retirement Plans

### 14. STOCK-BASED COMPENSATION:

#### Equity Compensation Plan

In 1995, the Board of Directors of the Company adopted a stock option plan, which was most recently amended and restated in 2014 and is now called the Equity Compensation Plan. The Equity Compensation Plan provides for the granting of incentive and nonqualified stock options, shares of common stock, stock appreciation rights and performance units to employees, directors and consultants of the Company. Stock options are exercisable over periods determined by the Compensation Committee, but for no longer than 10 years from the grant date. Through December 31, 2017, the Company's shareholders have approved increases in the number of shares reserved for issuance under the Equity Compensation Plan to 10,500,000, and have extended the term of the plan through 2024. As of December 31, 2017, there were 2,497,948 shares that remained available to be granted under the Equity Compensation Plan.

### Stock Options

The following table summarizes the stock option activity during the year ended December 31, 2017 for all the grants under the Equity Compensation Plan (in thousands, except share and per share data):

	Options	Weighted Average Exercise Price
Outstanding at January 1, 2017	3,500	\$ 15.99
Granted	—	—
Exercised	(2,250)	16.89
Forfeited/ Expired	(750)	17.24
Cancelled	—	—
Outstanding at December 31, 2017	500	10.04
Vested and expected to vest	500	10.04
Exercisable at December 31, 2017	500	\$ 10.04

No stock options were granted during the years ended December 31, 2017, 2016 or 2015.

A summary of stock options outstanding and exercisable by price range at December 31, 2017 is as follows (in thousands, except share and per share data):

Exercise Price	Outstanding and Exercisable			
	Number of Options Outstanding at December 31, 2017	Weighted Average Remaining Contractual Life (Years)	Weighted Average Exercise Price	Aggregate Intrinsic Value (A)
\$10.04-\$15.06	500	1.5	\$ 10.04	\$ 81

(A) The difference between the stock option's exercise price and the closing price of common stock at December 31, 2017.

The total intrinsic value of stock options exercised during the years ended December 31, 2017, 2016 and 2015 was \$146,000, \$507,000 and \$12.0 million, respectively. There was no compensation expense recognized for the years ended December 31, 2017, 2016, and 2015.

During the year ended December 31, 2015, 13,959 shares of common stock, with a fair value of \$429,000, were tendered to net share settle the exercise of options. During the years ended December 31, 2017 and 2016, no shares of common stock were tendered to net share settle the exercise of options. In connection with the exercise of options during the year ended December 31, 2015, 30,186 shares with a fair value of \$1.3 million were withheld in satisfaction of employee tax withholding obligations.

### Stock Awards

The following table summarizes the activity related to restricted stock unit ("RSU") share based payment awards:

	Number of Shares	Weighted- Average Grant-Date Fair Value
Unvested, January 1, 2017	131,119	\$ 45.44
Granted	69,497	116.58
Vested	(84,407)	46.38
Forfeited	(5,526)	54.99
Unvested, December 31, 2017	110,683	\$ 88.91

The weighted average grant-date fair value of RSU awards granted was \$116.58, \$53.85 and \$41.09 during the years ended December 31, 2017, 2016 and 2015, respectively. The fair value as of the respective vesting dates of RSUs was \$8.3 million, \$5.4 million and \$5.6 million for 2017, 2016 and 2015, respectively.

The following table summarizes the activity related to restricted stock award (“RSA”) share based payment awards:

	Number of Shares	Weighted- Average Grant-Date Fair Value
Unvested, January 1, 2017	749,955	\$ 46.64
Granted	3,604	83.25
Vested	(173,022)	47.14
Forfeited/ Canceled	(600)	49.70
Unvested, December 31, 2017	<u>579,937</u>	\$ 46.72

The weighted average grant-date fair value of RSA awards granted was \$83.25, \$65.37 and \$43.49 during the years ended December 31, 2017, 2016 and 2015, respectively. The fair value as of the respective vesting dates of RSAs was \$14.8 million, \$8.6 million and \$7.3 million for 2017, 2016 and 2015, respectively.

#### *Restricted Stock Awards and Units*

The Company has issued restricted stock awards and units to employees and non-employee members of the Scientific Advisory Board with vesting terms of one to six years. The fair value is equal to the market price of the Company’s common stock on the date of grant for awards granted to employees and equal to the market price at the end of the reporting period for unvested non-employee awards or upon the date of vesting for vested non-employee awards. Expense for restricted stock awards and units is amortized ratably over the vesting period for the awards issued to employees and using a graded vesting method for the awards issued to non-employee members of the Scientific Advisory Board.

For the years ended December 31, 2017, 2016 and 2015, the Company recorded, as compensation charges related to restricted stock awards and units issued to employees and non-employees, selling, general and administrative expense of \$8.5 million, \$6.6 million and \$5.8 million, manufacturing expense of \$443,000, \$1.1 million and \$178,000 and research and development expense of \$1.6 million, \$1.7 million and \$1.9 million, respectively.

The majority of the Company’s restricted stock awards and units that vested in 2017, 2016 and 2015 were net-share settled such that the Company withheld shares with value equivalent to the employees’ minimum statutory obligation for the applicable income and other employment taxes, and remitted the cash to the appropriate tax authorities. The total shares withheld were approximately 89,661, 84,135 and 99,345 for 2017, 2016 and 2015, respectively, and were based on the value of the restricted vesting dates as determined by the Company’s closing stock price. Total payments for the employees’ tax obligations to taxing authorities were \$7.8 million, \$4.5 million and \$4.2 million in 2017, 2016 and 2015, respectively, and are reflected as a financing activity within the consolidated statements of cash flows.

For the years ended December 31, 2017, 2016 and 2015, the Company recorded as compensation charges related to all restricted stock units to non-employee members of the Scientific Advisory Board whose unvested shares are marked to market each reporting period, research and development expense of \$976,000, \$242,000 and \$426,000, respectively.

#### *Board of Directors Compensation*

The Company has granted restricted stock units to non-employee members of the Board of Directors with vesting terms of approximately one year. The fair value is equal to the market price of the Company’s common stock on the date of grant. The restricted stock units are issued and expense is recognized ratably over the vesting period. For the years ended December 31, 2017, 2016 and 2015, the Company recorded compensation charges for services performed related to all restricted stock units granted to non-employee members of the Board of Directors, selling and administrative expense of \$1.6 million, \$1.5 million and \$865,000, respectively. Restricted stock issued to non-employee members of the Board of Directors during 2017, 2016 and 2015 was 27,500, 30,000 and 29,167 shares, respectively.

As of December 31, 2017, the total unrecognized cost related to RSUs and RSAs was \$30.2 million, which the Company expects to recognize over a weighted average period of 2.47 years.

### Performance Unit Awards

The following table summarizes the activity related to performance unit awards (“PSU”) share based payment awards:

	Number of Shares	Weighted- Average Grant-Date Fair Value
Unvested, January 1, 2017	93,769	\$ 46.02
Granted	24,664	105.65
Vested	(45,118)	39.72
Forfeited	—	—
Unvested, December 31, 2017	<u>73,315</u>	<u>\$ 62.36</u>

During the years ended December 31, 2017 and 2016, respectively, the Company granted 24,664 and 25,045 performance units, of which 7,817 and 12,520 are subject to performance-based vesting requirements and 7,821 and 12,525 are subject to market-based vesting requirements, and will vest over the terms described below. In 2017, there were also 9,026 incremental performance-based shares that vested resulting from an increased vesting factor based on Company performance. The weighted average grant date fair value of the performance unit awards granted was \$105.65, \$58.46 and \$35.98 during the years ended December 31, 2017, 2016 and 2015, respectively, as determined by the Company’s common stock on date of grant for the units with performance-based vesting and a Monte-Carlo simulation for the units with market-based vesting.

Each performance unit award is subject to both a performance-vesting requirement (either performance-based or market-based) and a service-vesting requirement. The performance-based vesting requirement is tied to the Company’s cumulative revenue growth compared to the cumulative revenue growth of companies comprising the Nasdaq Electronics Components Index, as measured over a specific performance period. The market-based vesting requirement is tied to the Company’s total shareholder return relative to the total shareholder return of companies comprising the Nasdaq Electronics Components Index, as measured over a specific performance period. The maximum number of performance units that may vest based on performance is two times the shares granted. Further, if the Company’s total shareholder return is negative, the performance units may not vest at all.

For the years ended December 31, 2017, 2016 and 2015, the Company recorded, as compensation charges related to all performance stock units, selling, general and administrative expense of \$1.2 million, \$1.3 million and \$854,000, manufacturing expense of \$119,000, \$133,000 and \$17,000 and research and development expenses of \$276,000, \$356,000 and \$237,000, respectively. In connection with the vesting of performance units during the year ended December 31, 2017, 19,217 shares with an aggregate fair value of \$1.6 million were withheld in satisfaction of employee tax withholding obligations. During the year ended December 31, 2016, no shares were withheld in satisfaction of employee tax withholding obligations.

As of December 31, 2017, the total unrecognized compensation cost related to PSUs was \$1.9 million, which the Company expects to recognize over a weighted average period of 1.69 years.

### **Employee Stock Purchase Plan**

On April 7, 2009, the Board of Directors of the Company adopted an Employee Stock Purchase Plan (ESPP). The ESPP was approved by the Company’s shareholders and became effective on June 25, 2009. The Company has reserved 1,000,000 shares of common stock for issuance under the ESPP. Unless terminated sooner by the Board of Directors, the ESPP will expire when all reserved shares have been issued.

Eligible employees may elect to contribute to the ESPP through payroll deductions during consecutive three-month purchase periods, the first of which began on July 1, 2009. Each employee who elects to participate will be deemed to have been granted an option to purchase shares of the Company’s common stock on the first day of the purchase period. Unless the employee opts out during the purchase period, the option will automatically be exercised on the last day of the period, which is the purchase date, based on the employee’s accumulated contributions to the ESPP. The purchase price will equal 85% of the lesser of the closing price per share of common stock on the first day of the period or the last business day of the period.

Employees may allocate up to 10% of their base compensation to purchase shares of common stock under the ESPP; however, each employee may purchase no more than 12,500 shares on a given purchase date, and no employee may purchase more than \$25,000 of common stock under the ESPP during a given calendar year.

For the years ended December 31, 2017, 2016 and 2015, the Company issued 9,730, 9,386 and 12,246 shares, respectively, of its common stock under the ESPP, resulting in proceeds of \$734,000, \$439,000 and \$354,000, respectively. For the years ended

December 31, 2017, 2016 and 2015, the Company recorded charges of \$ 69,000, \$45,000 and \$34,000, respectively, to selling, general and administrative expense, \$46,000, \$15,000, \$9,000, respectively, to manufacturing expense and \$94,000, \$67,000 and \$50,000, respectively, to research and development expense, related to ESPP equal to the amount of the discount and the value of the look-back feature.

## 15. EMPLOYEE RETIREMENT PLANS:

### *Defined Contribution Plan*

The Company maintains the Universal Display Corporation 401(k) Plan (the Plan) in accordance with the provisions of Section 401(k) of the Internal Revenue Code (the Code). The Plan covers substantially all full-time employees of the Company. Participants may contribute up to 90% of their total compensation to the Plan, not to exceed the limit as defined in the Code. Since January 1, 2017, once an employee is eligible to participate in the Plan, the Company will make a non-elective contribution equal to 3% of the employee's total compensation. For the years ended December 31, 2017, 2016 and 2015, the Company contributed \$601,000, \$459,000, and \$348,000, respectively, to the Plan.

### *Defined Benefit Plan*

On March 18, 2010, the Compensation Committee and the Board of Directors of the Company approved and adopted the Universal Display Corporation Supplemental Executive Retirement Plan (SERP), effective as of April 1, 2010. On March 3, 2015, the Compensation Committee and the Board of Directors amended the SERP to include salary and bonus as part of the plan. Prior to this amendment, the SERP benefit did not take into account any bonuses. The purpose of the SERP, which is unfunded, is to provide certain of the Company's executive officers with supplemental pension benefits following a cessation of their employment. As of December 31, 2017 there were seven participants in the SERP.

The SERP benefit is based on a percentage of the participant's annual base salary and in certain cases, the participant's average annual bonus for the most recent three fiscal years ending prior to the participant's date of termination of employment with the Company for the life of the participant. For this purpose, annual base salary means 12 times the highest monthly base salary paid or payable to the participant during the 24-month period immediately preceding the participant's date of termination of employment, or, if required, the date of a change in control of the Company.

Under the SERP, if a participant resigns or is terminated without cause at or after age 65 and with at least 20 years of service, he or she will be eligible to receive a SERP benefit. The benefit is based on a percentage of the participant's annual base salary and bonus for the life of the participant. This percentage is 50%, 25% or 15%, depending on the participant's benefit class.

If a participant resigns at or after age 65 and with at least 15 years of service, he or she will be eligible to receive a prorated SERP benefit. If a participant is terminated without cause or on account of a disability after at least 15 years of service, he or she will be eligible to receive a prorated SERP benefit regardless of age. The prorated benefit in either case would be based on the participant's number of years of service (up to 20), divided by 20. In the event a participant is terminated for cause, his or her SERP benefit and any future benefit payments are subject to immediate forfeiture.

The SERP benefit is payable in installments over 10 years, beginning at the later of age 65 or the date of the participant's separation from service. Payments are based on a present value calculation of the benefit amount for the actuarial remaining life expectancy of the participant. This calculation is made as of the date benefit payments are to begin (later of age 65 or separation from service). If the participant dies after reaching age 65, any future or remaining benefit payments are made to the participant's beneficiary or estate. If the participant dies before reaching age 65, the benefit is forfeited.

In the event of a change in control of the Company, each participant will become immediately vested in his or her SERP benefit. Unless the participant's benefit has already fully vested, if the participant has less than 20 years of service at the time of the change in control, he or she will receive a prorated benefit based on his or her number of years of service (up to 20), divided by 20. If the change in control qualifies as a "change in control event" for purposes of Section 409A of the Internal Revenue Code, then each participant (including former employees who are entitled to SERP benefits) will receive a lump sum cash payment equal to the present value of the benefit immediately upon the change in control.

Certain of the Company's executive officers are designated as special participants under the SERP. If these participants resign or are terminated without cause after 20 years of service, or at or after age 65 and with at least 15 years of service, they will be eligible to receive a SERP benefit. If they are terminated without cause or on account of a disability, they will be eligible to receive a prorated SERP benefit regardless of age. The prorated benefit would be based on the participant's number of years of service (up to 20), divided by 20.

The SERP benefit for special participants is based on 50% of their annual base salary and bonus for their life and the life of their surviving spouse, if any. Payments are based on a present value calculation of the benefit amount for the actuarial remaining life expectancies of the participant and their surviving spouse, if any. If they die before reaching age 65, the benefit is not forfeited if the surviving spouse, if any, lives until the participant would have reached age 65. If their spouse also dies before the participant would have reached age 65, the benefit is forfeited.

The Company records amounts relating to the SERP based on calculations that incorporate various actuarial and other assumptions, including discount rates, rate of compensation increases, retirement dates, and life expectancies. The net periodic costs are recognized as employees render the services necessary to earn the SERP benefits.

In connection with the initiation and subsequent amendments of the SERP, the Company recorded cost related to prior service of \$14.3 million as accumulated other comprehensive loss as of December 31, 2017. The prior service cost is being amortized as a component of net periodic pension cost over the average of the remaining service period of the employees expected to receive benefits under the plan. The prior service cost expected to be amortized for the year ending December 31, 2018 is \$2.2 million.

Information relating to the Company's plan is as follows (in thousands):

	Year Ended December 31,	
	2017	2016
<b>Change in benefit obligation:</b>		
Benefit obligation, beginning of year	\$ 27,563	\$ 22,594
Service cost	1,214	1,415
Interest cost	1,013	875
Actuarial loss	2,952	2,679
Plan amendment	434	—
Benefit obligation, end of year	33,176	27,563
Fair value of plan assets	—	—
Unfunded status of the plan, end of year	\$ 33,176	\$ 27,563
Current liability	—	—
Noncurrent liability	\$ 33,176	\$ 27,563

The accumulated benefit obligation for the plan was approximately \$30.4 million and \$24.7 million as of December 31, 2017 and 2016, respectively.

The components of net periodic pension cost were as follows (in thousands):

	Year Ended December 31,		
	2017	2016	2015
Service cost	\$ 1,214	\$ 1,415	\$ 1,186
Interest cost	1,013	875	618
Amortization of prior service cost	1,667	1,660	1,550
Amortization of loss	457	15	—
Total net periodic benefit cost	\$ 4,351	\$ 3,965	\$ 3,354

The measurement date is the Company's fiscal year end. The net periodic pension cost is based on assumptions determined at the prior year end measurement date.

Assumptions used to determine the year end benefit obligation were as follows:

	Year Ended December 31,	
	2017	2016
Discount rate	3.22%	3.57%
Rate of compensation increases	3.50%	3.50%

Assumptions used to determine the net periodic pension cost were as follows:

	Year Ended December 31,		
	2017	2016	2015
Discount rate	3.41%	3.57%	3.78%
Rate of compensation increases	3.50%	3.50%	3.50%

Actuarial gains and losses are amortized from accumulated other comprehensive loss into net periodic pension cost over future years based upon the average remaining service period of active plan participants, when the accumulation of such gains or losses exceeds 10% of the year end benefit obligation. The cost or benefit of plan changes that increase or decrease benefits for prior employee service (prior service cost or credit) is included in the Company's results of income on a straight-line basis over the average remaining service period of active plan participants.

The estimated amounts to be amortized from accumulated other comprehensive loss into the net periodic pension cost in 2018 are as follows (in thousands):

Amortization of prior service cost	\$	1,683
Amortization of loss		473
<b>Total</b>	<b>\$</b>	<b>2,156</b>

Benefit payments, which reflect estimated future service, are currently expected to be paid as follows (in thousands):

Year	Projected Benefits
2018	\$ 1,214
2019	2,548
2020	2,670
2021	2,756
2022	3,167
2023-2027	18,885
Thereafter	22,125

## 16. COMMITMENTS AND CONTINGENCIES:

### *Commitments*

Under the 2006 Research Agreement with USC, the Company is obligated to make certain payments to USC based on work performed by USC under that agreement, and by Michigan under its subcontractor agreement with USC. See Note 10 for further explanation.

Under the terms of the 1997 Amended License Agreement, the Company is required to make minimum royalty payments to Princeton. See Note 10 for further explanation.

The Company has agreements with six executive officers and one employee which provide for certain cash and other benefits upon termination of employment of the officer in connection with a change in control of the Company. If the executive's employment is terminated in connection with the change in control, the executive is entitled to a lump-sum cash payment equal to two times the sum of the average annual base salary and bonus of the officer and immediate vesting of all stock options and other equity awards that may be outstanding at the date of the change in control, among other items.

In order to manage manufacturing lead times and help ensure adequate material supply, the Company entered into a New OLED Materials Agreement (see Note 11) that allows PPG Industries to procure and produce inventory based upon criteria as defined by the Company. These purchase commitments consist of firm, noncancelable and unconditional commitments. In certain instances, this agreement allows the Company the option to reschedule and adjust the Company's requirements based on its business needs prior to firm orders being placed. As of December 31, 2017, 2016 and 2015, the Company had purchase commitments for inventory of \$14.2 million, \$5.0 million and \$9.0 million, respectively.

## Patent Related Challenges and Oppositions

Each major jurisdiction in the world that issues patents provides both third parties and applicants an opportunity to seek a further review of an issued patent. The process for requesting and considering such reviews is specific to the jurisdiction that issued the patent in question, and generally does not provide for claims of monetary damages or a review of specific claims of infringement. The conclusions made by the reviewing administrative bodies tend to be appealable and generally are limited in scope and applicability to the specific claims and jurisdiction in question.

The Company believes that opposition proceedings are frequently commenced in the ordinary course of business by third parties who may believe that one or more claims in a patent do not comply with the technical or legal requirements of the specific jurisdiction in which the patent was issued. The Company views these proceedings as reflective of its goal of obtaining the broadest legally permissible patent coverage permitted in each jurisdiction. Once a proceeding is initiated, as a general matter, the issued patent continues to be presumed valid until the jurisdiction's applicable administrative body issues a final non-appealable decision. Depending on the jurisdiction, the outcome of these proceedings could include affirmation, denial or modification of some or all of the originally issued claims. The Company believes that as OLED technology becomes more established and its patent portfolio increases in size, so will the number of these proceedings.

Below are summaries of certain active proceedings that have been commenced against issued patents that are either exclusively licensed to the Company or which are now assigned to the Company. The Company does not believe that the confirmation, loss or modification of the Company's rights in any individual claim or set of claims that are the subject of the following legal proceedings would have a material impact on the Company's materials sales or licensing business or on the Company's consolidated financial statements, including its consolidated statements of income, as a whole. However, as noted within the descriptions, some of the following proceedings involve issued patents that relate to the Company's fundamental phosphorescent OLED technologies and the Company intends to vigorously defend against claims that, in the Company's opinion, seek to restrict or reduce the scope of the originally issued claim, which may require the expenditure of significant amounts of the Company's resources. In certain circumstances, when permitted, the Company may also utilize the proceedings to request modification of the claims to better distinguish the patented invention from any newly identified prior art and/or improve the claim scope of the patent relative to commercially important categories of the invention. The entries marked with an "\*" relate to the Company's UniversalPHOLED® phosphorescent OLED technology, some of which may be commercialized by the Company.

### Opposition to European Patent No. 1394870\*

On April 20, 2010, Merck Patent GmbH; BASF Schweitz AG of Basel, Switzerland; Osram GmbH of Munich, Germany; Siemens Aktiengesellschaft of Munich, Germany; and Koninklijke Philips Electronics N.V., of Eindhoven, The Netherlands filed Notices of Opposition to European Patent No. 1394870 (the EP '870 patent). The EP '870 patent, which was issued on July 22, 2009, is a European counterpart patent, in part, to U.S. patents 6,303,238; 6,579,632; 6,872,477; 7,279,235; 7,279,237; 7,488,542; 7,563,519; and 7,901,795; and to pending U.S. patent application 13/035,051, filed on February 25, 2011 (hereinafter the "U.S. '238 Patent Family"). They are exclusively licensed to the Company by Princeton, and the Company is required to pay all legal costs and fees associated with this proceeding.

An Oral Hearing was held before a European Patent Office (EPO) panel of first instance in Munich, Germany, on April 8-9, 2014. The panel rejected the original claims and amended the claims to comply with EPO requirements by more narrowly defining the scope of the claims. The '870 patent, in its amended form, was held by the panel to comply with the EPO requirements.

The Company believes the EPO's decision relating to the broad original claims is erroneous and has appealed the ruling to reinstate a broader set of claims. Subsequent to the filing of the appeal, BASF withdrew its opposition to the patent. A hearing on the merits of the appeal has now been scheduled for the first quarter of 2018. This patent, as originally granted by the EPO, is deemed valid during the pendency of the appeals process.

At this time, based on the Company's current knowledge, the Company believes that the patent being challenged should be declared valid and that at least some of the Company's claims will be upheld. However, the Company cannot make any assurances of this result.

### Opposition to European Patent No. 1390962

On November 16, 2011, Osram AG and BASF SE each filed a Notice of Opposition to European Patent No. 1390962 (the EP '962 patent), which relates to the Company's white phosphorescent OLED technology. The EP '962 patent, which was issued on February 16, 2011, is a European counterpart patent to U.S. patents 7,009,338 and 7,285,907. They are exclusively licensed to the Company by Princeton, and the Company is required to pay all legal costs and fees associated with this proceeding.

The EPO combined the op positions into a single opposition proceeding, and a hearing on this matter was held in December 2015, wherein the EPO Opposition Division revoked the patent claims for alleged insufficiencies under EPC Article 83. The Company believes the EPO's decision relating to the original claims is erroneous, and has appealed the decision. Subsequent to the filing of the appeal, BASF withdrew its opposition to the patent. The patent, as originally granted by the EPO, is deemed valid during the pendency of the appeals process.

At this time, based on its current knowledge, the Company believes that the patent being challenged should be declared valid and that all or a significant portion of the Company's claims should be upheld. However, the Company cannot make any assurances of this result.

#### Opposition to European Patent No. 1933395\*

On February 24 and 27, 2012, Sumitomo, Merck Patent GmbH and BASF SE filed oppositions to the Company's European Patent No. 1933395 (the EP '395 patent). The EP '395 patent is a counterpart to the EP '637 patent, and, in part, to U.S. Patents 7,001,536; 6,902,830; and 6,830,828, and to JP patents 4358168 and 4357781. This patent is exclusively licensed to the Company by Princeton, and the Company is required to pay all legal costs and fees associated with this proceeding.

At an Oral Hearing on October 14, 2013, the EPO panel issued a decision that affirmed the basic invention and broad patent coverage in the EP '395 patent, but narrowed the scope of the original claims.

On February 26, 2014, the Company appealed the ruling to reinstate a broader set of claims. The patent, as originally granted by the EPO, is deemed to be valid during the pendency of an appeals process. Two of the three opponents also filed their own appeals of the ruling. In January 2015, Sumitomo withdrew its opposition of the '395 patent, and the EPO accepted the withdrawal notice. The appeal proceedings were held in the second quarter of 2016. As a result of the proceedings, the board concluded the oral proceedings and proposed to reinstate a broader set of claims pending the resolution of a remaining question of the applicable law, a question that the board has deferred to the Enlarged Board of Appeals for review. In December 2017, the Enlarged Board of Appeals issued a written opinion in which they have generally followed the Company's reasoning regarding the question of law. The written opinion should be used as guidance by the EPO opposition panel when the oral proceedings are rescheduled. The originally-granted claims remain in force during the pendency of this process.

In addition to the above proceedings and now concluded proceedings which have been referenced in prior filings, from time to time, the Company may have other proceedings that are pending which relate to patents the Company acquired as part of the Fujifilm patent or BASF OLED patent acquisitions or which relate to technologies that are not currently widely utilized in the marketplace.

#### 17. CONCENTRATION OF RISK:

Revenues and accounts receivable from the Company's largest customers for the years ended December 31 were as follows (in thousands):

Customer	2017		2016		2015	
	% of Total Revenue	Accounts Receivable	% of Total Revenue	Accounts Receivable	% of Total Revenue	Accounts Receivable
A	62%	\$ 19,588	63%	\$ 12,050	62%	\$ 13,355
B	24%	17,348	28%	9,128	25%	8,477
C	6%	10,632	4%	1,427	1%	1,564

Revenues from outside of North America represented approximately 97%, 98%, and 99% of the consolidated revenue for the years ended December 31, 2017, 2016, and 2015, respectively. Revenues by geographic area are as follows (in thousands):

Country	Year Ended December 31,		
	2017	2016	2015
South Korea	\$ 289,418	\$ 181,771	\$ 168,267
China	24,892	7,180	2,685
Japan	8,542	4,310	16,542
Other non-U.S. locations	2,438	1,849	2,334
Total non-U.S. locations	325,290	195,110	189,828
United States	10,339	3,776	1,218
Total revenue	\$ 335,629	\$ 198,886	\$ 191,046

The Company attributes revenue to different geographic areas on the basis of the location of the customer.

Long-lived assets (net), by geographic area are as follows (in thousands):

	2017	2016
United States	\$ 53,991	\$ 26,917
Other	2,459	286
Total long-lived assets	<u>\$ 56,450</u>	<u>\$ 27,203</u>

Substantially all chemical materials were purchased from one supplier. See Note 11.

#### 18. INCOME TAXES:

The components of income before income taxes are as follows (in thousands):

	Year ended December 31,		
	2017	2016	2015
United States	\$ 100,260	\$ 69,595	\$ 54,338
Foreign	49,277	(997)	(21,279)
Income before income tax	<u>\$ 149,537</u>	<u>\$ 68,598</u>	<u>\$ 33,059</u>

The components of the income tax expense are as follows (in thousands):

	Year ended December 31,		
	2017	2016	2015
Current income tax benefit (expense):			
Federal	\$ (5,817)	\$ (4,485)	\$ (1,018)
State	(54)	(47)	(2)
Foreign	(15,406)	(12,902)	(10,224)
	<u>(21,277)</u>	<u>(17,434)</u>	<u>(11,244)</u>
Deferred income tax (expense) benefit:			
Federal	(24,425)	(2,683)	(7,145)
State	(23)	(503)	51
Foreign	73	92	(43)
	<u>(24,375)</u>	<u>(3,094)</u>	<u>(7,137)</u>
Income tax expense	<u>\$ (45,652)</u>	<u>\$ (20,528)</u>	<u>\$ (18,381)</u>

Reconciliation of the statutory U.S. federal tax rate to the Company's effective tax rate is as follows:

	Year ended December 31,		
	2017	2016	2015
Statutory U.S. federal income tax rate	35.0%	35.0%	35.0%
State income taxes, net of federal benefit	0.0%	0.5%	(0.1)%
Effect of foreign operations	(7.1)%	0.9%	15.2%
Accruals and reserves	0.1%	3.2%	0.0%
Nondeductible employee compensation	1.5%	1.5%	2.5%
Research tax credits	(0.7)%	(1.3)%	(4.4)%
Change in valuation allowance	(4.1)%	(9.7)%	8.4%
Stock based compensation	(1.9)%	0.0%	0.0%
U.S. Tax Cuts and Jobs Act	7.7%	0.0%	0.0%
Other	0.0%	(0.2)%	(1.0)%
Effective tax rate	<u>30.5%</u>	<u>29.9%</u>	<u>55.6%</u>

The following table summarizes Company tax loss and tax credit carry forwards for tax return purposes at December 31, 2017 (in thousands):

	Related Tax Deduction	Tax Benefit	Expiration Date
Tax credit carry forwards:			
Research tax credits	n/a	\$ 12,928	2029 to 2037
Foreign tax credits	n/a	6,161	2027
State research tax credits	n/a	2,473	2025 to 2030
<b>Total credit carry forwards</b>	<b>n/a</b>	<b>\$ 21,562</b>	

Pursuant to Internal Revenue Code (IRC) sections 382 and 383, utilization of the Company's tax credit carry forwards could be subject to an annual limitation because of certain ownership changes.

On January 1, 2017, the Company adopted ASU No. 2016-09, *Improvements to Employee Share-Based Accounting*, which includes provisions intended to simplify various aspects related to how share-based payments are accounted for and presented in the financial statements. Under the previous guidance, tax effects of deductions for employee share awards in excess of compensation cost ("windfalls") were recorded in equity in the period in which the deductions actually reduced income taxes payable and any unrecognized tax benefits were tracked separately off the balance sheet. Under the new guidance, excess tax benefits and deficiencies are recorded in the income statement in the period in which stock awards vest or are settled, and any excess tax benefits not previously recognized because the related tax deduction had not reduced current taxes payable are recorded through a cumulative-effect adjustment to retained earnings at the beginning of the period of adoption.

The cumulative-effect adjustment on retained earnings resulting from the adoption of ASU 2016-09 was a net windfall tax benefit of \$26.5 million as of January 1, 2017.

The enactment of the Tax Cuts and Jobs Act (TCJA) in December 2017 resulted in a one-time charge of \$11.5 million in the fourth quarter. The charge includes two elements, a tax on accumulated overseas profits and the revaluation of deferred tax assets and liabilities. Without the TCJA, for the year ended December 31, 2017, the effective income tax rate and income tax expense would have been 22.8% and \$34.2 million.

Significant components of the Company's net deferred tax assets and liabilities are as follows (in thousands):

	December 31,	
	2017	2016
Deferred tax asset:		
Net operating loss carry forwards	\$ -	\$ 3,405
Capitalized technology license	804	4,163
Capitalized research expenditures	3,719	8,100
Accruals and reserves	962	6,712
Retirement plan	7,125	9,723
Deferred revenue	206	516
Tax credit carry forwards	21,562	1,846
Stock-based compensation	1,819	2,889
Other	59	874
	<u>36,256</u>	<u>38,228</u>
Valuation allowance	(2,460)	(7,950)
<b>Deferred tax assets</b>	<b><u>33,796</u></b>	<b><u>30,278</u></b>
Deferred tax liability:		
Accruals and reserves	(6,774)	(5,785)
<b>Deferred tax liabilities</b>	<b><u>(6,774)</u></b>	<b><u>(5,785)</u></b>
<b>Net deferred tax assets</b>	<b><u>\$ 27,022</u></b>	<b><u>\$ 24,493</u></b>

In assessing the realizability of deferred tax assets, management considers whether it is more likely than not that some portion or all of the deferred tax assets will not be realized. The ultimate realization of deferred tax assets is dependent on the Company's ability to generate future taxable income to obtain benefit from the reversal of temporary differences, net operating loss carryforwards and tax credits. As part of its assessment, management considers the scheduled reversal of deferred tax liabilities, projected future taxable income, and tax planning strategies. During the year ended December 31, 2017, based on previous earnings history, a current

evaluation of expected future taxable income and other evidence, we determined to retain the valuation allowance that relates to New Jersey research and development credits. The valuation allowance that related to UDC Ireland was almost completely utilized to offset income earned by this entity during the year; and the remainder has been released.

During the years ended December 31, 2017, 2016 and 2015, the Company paid foreign taxes on South Korean royalty and license fee income of \$14.9 million, \$12.4 million and \$9.9 million, respectively, which were recorded as current income tax expense. SDC has been required to withhold tax at a rate of 16.5% upon payment of royalties and license fees to the Company.

The Company's 2013 federal income tax return was audited by the Internal Revenue Services with no change; the years 2014 to 2016 are open and subject to examination. The state and foreign tax returns are open for a period of generally three to four years.

#### 19. NET INCOME PER COMMON SHARE:

The Company computes earnings per share in accordance with ASC Topic 260, *Earnings per Share* ("ASC 260"), which requires earnings per share for each class of stock to be calculated using the two-class method. The two-class method is an allocation of income between the holders of common stock and the Company's participating security holders. Under the two-class method, income for the reporting period is allocated between common shareholders and other security holders based on their respective participation rights in undistributed income. Unvested share-based payment awards that contain non-forfeitable rights to dividends or dividend equivalents are participating securities and, therefore, are included in computing earnings per share pursuant to the two-class method.

Basic net income per common share is computed by dividing net income allocated to common shareholders by the weighted-average number of shares of common stock outstanding for the period excluding unvested restricted stock units and performance units. Net income allocated to the holders of the Company's unvested restricted stock awards is calculated based on the shareholders proportionate share of weighted average shares of common stock outstanding on an if-converted basis.

For purposes of determining diluted net income per common share, basic net income per share is further adjusted to include the effect of potential dilutive common shares outstanding, including stock options, restricted stock units and performance units, and the impact of shares to be issued under the ESPP.

The following table is a reconciliation of net income and the shares used in calculating basic and diluted net income per common share for the year ended December 31, 2017, 2016, and 2015 (in thousands, except share and per share data):

	Year Ended December 31,		
	2017	2016	2015
Numerator:			
Net income	\$ 103,885	48,070	14,678
<i>Adjustment for Basic EPS:</i>			
Earnings allocated to unvested shareholders	\$ (1,638)	(734)	(138)
Adjusted net income	<u>\$ 102,247</u>	<u>47,336</u>	<u>14,540</u>
Denominator:			
Weighted average common shares outstanding – Basic	46,725,289	46,408,460	46,816,394
Effect of dilutive shares:			
Common stock equivalents arising from stock options and ESPP	2,611	5,398	267,145
Restricted stock awards and units and performance units	77,294	122,122	410,649
Weighted average common shares outstanding – Diluted	<u>46,805,194</u>	<u>46,535,980</u>	<u>47,494,188</u>
Net income per common share:			
Basic	\$ 2.19	\$ 1.02	\$ 0.31
Diluted	\$ 2.18	\$ 1.02	\$ 0.31

For the year ended December 31, 2017, 2016, and 2015, the combined effects of unvested restricted stock awards, restricted stock units, performance unit awards and stock options of none, 2,981 and 17,055, respectively, were excluded from the calculation of diluted EPS as their impact would have been antidilutive.

**20. QUARTERLY SUPPLEMENTAL FINANCIAL DATA (UNAUDITED):**

The following tables present certain unaudited consolidated quarterly financial information for each of the eight quarters in the two-year period ended December 31, 2017. In the opinion of Company management, this quarterly information has been prepared on the same basis as the consolidated financial statements and includes all adjustments (consisting of only normal recurring adjustments) necessary to present fairly the information for the periods presented. The results of operations for any quarter are not necessarily indicative of the results for the full year or for any future period.

Presented below is a summary of the unaudited quarterly financial information for the year ended December 31, 2017 (in thousands, except per share data):

	Three Months Ended				Total
	March 31, 2017	June 30, 2017 (1)	September 30, 2017	December 31, 2017 (1) (2)	
Revenue	\$ 55,566	\$ 102,513	\$ 61,683	\$ 115,867	\$ 335,629
Net income	\$ 10,365	\$ 47,187	\$ 13,520	\$ 32,813	\$ 103,885
Net income per common share:					
Basic	\$ 0.22	\$ 0.99	\$ 0.28	\$ 0.70	\$ 2.19
Diluted	\$ 0.22	\$ 0.99	\$ 0.28	\$ 0.69	\$ 2.18

(1) The Company receives significant license revenue in the second and fourth quarters; see Note 2 for further details.

(2) The enactment of the Tax Cuts and Jobs Act in December 2017 resulted in a one-time charge of \$11.5 million in the fourth quarter; see Note 18 for further details.

Presented below is a summary of the unaudited quarterly financial information for the year ended December 31, 2016 (in thousands, except per share data):

	Three Months Ended				Total
	March 31, 2016	June 30, 2016 (1)	September 30, 2016	December 31, 2016 (1)	
Revenue	\$ 29,703	\$ 64,392	\$ 30,214	\$ 74,577	\$ 198,886
Net income (loss)	\$ 1,949	\$ 21,802	\$ (1,500)	\$ 25,819	\$ 48,070
Basic	\$ 0.04	\$ 0.46	\$ (0.03)	\$ 0.55	\$ 1.02
Diluted	\$ 0.04	\$ 0.46	\$ (0.03)	\$ 0.55	\$ 1.02

(1) The Company receives significant license revenue in the second and fourth quarters; see Note 2 for further details.

Per share amounts for each quarter have been calculated separately. Accordingly, quarterly amounts may not add to annual amounts.

**SUBSIDIARIES OF THE REGISTRANT**

UDC, Inc., a New Jersey corporation.

Adesis, Inc., a Delaware corporation (acquired July 11, 2016).

Universal Display Corporation Hong Kong, Limited, a Hong Kong limited liability entity (formed on January 22, 2008).

Universal Display Corporation Korea, Y.H., a limited liability entity organized under the laws of the Republic of Korea (formed on December 14, 2010).

Universal Display Corporation Japan GK, a limited liability entity organized under the laws of Japan (formed on February 4, 2011).

UDC Ireland Limited, a private company limited by shares, organized under the laws of Ireland (formed on July 18, 2012).

Universal Display Corporation China, Ltd., a wholly foreign-owned limited liability company organized under the laws of China (formed on September 22, 2016).

**CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

The Board of Directors  
Universal Display Corporation:

We consent to the incorporation by reference in the registration statements (Nos. 333-170398, 333-166739, 333-165575, 333-163024, 333-159081, 333-157926, 333-155212, 333-150818, 333-149731, 333-147281, 333-142825, 333-141369, 333-138732, 333-134022, 333-131515, 333-129745, 333-120737, 333-124306, 333-112077, 333-101733, 333-74854, 333-72846, 333-60856, 333-50990, 333-48810, 333-40760, and 333-27901) on Form S-3 and the registration statements (Nos. 333-198060, 333-159083, 333-159082, 333-112067, and 333-92649) on Form S-8 of Universal Display Corporation of our reports dated February 22, 2018, with respect to the consolidated balance sheets of Universal Display Corporation and subsidiaries as of December 31, 2017 and 2016, and the related consolidated statements of income, comprehensive income, shareholders' equity, and cash flows for each of the years in the three-year period ended December 31, 2017, and the effectiveness of internal control over financial reporting as of December 31, 2017, which reports appear in the December 31, 2017 annual report on Form 10-K of Universal Display Corporation.

/s/ KPMG LLP

Philadelphia, Pennsylvania  
February 22, 2018

**CERTIFICATIONS REQUIRED BY  
RULE 13a-14(a)/15d-14(a)**

I, Steven V. Abramson, certify that:

1. I have reviewed this annual report on Form 10-K of Universal Display Corporation (the “registrant”) for the year ended December 31, 2017;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant’s other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
  - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
  - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, 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;
  - (c) Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
  - (d) Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and
5. The registrant’s other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):
  - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and
  - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

Date: February 22, 2018

By: /s/ Steven V. Abramson  
Steven V. Abramson  
President and Chief Executive Officer

**CERTIFICATIONS REQUIRED BY  
RULE 13a-14(a)/15d-14(a)**

I, Sidney D. Rosenblatt, certify that:

1. I have reviewed this annual report on Form 10-K of Universal Display Corporation (the “registrant”) for the year ended December 31, 2017;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant’s other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
  - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
  - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, 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;
  - (c) Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
  - (d) Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and
5. The registrant’s other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):
  - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and
  - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

Date: February 22, 2018

By: /s/ Sidney D. Rosenblatt  
Sidney D. Rosenblatt  
Executive Vice President and Chief Financial Officer

**CERTIFICATIONS REQUIRED BY  
RULE 13a-14(b)/15d-14(b) AND 18 U.S.C. SECTION 1350**

In connection with the annual report of Universal Display Corporation (the "Company") on Form 10-K for the year ended December 31, 2017, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Steven V. Abramson, President and Chief Executive Officer of the Company, hereby certify, based on my knowledge, that:

- (1) The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: February 22, 2018

By: /s/ Steven V. Abramson  
Steven V. Abramson  
President and Chief Executive Officer

**CERTIFICATIONS REQUIRED BY  
RULE 13a-14(b)/15d-14(b) AND 18 U.S.C. SECTION 1350**

In connection with the annual report of Universal Display Corporation (the "Company") on Form 10-K for the year ended December 31, 2017, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Sidney D. Rosenblatt, Executive Vice President and Chief Financial Officer of the Company, hereby certify, based on my knowledge, that:

- (1) The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: February 22, 2018

By: /s/ Sidney D. Rosenblatt  
Sidney D. Rosenblatt  
Executive Vice President and Chief Financial Officer