

**SPIE.** OPTICS +  
PHOTONICS

EXHIBITION GUIDE



Optics +  
Photonics

2018

# EXHIBITION GUIDE

**Exhibition**  
21-23 August 2018

**Conferences and Courses**  
19-23 August 2018

San Diego Convention Center  
San Diego, California, USA

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OPTICS & PHOTONICS International Exhibition



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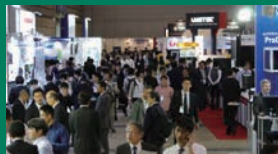
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# SPIE. OPTICS+PHOTONICS

Exhibition: 21-23 August 2018  
 Conferences and Courses: 19-23 August 2018  
 San Diego Convention Center, San Diego, California, USA

# EXHIBITION GUIDE

Tuesday 21 August · 10:00 am to 5:00 pm  
 Wednesday 22 August · 10:00 am to 5:00 pm  
 Thursday 23 August · 10:00 am to 2:00 pm

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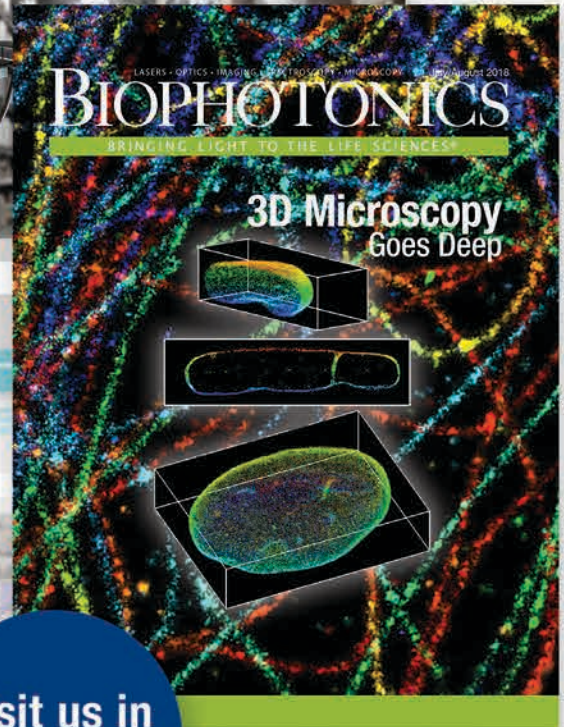
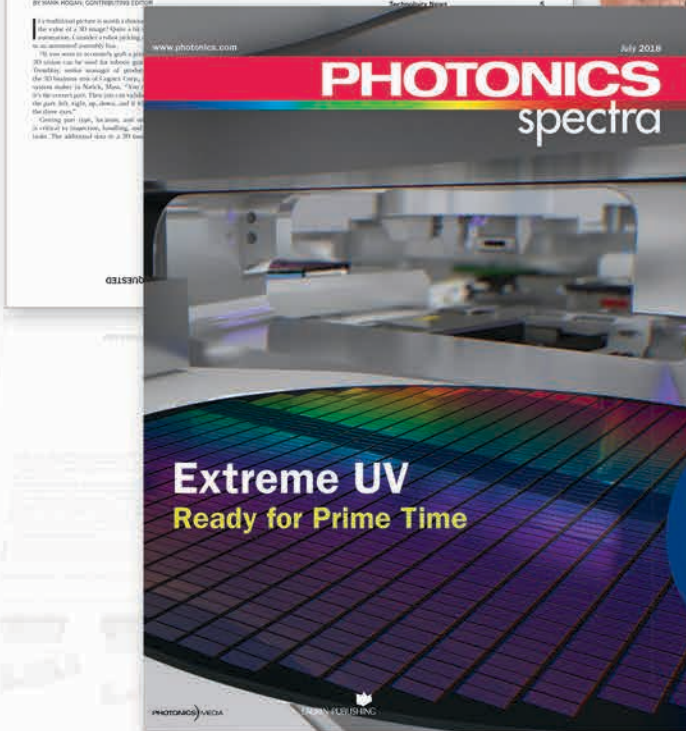
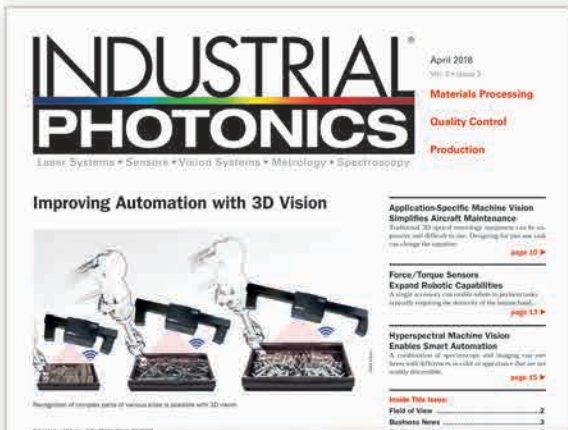


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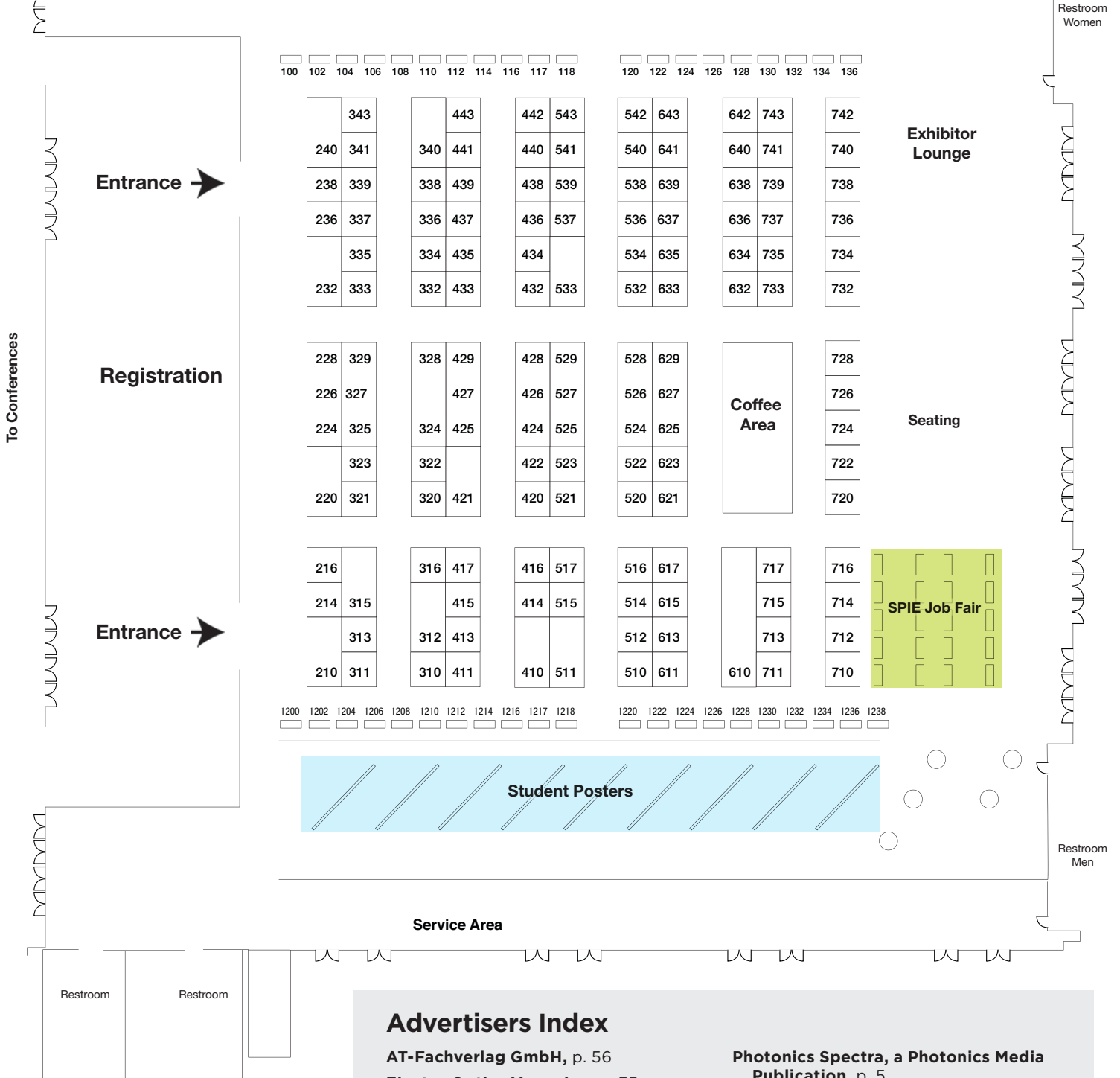
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# EXHIBITION FLOORPLAN

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# EXHIBITOR DIRECTORY

## HOW TO USE THIS GUIDE

SPIE Optics + Photonics exhibitors are listed in alphabetical order with details about products or services each is exhibiting. Companies are additionally cross indexed by technology areas in the Product Category Index on pages 46-49, to allow you to quickly shop for products for your engineering and business needs.

Booth numbers are provided in the Exhibition Guide, and may be cross-referenced with the floor plan on page 7. The address of each exhibitor is also listed, making this Exhibition Guide an excellent reference tool.

## EXHIBITION HOURS

Tuesday 21 August · 10:00 am to 5:00 pm  
Wednesday 22 August · 10:00 am to 5:00 pm  
Thursday 23 August · 10:00 am to 2:00 pm

San Diego Convention Center,  
Sails Pavilion  
San Diego, California, USA

### 4D Technology Corp.

#316

SPIE Corporate Member

3280 E Hemisphere Loop Ste 146, Tucson, AZ, 85706-5039 (USA)  
+1 520 294 5600; fax +1 520 294 5601  
info@4dtechnology.com; www.4dtechnology.com

#### Featured Product: PhaseCam 6100 Ultra-Compact Twyman-Green Laser Interferometers for visible through SWIR wavelengths.

4D Technology designs and manufactures dynamic laser interferometers, optical profilers, surface gauges and polarization cameras for non-contact metrology of optics and precision surfaces, even in the presence of vibration. 4D laser interferometers acquire data in as little as 30 microsec, at wavelengths from DUV through IR, with apertures from 33 to 800mm. Applications include astronomy, aerospace, general optics, flexible electronics, displays and more. Contact: Jack Latchinian, Western

Region Manager, jack.latchinian@4dtechnology.com; Steve Martinek, Director of Sales, steve.martinek@4dtechnology.com

**PhaseCam 6100 compact, vibration immune laser interferometer for measuring spheres, aspheres & flats**



### AccuCoat Inc.

#425

SPIE Corporate Member

111 Humboldt St Ste 8, Rochester, NY, 14609 (USA)  
+1 585 288 2330; fax +1 585 288 2331  
coatings@accucoatinc.com; www.accucoatinc.com

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### Accumold

#310

1711 SE Oralabor Rd, Ankeny, IA, 50021 (USA)  
+1 515 964 5741; fax +1 515 964 5742  
micromolding@accumold.com; www.accu-mold.com

#### Featured Product: Micro Injection Molding.

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# EXHIBITOR DIRECTORY

## ADIT Electron Tubes

#1202

300 Crane St, Sweetwater, TX, 79556-0870 (USA)  
+1 325 235 1418  
sales@electrontubes.com; www.et-enterprises.com

**Featured Product: New series of 2" and 3" compact photomultiplier tubes. New 1" and 2" high QE photomultiplier tubes.**

ADIT Electron Tubes designs and manufactures photomultiplier tubes, housings, voltage dividers, signal processing modules and photodetector modules. Photomultipliers are available in diameters from 1/2" to 11", some with our new high QE photocathodes. Tubes are available for use at cryogenic temperatures, high temperatures, with low background glass and qualified for space flight. Two manufacturing facilities, in west Texas and west London, help to ensure fast delivery and competitive pricing. Contact: Paul Davison, Sales Manager, paul@electrontubes.com

## AdOptica Optical Systems GmbH #1228

**SPIE** Corporate Member

Rudower Chaussee 29, Berlin, 12489 Germany  
+49 305 6590 8880; fax +49 305 6590 8881  
info@adloptica.com; www.adloptica.com

**Featured Product: foXXus - multi-focus optics for multi-kW lasers.**

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low sensitivity to misalignment. AdOptica is located in Adlershof, Berlin, Germany's leading science and technology park. Contact: Alexander Laskin, Project Manager, alex@adloptica.com; Vadim Laskin, General Manager, vadimus@adloptica.com

**foXXus - multi-focus objectives with up to 0.8 NA for laser cutting of brittle materials**

## Aerotech, Inc.

#632

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101 Zeta Dr, Pittsburgh, PA, 15238-2811 (USA)  
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sales@aerotech.com; www.aerotech.com

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## Agilent Technologies, Inc.

#332

2850 Centerville Rd, Wilmington, DE, 19808-1610 (USA)  
+1 800 227 9770  
contact\_us@agilent.com; www.agilent.com

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#640

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**Featured Product: APL Photonics.**

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## ALIO Industries Corp.

#226

**SPIE** Corporate Member

5335 Xenon St, Arvada, CO, 80002-1348 (USA)  
+1 303 339 7500  
sales@alioindustries.com; www.alioindustries.com

**Featured Product: ALIO's Patented Mini Hybrid Hexapod®: Leading Precision, Travel Range and Speed Starting at \$29,900.**

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## All Flex Flexible Circuits and Heaters

#440

1705 Cannon Ln, Northfield, MN, 55057-3605 (USA)  
+1 800 959 0865  
contactus@allflexinc.com; www.allflexinc.com

### Featured Product: Flexible Circuits and Heaters.

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## ALPAO S.A.S.

SPIE Corporate Member

345 rue Lavoisier, Montbonnot St Martin, 38330 France  
+33 476 890 965  
contact@alpao.fr; www.alpao.com

#642

### Featured Product: Deformable mirror, wavefront sensor, adaptive optics systems, softwares and kits.

ALPAO is a customer focused company that manufactures adaptive optics components which improves light quality for both research and industrial applications. Thanks to our breakthrough technologies developed from years of innovation and a close relationship with our end users, our customers benefit from high performance and cost efficient solutions. Contact: Abdes El Hassouni, Sales engineer, aeh@alpao.fr

## Andor Technology Ltd.

#1210

300 Baker Ave Ste 150, Concord, MA, 01742-2124 (USA)  
+1 860 290 9211; fax +1 860 290 9566  
www.andor.com

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## Andover Corporation

#520

SPIE Corporate Member

4 Commercial Dr, Salem, NH, 03079-2800 (USA)  
+1 603 893 6888; fax +1 603 893 6508  
info@andcorp.com; www.andovercorp.com

### Featured Product: First-surface UV filters.

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and ground-based astronomy, machine vision, biomedical analysis, photolithography, agricultural imaging, hyperspectral imaging, water and gas analysis, calibration, etc. AS9100B, and AS9104A certified, and ITAR registered. Contact: Michael Tiner, VP Business Development, mtiner@andovercorp.com; Rob Pursel, Sr. Coating Engineer, rpursel@andovercorp.com

**Low Cost Ultra Narrow Bandwidth Interference Filters. We offer bandwidths as narrow as 0.15nm**

## Applied Surface Technologies

#102

SPIE Corporate Member

15 Hawthorne Dr, New Providence, NJ, 07974 (USA)  
+1 908 464 6675  
co2clean@co2clean.com; www.co2clean.com

### Featured Product: CO<sub>2</sub> Snow Cleaning.

We demonstrate precision cleaning using a CO<sub>2</sub> Snow Jet, a quick and safe process capable of removing particles of all sizes, (visible to below 5 nanometers), organic residues, solvent stains, and water spots. CO<sub>2</sub> Snow cleans all types of substrates, optics, diamond turned optics, fiber-optics, wafers, mirrors, large telescopes mirrors, analytical samples (AFM & XPS), and many other items. We demonstrate manual, portable, and semi-automated units for R&D or manufacturing. Bring samples. Contact: Robert Sherman, roberts@co2clean.com

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## Exhibition Ice Cream Social

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# EXHIBITOR DIRECTORY

## Äpre Instruments, LLC

#118

**SPIE** Corporate Member

2440 Ruthrauff Rd., Ste. 100-120, Tucson, AZ, 85705 (USA)  
+1 520 639 8195; fax +1 860 347 6407  
sales@apre-inst.com; www.apre-inst.com

### Featured Product: Spectrally Controlled Interferometer for Measurements of Plano-parallel and Micro-optics.

Äpre Instruments is a leading innovator of surface and wavefront metrology tools. ÄPRE's objective is to make optical manufacturing stress-free and more cost effective. In supplying high performance interferometers for surface and wavefront measurement, we provide more confident control over ever tightening specifications from components to system test. Upgrades, peak performance interferometers and our unique innovations offer many choices from which to solve your demanding requirements. Contact: Donald (Don) Pearson II, Vice President, dpearson@apre-inst.com; Robert Smythe, President, rsmythe@apre-inst.com

## asphericon

#737

**SPIE** Corporate Member

5500 Bee Ridge Rd Ste 104, Sarasota, FL, 34233 (USA)  
+1 941 564 0890; fax +1 941 584 4071  
sales@asphericon.com; www.asphericon.com

### Featured Product: Aspheres, Optical Systems, Beam Shaping, Transmission Sphere.

As an independent and recognized specialist, asphericon is among the technological leaders in the field of asphere manufacture. The basis for manufacture is a specially developed and patented technology to control CNC grinding and polishing machines. asphericon assists its customers from the initial optic design, via manufacturing and coating, full-surface interferometric measuring and documentation, through to the assembly of optical modules and their optical characterization. Contact: Steffen Schneider, President, s.schneider@asphericon-inc.com

## AT-Fachverlag GmbH

#1234

Wilhelm-Pfizer-Str 28, Fellbach, 70736 Germany  
+49 711 95 29 51 0; fax +49 711 95 29 51 99  
at@at-fachverlag.de; www.photonik.de

### Featured Product: Trade journal "laser + photonics".

laser + photonics is the best-of-collection of technical articles from the magazine photonik reprinted in English and thus offers a broad range of worldwide up-to-date knowledge in the area of optical technologies. Reports on latest technology trends around the world and relevant industry news complete the editorial spectrum of this issue.

## attocube systems Inc.

#733

**SPIE** Corporate Member

2020 Stuart St, Berkeley, CA, 94703 (USA)  
+1 510 649 9245  
info@attocube.com; www.attocube.com

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solutions, optical displacement sensors with picometer resolution and cryogenic measurement systems, all optimized for the use in extreme environmental conditions such as cryogenic temperatures, high magnetic fields and vacuum. The attoDRY800 cryo-optical table is the perfect platform for optical measurements at low temperatures and seamlessly integrates an ultra low vibration cold breadboard system into the optical table.

**Laser interferometer for nanometer-precise displacement sensing - now with software**

## Avantes, Inc.

#629

**SPIE** Corporate Member

500 S Arthur Ave Ste 500, Louisville, CO, 80027-3038 (USA)  
+1 303 410 8668; fax +1 303 410 8669  
infousa@avantes.com; www.avantes.com

### Featured Product: Avantes Debuts the AvaSpec-Mini4096 Compact and AvaSpec-NIR512 Spectrometers

Avantes is a leader in fiber optic spectroscopy, offering a range of spectrometers, light sources, and fiber optics for measurements for the range 190-2500 nm. Avantes is excited to debut the first of its kind



AvaSpec-Mini4096 pixel compact CMOS spectrometer, built with our innovative optical alignment tooling for unbeatable unit-to-unit repeatability and thermal stability. The high-resolution AvaSpec-NIR512-1.7 is the newest addition to our NIRLine of Spectrometers for measurements to 1700nm Contact: Damon Lenski, General Manager, infousa@avantes.com

**AvaSpecNIR256/512-1.7EVO series pairs InGaAs array w/ new electronics, most powerful AvaSpec-NIR yet**

## BeamIO

#1230

6th Floor, 1101 Wilson Blvd, Spaces the Artisphere, Arlington, VA, 22209 (USA)  
+1 607 206 6644  
info@beamio.net; beamio.net

### Featured Product: TileDriver with AlgorithmToolkit

BeamIO enables commercial customers and research partners to automate state of the art remote sensing workflows. Through our TileDriver platform, we provide end users with easy-to-use tools to make data-driven decisions. Our Algorithm Toolkit is helping to accelerate innovation in academic research institutions that are developing state-of-the-art imaging science and machine learning algorithms. Contact: Brent Bartlett, COO, info@beamio.net; Jason Casey, CEO, info@beamio.net

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### LIGHT SOURCES

Introducing the **Lambda 421** Optical Beam Combiner, a newly patented concept for combining separate light sources with different spectra into a single output beam. We have a wide selection of high-powered LEDs, the highly stable **Lambda XL** plasma light source and **Lambda LS** Xenon arc lamp.



### WAVELENGTH SWITCHING & SHUTTERING

A broad line of robust and reliable wavelength switching products including the **Lambda 10-3** controller which controls of up to 3 wheels and 2 shutters. For tunable filters, single and 5-position filter changers provide access to any center bandpass from 338 to 900nm in nanometer increments. Our **SmartShutter®** offers the most sophisticated shutter control available.



### MICROSCOPES

Perform *in vivo* and *in vitro* advanced optical experiments using the **MOM®** 2-photon resonant scanning microscope, **BOB** open architecture upright scope, or **SOM®** simple moving microscope. We have solutions for wide field functional imaging, multi-photon imaging, photostimulation and slice electrophysiology. Stand-alone components include **MScan** software suite, the **RESSCANNER**, an ultra quiet resonant scan box and controller, and **PS-2** PMT power supply.



### NSOM TIPS

Sutter Instrument, the recognized leader in micropipette fabrication technology, offers leading edge technology in the **P-2000** micropipette puller, which allows for fast and repeatable nanospray tip production with complete control of tip morphology. The **P-2000** can be pre-programmed to produce tips to your specifications at no extra charge.



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EMAIL: INFO@SUTTER.COM | WWW.SUTTER.COM



# EXHIBITOR DIRECTORY

## Breault Research Organization, Inc. #611

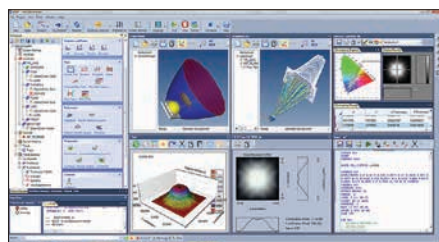
**SPIE** Corporate Member

4400 E Broadway Blvd Ste 500, Tucson, AZ, 85711-3554 (USA)  
+1 800 882 5085; fax +1 520 721 9630  
sales@breault.com; www.breault.com

**Featured Product: Completely redesigned, ASAP NextGen is a new paradigm in easy to use optical simulation software.**

BRO is an optical engineering firm of global reach and reputation. BRO's APEX, ASAP, and ReflectorCAD optical software helps engineers turn creative visions into working prototypes, and the company's own engineers work on beyond-state-of-the-art projects for enterprise companies, research institutions, and top government labs. In over three decades of innovation, BRO has contributed to the success of

engineering projects for thousands of clients. Contact: Jon Herlocker, Director of Technical Support, support@breault.com



**ASAP NextGen is a new paradigm in optical simulation software for predicting real-world performance.**

## Bruker Nano Surfaces, Inc. #543

3400 E Britannia Dr Ste 150, Optical Profilers and Stylus Profilers, Tucson, AZ, 85706 (USA)

+1 520 741 1044; fax +1 520 294 1799

productinfo@bruker-nano.com; www.bruker.com/3DMetrology

Bruker's 3D optical microscopes and profilers provide analyses for samples ranging from microscopic MEMS to entire engine blocks. Our ContourGT® platform features proven, industry-leading metrology and easy to use Vision64® analysis software, delivering the high-speed operation, accuracy, and repeatability that top-level R&D and production requires. These profilers supply the specific information needed to answer R&D, QA/QC, and surface measurement questions with speed, accuracy, and ease. Contact: Steve Ziegler, Sales Account Manger, Stephen.Ziegler@Bruker.com

## Canon U.S.A., Inc. #634

**SPIE** Corporate Member

1 Canon Park, Melville, NY, 11747-3036 (USA)

+1 516 330 5000; fax +1 516 328 4639

pr@cusa.canon.com; www.usa.canon.com

## Chroma Technology Corp. #514

**SPIE** Corporate Member

10 Imtec Ln, Bellows Falls, VT, 05101-3119 (USA)

+1 802 428 2500; fax +1 802 428 2525

sales@chroma.com; www.chroma.com

**Featured Product: Optical filters for the scientific, biomedical, photonics, imaging and detection industries**

Chroma is an employee-owned company that designs and manufactures precision optical filters and coatings from 220-2600nm for myriad applications. We provide application engineering support and short cycle times and are as comfortable designing and manufacturing custom filters as we are our catalog items; regularly offering custom filters at catalog prices. Contact: Kelly Stockwell, OEM Sales Engineer, kstockwell@chroma.com; Christopher Conca, OEM Sales, cconca@chroma.com

## College of Optical Sciences, The Univ. of Arizona #627

**SPIE** Corporate Member

1630 E University Blvd, Tucson, AZ, 85721-0095 (USA)

+1 520 621 6997; fax +1 520 626 1480

info@optics.arizona.edu; www.optics.arizona.edu

**Featured Product: Education & Research.**

The University of Arizona College of Optical Sciences is one of the premier educational and research institutions in optics and photonics worldwide. We focus on educating outstanding students with a broad foundation in all areas of optics and on providing practical experience and highly competitive technical skills. Our research program spans from optical engineering to fundamental optical physics, from photonics to image science. Contact: R. John Koshel, Associate Dean of Academics, rkoshel@optics.arizona.edu; Jennifer Garcia, Events Coordinator, jgarcia@optics.arizona.edu

## Contour Metrological & Manufacturing, Inc. #724

**SPIE** Corporate Member

488 Oliver Dr, Troy, MI, 48084-5426 (USA)

+1 248 273 1111

info@cmmoptic.com; www.cmmoptic.com

Contact: Thomas Goundry, VP, Business Development, tgoundry@cmmoptic.com

## CoorsTek Technical Ceramics #443

555 NE 53rd Ave, Hillsboro, OR, 97124-6471 (USA)

+1 303 271 7100; fax +1 303 271 7009

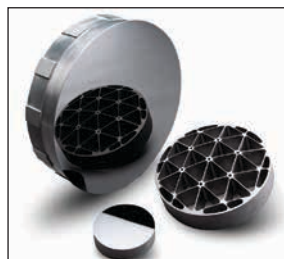
optics@coorstek.com; www.coorstek.com

**Featured Product: Ceramic Mirrors, Optics & Structures for Aerospace Sensing & Imaging.**

CoorsTek silicon carbides (SiC) are engineered and optimized specifically for optics and imaging applications which demand high stiffness, low mass, and thermal stability. Our silicon carbides are ideally suited for mirrors, focal plane array components, and structural supports used in aerospace and specialized ground-based optical systems. Silicon carbide

optical systems are engineered for low mass, low complexity, athermal designs — enhancing optical system performance and reliability. Contact: Janet Kolen, Product Manager, jkolen@coorstek.com; Matt Roth, Business Development Manager, mroth@coorstek.com

**CoorsTek offers high-performance silicon carbides for athermal, low-mass optical system designs.**



# EXHIBITOR DIRECTORY

## Corning Incorporated

#522

**SPIE** Corporate Member

1 Riverfront Plz, Corning, NY, 14831 (USA)

+1 607 974 9000

inquiries@corning.com; www.corning.com

Corning is one of the world's leading innovators in materials science & optical physics, developing category-defining products that transform industries. We succeed through sustained investment in RD&E and trust-based relationships with customers. Our markets include optical communications, consumer electronics, and display technologies. Our Advanced Optics portfolio includes durable materials for semicon manufacturing and diamond-turned precision optics. Visit: [www.corning.com/advanced-optics](http://www.corning.com/advanced-optics)

## Cryslaser Inc.

#643

**SPIE** Corporate Member

B1 199 Western Rd, High-Tech District Western Zone, Chengdu, Sichuan, 611731 China

+86 28 6634 8329; fax +86 28 8798 8682

sales@cryslaser.com; www.cryslaser.com

**Featured Product: Nd:YAG, diffusion bonded crystal, NLO crystals.**

Cryslaser is one of largest manufacturer of YAG serisals crystals in China. We specialize in laser crystals including YAG and YVO4 and provide NLO crystals including: KBBF, BBO, LBO and KTP; as well as IR optics (Ge, Si, ZnS and ZnSe). Laser optics (mirrors, windows, lenses, etc.) and components are also available. Focused on quality and customer service as well as on-time delivery, we are now serving customer widely spread in America, Germany, Israel, Japan, Korea and Canada. Contact: Hoya Liu, sales manager, [hoyalium@cryslaser.com](mailto:hoyalium@cryslaser.com)



**YAG crystals**

## DataRay Inc.

#1204

**SPIE** Corporate Member

1675 Market St, Redding, CA, 96001 (USA)

+1 530 395 2500

sales@dataray.com; www.dataray.com

**Featured Product: WinCamD-IR-BB - ISO 11146 compliant 2 to 16  $\mu$ m MWIR/FIR beam profiler.**

DataRay Inc. was founded in 1988 to bring affordable, high-performance beam profiling to the photonics community. DataRay manufacture precision, UV to 16 micron beam profiling instruments for laser, laser assembly and fiber optic telecom beam profiling and imaging to ISO 11146 standards. Contact: Kevin Garvey, COO, [kgarvey@dataray.com](mailto:kgarvey@dataray.com); Nea Hamilton, Sales Engineer, [nhamilton@dataray.com](mailto:nhamilton@dataray.com)



**The WinCamD-LCM is a compact but powerful beam profiler with a 1" CMOS with 5.5  $\mu$ m pixels.**

## DCM Tech

#341

**SPIE** Corporate Member

4455 Theurer Blvd, Winona, MN, 55987-1593 (USA)

+1 507 452 4043; fax +1 507 452 7970

interest@dcm-tech.com; www.dcm-tech.com

**Featured Product: DCM will be showcasing our IG180SD, IG280SD, and IG380SD Rotary Surface Grinders.**

DCM designs and builds a line of precision Industrial Rotary Surface



Grinders. We have provided quality machine tools and customer satisfaction since 1974. Our response to customer needs over the years has allowed us to provide long lasting, application specific solutions to customers worldwide. Use of the DCM Tech Vertical Spindle Rotary Table Surface Grinders has consistently brought dollars to our customers' bottom line via process improvement. Contact: Brian Ebbinger, Sales/ Technical Specialist, [brianebbinger@dcm-tech.com](mailto:brianebbinger@dcm-tech.com)

**DCM IG 280 SD Precision Rotary Surface Grinder**

## Denton Vacuum Inc.

#613

1259 N Church St, Bldg 3, Moorestown, NJ, 08057-1169 (USA)

+1 856 439 9100

info@dentonvacuum.com; www.dentonvacuum.com

## Diverse Optics Inc.

#529

**SPIE** Corporate Member

10310 Regis Ct, Rancho Cucamonga, CA, 91730 (USA)

+1 909 593 9330; fax +1 909 596 1452

info@diverseoptics.com; www.diverseoptics.com

**Featured Product: Your Polymer Optics Perfected.**

We know that your optics are as unique as you are. You can reduce cost, trim weight, simplify design, and improve the performance of your optics using polymers. For 30 years, we've manufactured the most challenging polymer optic components and assemblies for leading defense, medical, and commercial applications with advanced technology and an experienced team of professionals. With our knowledge of injection molding and diamond turning, we'll show you how polymer optics are perfected. Contact: Letty Treviño, Sales Engineer, [info@diverseoptics.com](mailto:info@diverseoptics.com)

## Dynamic Optics

#720

**SPIE** Corporate Member

1580-C Kingsway Ave, Port Coquitlam, BC, V3C 3Y9 Canada

+1 520 661 6313; fax +1 604 294 4550

p.wangsness@outlook.com; www.dynamicstructures-optics.webs.com

**Featured Product: Economical lightweight mirror substrates.**

Design and manufacture of economical lightweight glass (primarily borosilicate) mirror substrates from 20mm to >2,400mm+ in diameter. Unusual shapes and dimensions are possible. Low mass and high stiffness complement, low inertia and rapid thermalization. Quantities range from single prototype to OEM. Areal densities as low as 8kg/m<sup>2</sup> have been fabricated. Complete systems available. Optical Telescopes, Lidar systems, scanners, active primary and secondary optics and airborne optical systems. Contact: Peter Wangsness, Astronomy Technologist, [p.wangsness@outlook.com](mailto:p.wangsness@outlook.com)

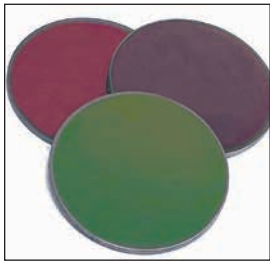
# EXHIBITOR DIRECTORY

## Dynasil Corporation of America #1226

313 Washington St Ste 403, Newton, MA, 02458 (USA)  
+1 617 668 6855; fax +1 617 668 6992  
sales@dynasil.com; www.dynasil.com

**Featured Product: IR High Efficiency Anti-Reflective (HEAR) and Diamond Like Carbon (DLC) coatings, components, assy's.**

For over 140 years, Dynasil's broad spectrum of products, excellent service and materials expertise have enabled photonics applications across every imaginable industry. Dynasil is a recognized leader in scintillation materials for radiation detection & imaging, customized optical coatings and optical components for the photonics industry, putting Dynasil at the forefront of markets in the radiation detection & photonics industries, including sensors & imaging, laser, space, defense, & industry. Contact: Gary Bishop, Executive Vice President, Photonics, gary.bishop@dynasil.com; Patty Kehe, Corporate Secretary, pkehe@dynasil.com



**Subsidiaries EMF Corp & Optometrics announce Infrared High Efficiency Anti-Reflective & DLC Coatings**

## Edmund Optics Inc. #210

**SPIE** Corporate Member

101 E Gloucester Pike, Barrington, NJ, 08007-1380 (USA)  
+1 856 547 3488  
sales@edmundoptics.com; www.edmundoptics.com

Edmund Optics is a leading global supplier of optics and optical components, designing and manufacturing a wide array of multi-element optical lenses, coatings, imaging systems, and optomechanical equipment. Led by skilled optical engineers and scientists, EO is application focused and pursues new ways to implement optical technology, enabling advancements in industrial metrology, semiconductor manufacturing, life sciences, and more. Contact: Sales, sales@edmundoptics.com

## Electro Optics Magazine #1206

4 Signet Ct, Cambridge, CB5 8LA United Kingdom  
+44 1223 221030; fax +44 1223 213 385  
sales@europascience.com; www.electrooptics.com

Electro Optics (EO) is Europe's original photonics title and multi-platform resource for anyone involved in the photonics industry. Readers have access to the latest technological developments, trends and opinions; independent, in-depth editorial content; and informed commentary and analysis. EO is published ten times a year in print and digital editions, with two monthly newsletters. It is available at no cost to readers working or engaged in the photonics industry.

## EMF Corp. #1226

**SPIE** Corporate Member

239 Cherry St, Ithaca, NY, 14850-5024 (USA)  
+1 800 456 7070; fax +1 800 456 3227  
information@emf-corp.com; www.emf-corp.com

**Featured Product: Most established thin film coater in the world! Metallic, AR, IR, DLC, Dichroic, Dielectric & more!**

EMF is the most established thin film coating house in US-founded in 1936. Get the EMF Edge \*On time delivery > 99% \*Product Quality > 99% \*Application/Technical Engineering Support \*Precision Custom coatings,



Very High Volume coatings and Large Optic capability. Capability to coat both small & large optics ranging from 2mm to 2.6 meters. Largest capacity in the industry- 27 chambers across 2 sites. We coat Glass, Metal, Ceramic, Composite & Plastic substrates. Now coating for IR - Ge, ZnSe Contact: Michelle Henderson, Sales Account Manager, michelleh@emf-corp.com; John McCartney, Sales Engineer, jmccartney@emf-corp.com

**EMF Corp expands High Efficiency AR coatings for the IR with the addition of a DLC coating chamber**

## Empire West, Inc. #541

**SPIE** Corporate Member

9270 Graton Rd, Graton, CA, 95444-9375 (USA)  
+1 707 823 1190  
info@empirewest.com; www.empirewest.com

## Energetiq Technology, Inc. #734

**SPIE** Corporate Member

7 Constitution Way, Woburn, MA, 01801-1024 (USA)  
+1 781 939 0763; fax +1 781 939 0769  
info@energetiq.com; www.energetiq.com

**Featured Product: Next Generation Laser-Driven Light Sources (LDLS™).**

Energetiq Technology is the world's leading developer and manufacturer of ultra-bright broadband light sources for a wide variety of advanced applications in defense, life and materials sciences, sensor testing and calibration, semiconductor manufacturing and R&D. Energetiq's light sources are based on a revolutionary laser-driven light source technology that generates high brightness across the spectrum, with high reliability and long operating life in a compact package. Contact: Samuel Gunnell, Technical Sales Engineer, sgunnell@energetiq.com; Mae Steinberg, Marketing Communications Associate, MSteinberg@energetiq.com

## Epner Technology #1216

**SPIE** Corporate Member

279 Frost St, Brooklyn, NY, 11222-5601 (USA)  
+1 718 782 5948  
info@epner.com; www.epner.com

**Featured Product: Laser Gold Plating.**

We are a 100 year-old specification plating company, specializing in the high-tech markets of Space, Medical, Defense, and the contract machinists that service those industries. Contact: David Epner, President, Info@epner.com



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- \$1,000 discount on the full Worldwide Laser Market Report
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## Exogenesis Corporation

#117

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+1 978 439 0120; fax +1 978 439 0220  
www.exogenesis.us

### SPONSOR

## Filmetrics, Inc.

#422

10655 Roselle St Ste 200, San Diego, CA, 92121 (USA)  
+1 858 573 9300; fax +1 858 573 9400  
info@filmetrics.com; www.filmetrics.com

Filmetrics features a complete line of affordable UV to NIR spectrometer systems for measuring thin film thickness from 1nm to 13mm, optical constants, and deposition rates of thin films. For applications requiring measurement of sub-nanometer surface roughness and/or precision step heights, Filmetrics offers the Profilm3D – an easy-to-use, full-featured profilometer at a fraction of the cost of competitive systems. Contact: Menno Bouman, Senior Applications Engineer, mbouman@filmetrics.com; Will Rance, Applications Engineer, wrance@filmetrics.com

## Flash Photonics, Inc.

#728

8201 164th Ave NE, Ste 236, Redmond, WA, 98052-7604 (USA)  
+1 888 796 9010  
hello@flash-photonics.com; flash-photonics.com

### Featured Product: Moku:Lab, 3DOptix, Lasers, LeRoy Stabilized Fiber-Coupled LEDs, USB Photodetectors, NIRONE Sensors

Flash Photonics, Inc. is an optical sensing solutions supplier for laboratory and commercial applications in North America. We specialize in Raman, LIBS, Infrared, Atomic Force Microscopy, Optomechanical, and Photoacoustic Gas Measurement Systems. We also provide components such as probes, sensors, lasers, LEDs, and photodetectors to enhance your existing measurement systems. Our team of experts have decades of experience and can help you find the best solution for your problems in a flash. Contact: Steve Buckley, Ph.D., CEO, steve@flash-photonics.com; Kevin Kaye, Director of Sales, kevin.kaye@flash-photonics.com

## Flexible Optical B.V.

#110

**SPIE** Corporate Member

Polakweg 10-11, Rijswijk, 2288 GG Netherlands  
+31 70 262 9420; fax +31 70 710 1400  
oko@okotech.com; www.okotech.com

### Featured Product: 96-channels deformable mirror with embedded electronics and USB interface.

We have pioneered the field of affordable adaptive optics with our first micro machined deformable mirror in 1997. Since that we have extended the range of our high-quality products which now includes: membrane based deformable mirrors, piezo-actuated deformable mirrors, highly-customizable wavefront sensors, control electronics and software for adaptive optics. Our experience includes development of custom AO systems for education, industry, astronomy, medicine and military applications. Contact: Gleb Vdovin, Director, oko@okotech.com

## Fresnel Technologies

#228

**SPIE** Corporate Member

101 W Morningside Dr, Ft Worth, TX, 76110-2708 (USA)  
+1 817 926 7474; fax +1 817 926 7146  
sales@fresneltech.com; www.fresneltech.com

Fresnel Technologies, Inc. is a world leader in the production of plastic Fresnel lenses, conventional & freeform optics, IR-transmitting materials & optics made from them. Specialties include lens arrays for passive IR, diffusers & microlens arrays for illumination & 3D applications, optics for 3.4µm light, silicone optics for UV & high heat applications. We assist in design, prototyping, low to high volume production molds, 2-5 axis diamond machining and metrology of catalog and custom optics. Contact: Nelson Claytor, President, nclaytor@fresneltech.com; Oscar Lechuga, Member of Technical Staff, olechuga@fresneltech.com

## General Ruby & Sapphire Co.

#515

**SPIE** Corporate Member

11443 Challenger Ave, Odessa, FL, 33556 (USA)  
+1 888 361 5707; fax +1 888 965 9446  
sales@generalruby.com; www.generalruby.com

## GPD Optoelectronics Corp.

#100

**SPIE** Corporate Member

7 Manor Pkwy, Salem, NH, 03079-2842 (USA)  
+1 603 894 6865; fax +1 603 894 6866  
sales@gpd-ir.com; www.gpd-ir.com

GPD Optoelectronics Corp., is a global supplier of Ge & InGaAs photodetectors operating in the 0.8 to 2.6 micron short wave infrared (SWIR) spectrum. The Ge photodiodes, InGaAs photodiodes and InGaAs APDs are available in die on carrier, TO package, TEC module, single/multi-mode fiber (with high reliability packaging), SMA/FC/SC/ST active mount, & custom designs. GPD has Si over Ge, Si over InGaAs, InGaAs over InGaAs "two-color sandwich" sensors for ratio pyrometry & InGaAs quadrant sensors. Contact: Rufus Ward, President, rward@gpd-ir.com; George Gasparian, Sales/Applications Engineer, ggasparian@gpd-ir.com

## GS Plastic Optics

#429

**SPIE** Corporate Member

408 St Paul St, Rochester, NY, 14605-1788 (USA)  
+1 585 295 0200; fax +1 585 232 2314  
gspartners@gs optics.com; www.gs optics.com

### Featured Product: Precision Polymer Optics.

GS Plastic Optics works with executives and program managers to solve complex optical challenges. We manufacture high-performance injection molded polymer optics specifically designed to help customers improve their competitiveness and market share. Our in-house team consists of experts in diamond turning, thin film coating, mold fabrication, and opto-mechanical assembly. We have all of the advanced metrology equipment

needed to control performance and quality. Contact: Steve Orth, Sales Executive, sorth@gs optics.com; Will Beich, Director of Sales and Marketing, wbeich@gs optics.com

**Providing solutions to complex optical challenges, we improve our customers' market share.**



## Hamamatsu Corporation

#635

**SPIE** Corporate Member

360 Foothill Rd, Bridgewater, NJ, 08807-2932 (USA)  
+1 908 231 0960; fax +1 908 231 1539  
photonics@hamamatsu.com; www.hamamatsu.com

**Featured Product: New cooled SiPM (MPPC) modules with 600 nm peak sensitivity from Hamamatsu.**

Hamamatsu Corporation is the North American subsidiary of Hamamatsu Photonics K.K. (Japan), a leading manufacturer of devices for the generation and measurement of infrared, visible, UV light and x-rays.



These devices include silicon photomultipliers, photodiodes, photomultiplier tubes, image sensors, cameras, and light sources. Hamamatsu Photonics also offers specialized systems for select applications.

**New cooled SiPM (MPPC) modules with 600 nm peak sensitivity from Hamamatsu**

## Hangzhou Freqcontrol Electronic Technology Ltd.

#1222

#1106, CIBC, No.198 Wuxing Rd., Qianjiang New City, Hangzhou, Zhejiang, 310006 China  
+86 571 85803723; fax +86 571 85803724  
sales@csimc-freqcontrol.com; www.csimc-freqcontrol.com

**Featured Product: Lithium Niobate/Lithium Tanatalate/single crystal quartz/fused silica wafers/glass wafers.**

Our company is a leading Chinese manufacturer involved in the single piezo crystal science. We supply all kinds of high precision quartz, blank and Lithium Niobate, Lithium Tantalate, & glass wafers to the microelectronics, semiconductor and optical industry. We provide substrate products on 3", 4", 6", 8", 12" with the most thinner at 0.1-



0.15 mm, which will make chips possible to be packed within the most smallest of packages. Contact: Tianhua Wu, G.M, sales@csimc-freqcontrol.com; Julie Zhu, Marketing, sales@csimc-freqcontrol.com

**Lithium Niobate / Lithium Tanatalate/ single crystal quartz/ fused quartz/glass wafer**

## Hardin Optical Co.

#323

**SPIE** Corporate Member

87679 Kehl Ln, Bandon, OR, 97411-0090 (USA)  
+1 541 347 9467; fax +1 541 347 8176  
optics@hardinoptical.com; www.hardinoptical.com

**Featured Product: Custom Optical Components and Coatings.**

Hardin Optical manufactures precision optical components for commercial and defense applications. We fabricate custom optical elements used in UV, Visible, and IR applications. Our manufacturing facility includes CNC grinding and polishing, conventional grinding and polishing, diamond turning, and thin film coating capabilities. We take pride in our record of on-time delivery of quality products. Hardin Optical Company was founded in 1976. www.hardinoptical.com. Contact: optics@hardinoptical.com

## HEIDENHAIN Corporation

#427

**SPIE** Corporate Member

333 E State Pkwy, Schaumburg, IL, 60173-5337 (USA)  
+1 847 490 1191; fax +1 847 490 3931  
marketing01@heidenhain.com; www.heidenhain.us

HEIDENHAIN Corporation is the North American subsidiary of the German company DR. JOHANNES HEIDENHAIN GmbH, a leading international manufacturer of precision measurement and control equipment. This superior technology is utilized within high precision motion control and machining systems worldwide. Contact: Peter Suliga, Sales Manager, psuliga@heidenhain.com

## Himax IGI

#1232

4611 E Lake St, Minneapolis, MN, 55406-2305 (USA)  
+1 612 721 6283  
sales@himaxigi.com; himax.com.tw

**Featured Product: Micro Optic Arrays, Diffractive Optics & Nano Structures for prototype and high volume optics.**

Himax IGI designs & manufactures innovative micro & nano patterns for displays, optics, telecommunications, biomedical, & other applications. NanoSculpt technologies are used to make photoresist masters, nickel shims, & soft molds with diverse pattern characteristics that create the desired surface or optical properties. Products made by Himax IGI are used in Nano-imprint lithography, injection molding, roll-to-roll, embossing, stamping, & other prototype and high volume manufacturing processes. Contact: Rob Larsen, VP, rob\_larsen@himaxigi.com; Mark Mulhern, Product Engineer, mark\_mulhern@himaxigi.com

## Hinds Instruments, Inc.

#322

**SPIE** Corporate Member

7245 NE Evergreen Pkwy, Hillsboro, OR, 97124 (USA)  
+1 503 690 2000; fax +1 503 690 3000  
sales@hindsinstruments.com; www.hindsinstruments.com

Hinds is a manufacturer of high sensitivity polarization metrology tools. These include the photoelastic modulator (PEM) polarization modulation components, Stokes & Mueller Polarimeters, and Exicor® birefringence measurement instrumentation. The PEM is used a variety of applications where polarization analysis or modulation is required. The Polarimeters can be used for fiber/free space or materials characterization. The Exicor systems measure retardation magnitude and angle simultaneously. Contact: Connie Wimmer, Sales Engineer, cwimmer@hindsinstruments.com; Deion Mock, Sales Engineer, dmock@hindsinstruments.com

## HIWIN Corp.

#340

12455 Jim Dhamer Dr, Huntley, IL, 60142-8065 (USA)  
+1 847 827 2270; fax +1 847 827 2291  
info@hiwin.com; www.hiwin.com

HIWIN Corp. manufactures an extensive line of both linear motion components and complete solutions. With a goal of supplying superior quality at the most competitive prices, the company offers a variety of precision ground and rolled ballscrews, linear guideways, electric actuators, ballscrew-driven stages, and linear motors, with many fully integrated value-added features. Contact: Shawn Lawrence, Marketing Manager, s.lawrence@hiwin.com; Randy Coleman, Territory Manager, r.coleman@hiwin.com



# EXHIBITOR DIRECTORY

## HOYA Corp. USA

#114

**SPIE** Corporate Member

680 N McCarthy Blvd Ste 120, Optics Div, Milpitas, CA, 95035-5120 (USA)

+1 408 654 2200; fax +1 408 654 2270

opticsales.hoyausa@hoya.com; www.hoyaoptics.com

**Featured Product: UV Transmitting – Visible Blocking, Neutral Density, Sharp Cut, NIR, Visible filters & optical glass.**

HOYA CORP USA Optics Division is a leading supplier of filter, optical and specialty glasses in semi-finished and finished forms. We operate around a worldwide network of R&D, precision manufacturing and mass scale production facilities, enabling HOYA to offer End-to-End Solutions unmatched by our competitors. Large selection of standard stock and custom components. UV-VIS-NIR ND Color Filters, Optical & Specialty glasses in various forms: Lenses, blanks, strips & blocks. Contact: Naoko Sato-Tazuma, Sales Representative, naoko.sato@hoya.com; Sean Wilson, Sales Engineer, sean.wilson@hoya.com

## Ibsen Photonics A/S

#108

**SPIE** Corporate Member

Ryttermarken 15-21, Farum, 3520 Denmark

+45 44 34 7000; fax +45 44 34 7001

inquiry@ibsen.dk; www.ibsen.com

Ibsen Photonics is a global leader in transmission gratings and OEM spectrometer modules for a wide range of telecom, analytical, sensing, and laser markets. Spectrometer products: 1) FREEDOM for ultra-compact size, 2) ROCK for high throughput, 3) EAGLE for high resolution, and 4) I-MON interrogation monitors for FBG sensing. Grating products: 1) Phase masks for FBG writing, 2) PCG for laser pulse compression,

3) PING for telecom WSS, tunable filters, and OCM's, and 4) Spectrometer gratings. Contact: Heidi Olson, Technical representative North America, ho@ibsen.com

**FREEDOM C, compact OEM spectrometers for the UV, VIS and NIR ranges with very high resolution.**



## II-VI Optical Systems

#710

**SPIE** Corporate Member

36570 Briggs Rd, Murrieta, CA, 92563-2347 (USA)

+1 951 926 2994; fax +1 951 926 1984

opticalsystems.info@ii-vi.com; www.opticalsystems.com

II-VI Optical systems is a Military Aerospace focused business that serves four strategic areas of Intelligence Surveillance & Reconnaissance (ISR), High Energy Lasers, Missiles and Ordnance, and EMI & Survivability. Leveraging the Corporation's strength in engineered materials and experience in Design for Manufacturability and Assembly. II-VI OS delivers solutions that work from miles below the surface of the ocean to outer space. Contact: Janice Roewer, Inside Sales Manager, Janice.Roewer@II-VI.com; Larry Walker, Sr. Business Development Manager, Larry.Walker@II-VI.com

## Infinite Optics Inc.

#112

**SPIE** Corporate Member

1712 Newport Cir Ste F, Santa Ana, CA, 92705-5118 (USA)

+1 714 557 2299; fax +1 714 557 2170

info@infiniteoptics.com; www.infiniteoptics.com

**Featured Product: High Efficiency AR Coatings from .9-14nm on various Chalcogenite glass**

Infinite Optics specializes in optical thin-film coatings ranging from 193nm's to 20 microns. We support astronomical, industrial, medical and military markets by fabricating and coating optics required for telescopes, lasers and optoelectronic devices. Our services include special applications, development, production runs and quality control. We are DDTC registered and ITAR compliant. Contact: Geza Keller, geza@infiniteoptics.com; Stan King, stan@infiniteoptics.com

## Inrad Optics

#439

**SPIE** Corporate Member

181 Legrand Ave, Northvale, NJ, 07647-2498 (USA)

+1 201 767 1910; fax +1 201 767 9644

sales@inradoptics.com; www.inradoptics.com

Inrad Optics manufactures optical components and assemblies for applications from sensing to imaging. We grow non-linear crystals, scintillation crystals, and x-ray diffraction crystals. Products include toroids and bent crystal analyzers for X-Ray optics, aspheric mirrors, and transmission flats. From crystals to components optics powered by materials expertise. Contact: Sales, sales@inradoptics.com

## InterOptics, LLC

#539

**SPIE** Corporate Member

4854 N Shamrock Place, Tucson, AZ, 85705 (USA)

+1 520 344 7786

info@inter-optics.com; inter-optics.com

**Featured Product: OptoFlat low noise, engineered coherence interferometer for measuring plane parallel optics and more.**

InterOptics was founded by industry veterans Dr. Chris Koliopoulos, Dr. Klaus Freischlad, and Matt Boston to create a new optical metrology instrumentation company offering value-engineered high precision interferometric equipment to manufacturers or users of precision surfaces, such as hard disks, plano optics, polished valves, and Silicon and glass wafers. OptoFlat uses a unique LED illumination system to allow surface isolation of plane parallel optics for sub-nanometer measurement precision. Contact: Klaus Freischlad, Managing Member, klausf@inter-optics.com; Matt Boston, Member, mattb@inter-optics.com

## IOP Publishing Ltd.

#1200

Temple Way, Temple Circus, Bristol, BS1 6HG United Kingdom

+44 117 929 7481; fax +44 117 929 4318

custserv@iop.org; www.ioppublishing.org

**Featured Product: <https://physicsworld.com/c/optics-photonics/>**

IOP Publishing is a society-owned scientific publisher, providing impact, recognition and value for the scientific community. Wholly owned by the UK Institute of Physics, we work closely with researchers, academics, and partners worldwide to produce academic journals, ebooks, conference series, and digital products, covering the latest and best research in the physical sciences and beyond. Contact: Fiona Walker, Global Exhibitions Manager, fiona.walker@iop.org

## Isuzu Glass, Inc.

#238

**SPIE** Corporate Member

23505 Crenshaw Blvd Ste 130, Torrance, CA, 90505-5225 (USA)  
+1 310 517 1866; fax +1 310 517 1869  
sales@isuzuglas.com; www.isuzuglass.com

### Featured Product: ISK-171, ISK-167

Isuzu Glass has been developing original techniques and know-how and supplying a variety of Optical products to customers using unique manufacturing methods. Our melting technology has made it possible to develop glass products that can perform special functions in the wavelength range of invisible ultraviolet and far-infrared rays. A small quantity of glass with slightly different spectral characteristics and 'glass with tailor-made functions'. Contact: Hiroaki Yokoi, President, sales@isuzuglass.com; Naoko Kaga, Advanced Engineer, nkaga@isuzuglass.com

## J.A. Woollam

#240

**SPIE** Corporate Member

645 M St Ste 102, Lincoln, NE, 68508-2243 (USA)  
+1 402 477 7501; fax +1 402 477 8214  
sales@jawoollam.com; www.jawoollam.com

For all your ellipsometry needs, from measuring your thin film sample to the installation and training of your very own ellipsometer, the J.A. Woollam Company is here for you every step of the way. We offer a wide variety of ellipsometers to help you characterize your thin films, covering spectral ranges from vacuum ultra-violet to far infrared. We have 30+ years of experience and offer unrivaled customer support. Contact us today to learn more about our products lineup at sales@jawoollam.com. Contact: Andrew Martin, Applications Engineer, amartin@jawoollam.com; Ron Synowicki, Applications Engineer, rsynowicki@jawoollam.com

## JENOPTIK Optical Systems, LLC #421

**SPIE** Corporate Member

16490 Innovation Dr, Jupiter, FL, 33478-6428 (USA)  
+1 561 881 7400; fax +1 561 881 1947  
sales@jenoptik-inc.com; www.jenoptik.us

Jenoptik Optical Systems designs and builds high-performance optical and micro optical lenses and systems used in leading diagnostic instruments, semiconductor tools, security systems, projection systems as well as in communications technology (ICT). Materials include optical glasses, fused silica, crystals, infrared materials, as well as plastics coated in wavelengths from far infrared to DUV. We are a global, high-volume manufacturer, ISO 9001 and ISO 13485 certified as well

as ITAR compliant. Contact: Jim Hillendahl, Applications Engineer, jim.hillendahl@jenoptik-inc.com; Ray Malcom, Business Development Manager, ray.malcom@jenoptik-inc.com

**Jenoptik's new Motorized Laser Beam Setting with Smart Beam Expanders 1-8 for 355 nm & 1030-1080 nm.**



## Kaufman & Robinson, Inc.

#338

**SPIE** Corporate Member

1330 Blue Spruce Dr, Fort Collins, CO, 80524-2030 (USA)  
+1 970 495 0187  
info@ionsources.com; www.ionsources.com

### Featured Product: RFICP 380 Ion Beam Source, RFICP 220.

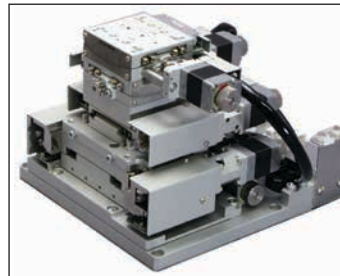
Kaufman & Robinson can assist you with your film depositions, etching processes, and material modifications. We manufacture a wide range of ion/plasma sources, electron neutralizers and power supply controllers. KRI's product technology includes high current gridless plasma sources, filamentless RFICP gridded sources, low energy electron sources and automated power supply controllers. With over 40 years of experience, we are the source you can trust! Contact: Raymond Arent, Inside Sales, arent@ionsources.com; Steve Hansen, Inside Sales, hansen@ionsources.com

## KOHZU Precision c/o Daniel F Crews, LLC #120

PO Box 2804, Evergreen, CO, 80437 (USA)  
+1 303 944 1082  
KOHZU@dfcrews.com; www.dfcrews.com/kohzu

### Featured Product: Precision motion stages (X, Y, Z, Tip, Tilt & R) for alignment and positioning of optics & devices.

KOHZU Precision, established in 1945, manufactures reliable, high precision, production quality, cost effective, linear stages (X), rotary axes (R), vertical lift stages (zed axis, Z), stacked XY, swivel or goniometer



stages (tip/tilt) for atmospheric or vacuum environments. Stages are available with manual micrometers or stepper motors. KOHZU also manufactures 6-axis alignment stations, metrology & synchrotron equipment. Contact: Dan Crews, President, kohzu@dfcrews.com

**KOHZU expands precision 6-axis assemblies offered with the compact USM & SMR series.**

## Labsphere, Inc.

#442

**SPIE** Corporate Member

231 Shaker Street, PO Box 70, North Sutton, NH, 03260-0070 (USA)  
+1 603 927 4266  
labsphere@labsphere.com; www.labsphere.com

## LaCroix Precision Optics #424

**SPIE** Corporate Member

50 Lacroix Dr, Batesville, AR, 72501 (USA)  
+1 870 698 1881; fax +1 870 698 1880  
info@lacroixoptics.com; www.lacroixoptics.com/

### Featured Product: Short lead time precision aspheres.

Since 1947, LaCroix Precision Optics has positioned itself as a premier domestic volume and prototype manufacturer of custom precision optics. Capabilities include Spherical, Aspherical, Plano, and custom coated optics. At our facility in Batesville, Arkansas, we use both traditional methods and advanced CNC processing to achieve the highest level of precision and quality demanded by our customers. ISO 9001:2015, ITAR certified and compliant. Contact: Kenny Rains, Technical Sales and Manufacturing Engineer, kenny@lacroixoptics.com; Clayton Carpenter, Technical Sales and Manufacturing Engineer, clayton.carpenter@lacroixoptics.com

# EXHIBITOR DIRECTORY

## Lake Shore Cryotronics

#339

575 McCorkle Blvd, Westerville, OH, 43082-8699 (USA)  
+1 614 891 2244; fax +1 614 818 1600  
sales@lakeshore.com; www.lakeshore.com

**Featured Product: Cryogenic probe stations for electro-optical, DC, RF, microwave, or THz-frequency device measurement.**

Supporting advanced research since 1968, Lake Shore Cryotronics (<http://www.lakeshore.com>) is a leading innovator in solutions for measurement over a wide range of temperatures and magnetic field conditions. High-performance products include micro-manipulated cryogenic probe stations that enable the measurement of early-stage devices as well as novel photovoltaic materials within a tightly controlled environment at temperatures as low as 1.6 K and in fields to over 2 T, depending on the model. Contact: Technical Sales Manager, sales@lakeshore.com

## Lambda Research Corp.

#343

**SPIE** Corporate Member

25 Porter Rd, Littleton, MA, 01460-1434 (USA)  
+1 978 486 0766; fax +1 978 486 0755  
sales@lambdaresearch.com; www.lambdaresearch.com

**Featured Product: TracePro 2018.**

Lambda Research Corporation sets itself apart as a cost-effective, single-source solution for optical and illumination design. Lambda sells TracePro® opto-mechanical software known for its ease of use, CAD interface and accuracy in illumination design, OSLO® optical design software renowned for its power and flexibility in lens design, and RayViz™, a ray-tracing add-in for SOLIDWORKS. Lambda also distributes the ScatterMaster ScatterScope4™ scatterometer. Contact: Nance Lordan, Sales Manager, sales@lambdaresearch.com



**TracePro 2018 features new tolerancing utility and upgraded CAD kernel.**

## Laser Components USA, Inc.

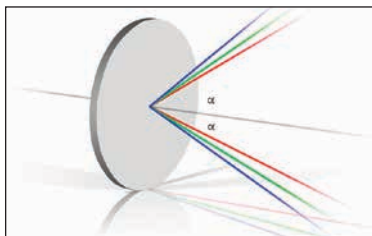
#527

**SPIE** Corporate Member

116 S River Rd Unit C, Bedford, NH, 03110 (USA)  
+1 603 821 7040; fax +1 603 821 7041  
info@laser-components.com; www.laser-components.com

**Featured Product: Triple laser mirrors produced for custom wavelength combinations.**

One of our strengths is the in-house production of coatings for laser optics. Our manufacturing capabilities include E-Beam coating, Ion-Assisted Deposition (IAD) coating and Ion Beam Sputtering (IBS) coating. We provide a number of standard coatings as well as coating solutions, designed specifically for your application requirement. Contact: Matt Robinson, Sales Director, robinson@laser-components.com; Huyen Vu, Sales Director, hvu@laser-components.com



**Triple laser mirrors produced for custom wavelength combinations**

## Laser Focus World

#414

**SPIE** Corporate Member

61 Spit Brook Rd, PennWell Technology Div, Nashua, NH, 03060-5614 (USA)  
+1 603 891 0123  
info@pennwell.com; www.laserfocusworld.com

Published since 1965, Laser Focus World - a monthly magazine for engineers, researchers, scientists, and technical professionals - provides comprehensive global coverage of optoelectronic technologies, applications, and markets. Nearly 80,000 qualified optoelectronics professionals from around the world currently subscribe. Contact: Alan Bergstein, Publisher, alanb@pennwell.com; Conard Holton, Editor in Chief, cholton@pennwell.com

## Laser Quantum Inc.

#741

47673 Lakeview Blvd, Fremont, CA, 94538-6544 (USA)  
+1 510 210 3034; fax +1 408 352 6192  
info@laserquantum.com; www.laserquantum.com

**Featured Product: The Opus 1064 0.5-10W laser. Noise <0.15%, TEM 0,0, pointing <10urad/C, ideal for optical tweezers.**

Laser Quantum is a world-class manufacturer of revolutionary solid-state and ultrafast lasers. Our products lead the industry in performance specifications, reliability, compactness and operational lifetime. You will find Laser Quantum lasers used in laboratories and integrated in systems and machines worldwide. Our lasers are helping scientists to break new ground in many applications ranging from attosecond physics to forensics and genomics. Visit [www.laserquantum.com](http://www.laserquantum.com) for more information. Contact: Ben Sedgley, Sales Engineer, ben.sedgley@laserquantum.com; Barney Mitchell, VP Sales and Marketing, barney.mitchell@laserquantum.com

## Lasertec, Inc.

#714

**SPIE** Corporate Member

177 CongYang Rd ChengYang, Qingdao, Shandong, 266100 China  
+86 532 68959242  
lasertec01@gmail.com; www.lcoptical.com

**Featured Product: Super polishing windows, Laser windows, Laser Lenses, optical Wafer, Diffusion bonding technology**

Lasertec Inc is a recognized leader in laser components and high-performance optical solutions. Lasertec provide high quality laser



crystals, NLO crystals Laser optics and precision optics for the Laser, Medical, Life Sciences, Defense & security, Semiconductor, and Industrial OEM markets. Contact: gary Liu, Director, lasertec01@gmail.com

**Lasertec has super polishing technology to support High precision windows for laser application.**

## Leoni Fiber Optics

#739

**SPIE** Corporate Member

209 Bulifants Blvd, Williamsburg, VA, 23188-5729 (USA)  
+1 757 258 4805; fax +1 757 258 4694  
cusme-s.contact@leoni.com; www.leoni-northamerica.com



## SPONSOR

### Luminate

**SPIE** Corporate Member

260 E Main St Ste 6000, Rochester, NY, 14604 (USA)  
+1 585 214 2400  
info@nextcorps.org; www.nextcorps.org

#1217

### Mad City Labs., Inc.

**SPIE** Corporate Member

5224 Todd Dr, Madison, WI, 53713-2317 (USA)  
+1 608 298 0855; fax +1 608 298 9525  
sales@madcitylabs.com; www.madcitylabs.com

#333

Mad City Labs designs & manufactures high precision piezo nanopositioners, micropositioners, and microscopes suitable for inspection, metrology, microscopy, interferometry, and astronomy. Our nanopositioners include proprietary PicoQ® position sensors yielding picometer scale precision, low noise performance, and high stability. We provide innovative motion control solutions from the micro-to-pico scale with special emphasis on ultra-high vacuum applications and extreme custom solutions. Contact: Technical Sales, sales@madcitylabs.com; European Sales, sales@madcitylabs.eu

### Mahr Inc. - ESDI

**SPIE** Corporate Member

150 N Tucson Blvd, Tucson, AZ, 85716-4740 (USA)  
+1 520 296 3068; fax +1 520 296 2897  
mahr-esdi.sales@mahr.com; www.mahr.com

#334

#### Featured Product: Full featured 100 mm aperture Fizeau for characterization of flat and spherical surfaces.

Mahr has over 150 years' experience in manufacturing dimensional metrology tools from handheld gages to advanced measurement systems for form, contour, surface finish and length. Mahr produces custom engineered gages and provides calibration and contact



measurement services. Mahr also provides optical metrology solutions for aerospace, automotive, and optical production applications. Contact: Steve Moore, Applications, steve.moore@mahr.com; Mason Wilson, Applications, mason.wilson@mahr.com

**Full featured 100 mm aperture Fizeau for characterization of flat and spherical surfaces.**

### MegaWatt Lasers, Inc.

**SPIE** Corporate Member

PO Box 24190, Hilton Head Island, SC, 29925-4190 (USA)  
+1 843 342 7221  
sales@megawattlasers.com; www.megawattlasers.com

#132

MegaWatt Lasers manufactures application specific solid-state lasers and components for medical, industrial, and defense applications. Standard products include a complete line of high-quality diffuse-reflector pump chambers for solid-state laser applications. Our pump chamber designs are well suited for both breadboard experimentation as well as OEM applications. MegaWatt Lasers is known for its line of Eyesafe Er:Glass microlasers for various remote sensing applications. Contact: Scott Hamlin, President, sales@megawattlasers.com

### Micro Laser Systems, Inc.

#224

**SPIE** Corporate Member

12841 Western Ave Ste H, Garden Grove, CA, 92841-4025 (USA)  
+1 714 898 6001; fax +1 714 897 0979  
sales@microlaser.com; www.microlaser.com

#### Featured Product: FC100, A 100mm Fiber Collimator.

We are a manufacturer of Diffraction Limited Fiber Coupled Laser Systems, Optical Systems and Fiber Optic Systems from 240nm to 6000nm. Unique products include Fiber Collimators with apertures of 2mm to 100mm, Fiber Focusers down to half the core size, Fiber Coupled Lasers, Fiber Splitters and fiber assemblies. Our products are used in Quantum Optics, Free Space Communications, Lidar, metrology and bio-photonics. We routinely design and build custom assemblies for our customers. Contact: Norma Adachi, Marketing, norma@microlaser.com



**FC100, A 100mm Fiber Collimator**

### Millennium Optical System Co., Ltd. #510

29 Dunbangi-gil Beobwon-eup, paju-si Kyonggi, 10829 Korea, Republic of  
+82 31 946 7041; fax +82 31 946 7043  
sales@mosoptics.com; www.mosoptics.com

#### Featured Product: Prism, Lens, Filter, window, Beamsplitter, polarizers, Assemblies, coating (IR, AR, gold, silver, ITO).

MOS is a professional manufacturer of optical components, producing prism lens, filter and so on used in many in industries such as electricity, telecommunication, electronics, optical research institutes, and making precision optical components related to major industries such as space, core parts for defense, advanced medical, laser equipment, core parts for precision instruments, semiconductor etc. and especially, we have MOS's know-how and technology in the super precision polishing filed. Contact: Amy Kang, Sales assistant manager, sales@mosoptics.com

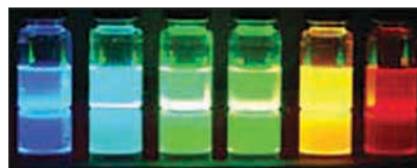
### MilliporeSigma

#1212

6000 N Teutonia Ave, Milwaukee, WI, 53209 (USA)  
+1 414 438 4231  
matsci@sial.com; www.sigmaaldrich.com/materials-science.html

#### Featured Product: Nanomaterials; Quantum Dots; Organic Electronic and Solar Cell Materials.

Sigma-Aldrich Materials Science is a strategic technology initiative of MilliporeSigma, a business of Merck KGaA, Darmstadt, Germany. The leading provider of materials for use in energy, biomedical, and electronics research. Our inorganic and organic chemicals, polymers, nanomaterials, and materials for electronics and alternative energy are used worldwide. We support innovation through development and distribution of state-of-the-art materials, scientific collaboration and manufacturing. Contact: Taryn Fuhrman-Hall, Marketing Product



Manager, taryn.fuhrman@sial.com; Niraj Singh, Energy Product Manager, niraj.singh@sial.com

**Displays and Lighting Materials (OLED, QDs, Phosphors)**

# EXHIBITOR DIRECTORY

## Mindrum Precision, Inc.

#216

**SPIE** Corporate Member

10000 4th St, Rancho Cucamonga, CA, 91730-5723 (USA)

+1 909 989 1728

sales@mindrum.com; www.mindrum.com

Custom machining and polishing of ultra-precision components and assemblies. Complex shaping ability with 5-axis CNC milling, CNC turning and CNC surface grinding. Plano, spherical and cylindrical polishing using spindle, continuous and double-sided equipment. We work with hard materials i.e.: glass, quartz, sapphire and ceramics etc. Also work with conventional materials i.e. aluminum, steel and titanium etc. Other capabilities include glassblowing, acid etching, soldering, wire EDM and dicing. Contact: Linda Kondris, Technical Sales, linda@mindrum.com; Adam Pohl, VP Engineering, adam@mindrum.com

## Minus K Technology

#329

**SPIE** Corporate Member

460 Hindry Ave Ste C, Inglewood, CA, 90301-2044 (USA)

+1 310 348 9656; fax +1 310 348 9638

sales@minusk.com; www.minusk.com

**Featured Product: New 2" tall Minus K CT-1 platform for low frequency vibration isolation, No Air or Electricity.**

Manufacturer of vibration isolation systems for AFMs, SPMs, SEMs, metrology, micro-hardness testers, lasers and optics. They are low-cost, passive, vacuum adaptable and require no air or electricity. Products: table-top platforms, workstations, floor platforms and custom systems. Guaranteed 1/2 Hz natural frequencies make them effective against low-frequency building vibrations. Isolation is typically 10 to 100 times better than air tables and even better than the higher-priced active systems. Contact: Steve Varma, Operations Manager, stevev@minusk.com; Erik Runge, Director of Engineering, erik@minusk.com



**New 2" tall Minus K CT-1 platform for low frequency vibration isolation, No Air or Electricity!**

## MKS Instruments, Inc.

#220

**SPIE** Corporate Member

1791 Deere Ave, Irvine, CA, 92606-4814 (USA)

+1 949 863 3144; fax +1 949 253 1680

sales@newport.com; www.newport.com

MKS Instruments, Inc. is a global provider of instruments, subsystems and process control solutions that measure, control, power, monitor, and analyze critical parameters of advanced manufacturing processes to improve process performance and productivity. Our primary served markets include semiconductor capital equipment, industrial manufacturing, environmental, medical, life sciences and scientific research. Additional information can be found at www.mksinst.com. Contact: Bill Casey, bill\_casey@mksinst.com

## Motion Controls, LLC

#1236

1174 Western Dr, Hartford, WI, 53022 (USA)

+1 262 673 9255; fax +1 262 673 9554

brad@motioncontrolslc.com; www.motioncontrolslc.com

**Featured Product: QVLA light emitter with RGB sensing through fiber optic for spectral and volume analysis.**



Manufacturer of oil and air actuators for over 50 years. Now leading with proprietary QVLA position sensing technology. QVLA technology has pivoted into sensing for hard and soft water, steam, coolants, and other fluids using RGB detectors. Contact: Brad Engstrand, President, brad@motioncontrolslc.com

**RGBW analysis with custom software using our proprietary, reference quality QVLA emitter.**

## Moulded Optics GmbH

#711

**SPIE** Corporate Member

Steinstrasse 13-15, Schöffengrund, 35641 Germany

+49 6445 6000 0; fax +49 6445 6000 40

info@mouldedoptics.com; www.mouldedoptics.com

**Featured Product: Molded GLASS and PLASTIC Optical Components.**

Moulded Optics GmbH, an ISO 9001:2008 certified supplier, will be displaying many types of molded GLASS and PLASTIC optical components including STANDARD molded GLASS ASPHERIC lenses from 4mm to 80mm diameter sizes, HALF-BALL (HEMISPHERES) lenses in 3mm, 4mm, 5mm and 6mm diameter sizes, and CUSTOM molded GLASS and PLASTIC optical components from approximately 2mm to 100mm sizes, including LENSES, HYBRID OPTICS, MICRO LENS ARRAYS, MIRRORS, PRISMS and SPECIAL SHAPES for many types of illumination. Contact: Martin Pfeil, managing director, martin.pfeil@mouldedoptics.com; Beate Dannewitz, sales manager, beate.dannewitz@mouldedoptics.com



**Molded GLASS and PLASTIC optical components for many types of illumination applications.**

## MOXTEK, Inc.

#743

**SPIE** Corporate Member

452 W 1260 N, Orem, UT, 84057-2941 (USA)

+1 801 225 0930; fax +1 801 221 1121

info@moxtek.com; www.moxtek.com

## Nanotronics

#415

**SPIE** Corporate Member

2251 Front St Ste 109-111, Cuyahoga Falls, OH, 44221-2577 (USA)

+1 330 926 9809

sales@nanotronics.co; www.nanotronics.co

**Featured Product: nSPEC®**

Nanotronics designs and manufactures autonomous microscopes to fill gaps in and enhance existing inspection and process control equipment. nSpec® is used by many of the world's leading semiconductor and electronics manufacturers. nSpec® is powered by advanced computer vision, machine learning, and artificial intelligence software analyzers to deliver maximum value and capability at lower cost. Contact: Julio Coppo, Senior Sales Director, julio@nanotronics.co; Ed Sandke, Sales Director, esandke@nanotronics.co



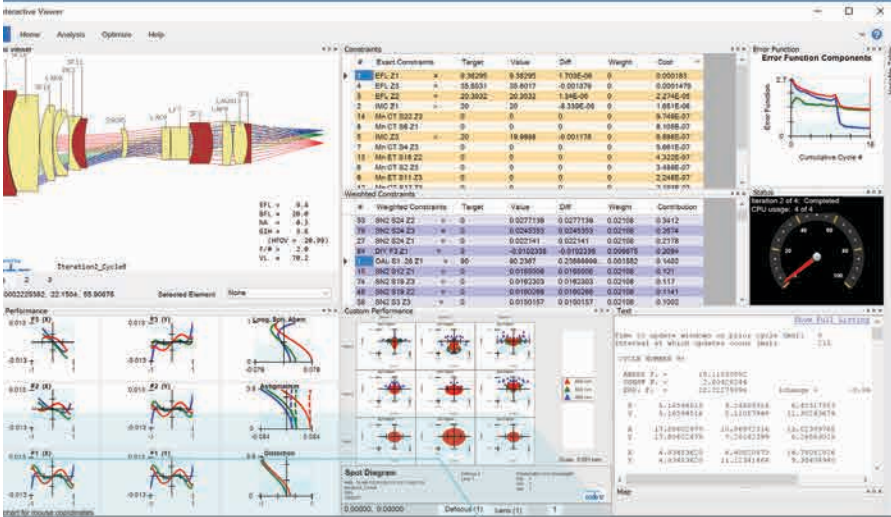
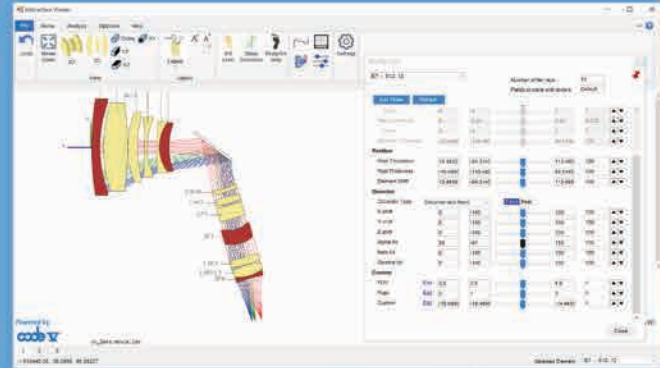


Connect: [k2\\_support@k2realm.com](mailto:k2_support@k2realm.com)

A Powerful Extension Plug-in for  
**CODE V Optical Design**

Your designs in half the time

# K2realm Extensions Pack



## 3D Viewer with Slider Controls



Use sliders to adjust any lens parameter with an interactive 3D experience

## Optimization Dashboard

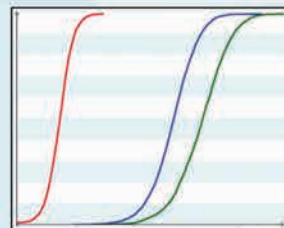


More efficient interaction with dashboard layout and auto-conversion from weighted to exact constraints

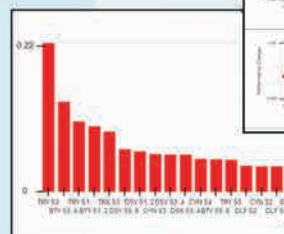
## K2realm LATEST RELEASE

Visualize the most sensitive tolerances with custom charts; run Monte Carlo 3X - 10X faster (per available cores).

- ✓ Multi-core Monte Carlo tolerancing
- ✓ Hour-long run-times reduced to minutes
- ✓ Tolerance listing data simplified in bar charts
- ✓ Customized layouts combine tolerances, fields, and zooms
- ✓ Improved command usage for Macro+ and Python scripts



## Multi-Core Tolerancing with Custom Charts & Graphs



Easily shows which tolerances have the largest impact per surface, field, and zoom. Tolerances are sorted in order to pick out the worst performers first.

## A Third-Party Software

Proudly serving the community of Synopsys' CODE V® optical design software engineers

## FREE TRIAL DOWNLOAD

SIGN UP FOR A 30-DAY TRIAL AT [K2REALM.COM](http://K2REALM.COM)  
Try K2realm's Extensions Pack with CODE V software for an enhanced user experience with modeling, analysis, and optimization capabilities.



# EXHIBITOR DIRECTORY

## NASA Technology Transfer Program

#525

NASA Marshall Space Flight Ctr, MC ST22, Huntsville, AL, 35812 (USA)  
+1 256 544 5608; fax +1 256 544 4810  
technology.nasa.gov

## Navitar Inc.

#416

**SPIE** Corporate Member

200 Commerce Dr, Rochester, NY, 14623-3506 (USA)  
+1 585 359 4000; fax +1 585 359 4999  
info@navitar.com; www.navitar.com

Navitar designs, develops, manufactures and markets precision optical solutions for a wide variety of industries including Biomedical & Life Sciences, Defense & Security, Industrial Imaging and Projection spanning from standard video to 4K planetarium lenses. Applications for Navitar optics include machine vision, automation, assembly, imaging, testing, measuring, metrology, biometrics, telecommunications, photonics R&D, non-contact measurement, simulation, planetarium, amusement, and more. Contact: Craig Fitzgerald, VP Business Development, craig.fitzgerald@navitar.com; Amy Block, Director of Marketing, amy.block@navitar.com

## Newport Corporation

#220

**SPIE** Corporate Member

1791 Deere Ave, Irvine, CA, 92606-4814 (USA)  
+1 949 863 3144; fax +1 949 253 1680  
sales@newport.com; www.newport.com

Newport is a brand within the MKS Instruments Light & Motion division. The Newport product portfolio consists of a full range of solutions including motion control, optical tables and vibration isolation systems, photonics instruments, optics and opto-mechanical components. Contact: Tom Miller, Senior Director of Sales, tom.miller@newport.com

## Nikon Glass Business Unit

#1220

1399 Shoreway Rd, Belmont, CA, 94002-4107 (USA)  
+1 650 454 7360; fax +1 650 508 4600  
Glass.Sales@nikon.com; www.nikon.com/products/glass

**Featured Product: Synthetic Silica Glass (NIFS Series), Calcium Fluoride (NICF Series), i-line Glass, Optical Glass.**

Nikon began research, development and production of optical glass materials in 1918. By leveraging this vast history of technology, Nikon produces industry-leading synthetic silica glass and calcium fluoride materials. As well as lenses for semiconductor lithography systems and optical components for many other demanding applications, Nikon's analysis and measurement services are also contributing to our customers' quality assurance needs in a variety of applications. Contact: Naoyasu Uehara, Sales and Marketing, naoyasu.uehara@nikon.com

## NIL Technology ApS

#130

Diplomvej 381, Kongens Lyngby, 2800 Denmark  
+45 5384 1774  
contact@nilt.com; www.nilt.com

**Featured Product: Masters for micro- and nanostructure replication.**

NIL Technology provide masters for replication of micro- and nanostructures. \*Masters are made with feature sized from below 20 nm and up to micrometers. \*Masters support replication by nanoimprint, hot embossing, UV-replication, roll printing and injection molding. \*Masters are made from silicon, glass, nickel, steel, polymers and polymer materials. \*Especially optical structures such as DOE, MLA, blazed-, slanted-, and binary gradings are supported. Contact: Theodor Nielsen, CEO, Theo@nilt.com

## NiPro Optics, Inc

#641

7 Marconi, Irvine, CA, 92618 (USA)  
+1 949 215 1151  
sales@niprooptics.com; www.niprooptics.com

**Featured Product: Diamond Turned Polygon Mirrors.**

NiPro Optics provides a full spectrum of precision manufacturing options to meet the demanding needs of your optical project. Our Southern California facility produces the highest quality electroformed optics available today, including "digital reflectors" from diamond turned tooling. Our Optical Diamond Turning Center manufactures complex geometries to submicron tolerances in a variety of materials. Contact: Robin Reed, General Manager, rob@niprooptics.com; Tom Gross, President, tom@niprooptics.com

## NKT Photonics Inc.

#435

**SPIE** Corporate Member

3514 N Vancouver Ave Ste 310, Portland, OR, 97227-2026 (USA)  
+1 503 444 8404; fax +1 503 914 1664  
sales-us@nktphotonics.com; www.nktphotonics.com

NKT Photonics is the leading supplier of high performance fiber lasers, fiber optic sensing systems, and photonic crystal fibers. Our main markets are within imaging, sensing and material processing. Our products include ultrafast lasers, supercontinuum white light lasers, low noise fiber lasers, distributed temperature sensing systems and a wide range of specialty fibers. NKT Photonics has its headquarters in Denmark with sales and service worldwide. Contact: Chris Campillo, Senior Sales Manager; Chris Meyers, Senior Sales Manager

## Novus Light Technologies Today

#116

PO Box 272574, Fort Collins, CO, 80527-2574 (USA)  
+1 970 672 1109  
info@novustoday.com; www.novuslight.com

**Featured Product: Novus Light Technologies Today is an online publication with daily photonics news and information.**

Novus Light Technologies Today is an online publication that offers expert commentary, industry perspective and vital on-line discussions on a comprehensive list of photonics subjects: Optics, Automation, Electronics, Lasers, MEMs/Nanotech, LEDs, Imaging and Machine Vision, Photovoltaics, Displays and Cameras. Contact: Ron Sherwood, Senior Account Manager, ron.sherwood@novustoday.com

## nPoint, Inc.

**SPIE** Corporate Member

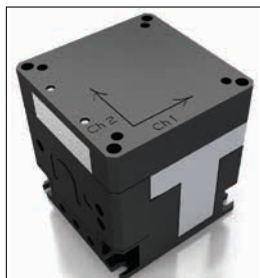
3030 Laura Ln Ste 100, Middleton, WI, 53562-1872 (USA)

+1 608 824 1770; fax +1 608 824 1774

info@npoint.com; www.npoint.com

**Featured Product: nPoint's nPCube provides 100 $\mu$ m of XYZ positioning for fast alignment applications.**

nPoint, Inc. designs & manufactures nano-positioning tools for OEM and research applications. Products include piezo-actuated flexure stages and digital control electronics. Nano-positioning systems provide closed-loop translation in the X, XY, XYZ and tip/tilt. Enables high-speed, high-resolution, sub-nanometer precision for optics, semiconductor, defense, aerospace and bio-industries. Contact: Katerina Moloni, VP Product Development, katerina.moloni@npoint.com; Tom Rocko, Sales Engineer, tom.rocko@npoint.com



**nPCube - 100 $\mu$ m range piezo stage with small footprint. Great for alignment applications.**

#311

## Ohara Corp.

**SPIE** Corporate Member

23141 Arroyo Vista Ste 200, Rancho Santa Margarita, CA, 92688-2613 (USA)

+1 949 858 5700

sales@oharacorp.com; www.oharacorp.com

Manufacturer of precision optical glasses: strip/slab, cut/molded blanks, high homogeneity blanks, fine gobs, polished ball lenses, near UV transmitting i-Line glass, glass ceramic substrates, CaF<sub>2</sub>, UV & IR materials, quartz, Fused Silica (standard and excimer grade). Ohara ClearCeram-Z ultralow expansion glass (excellent CTE uniformity; large sizes). NANOCERAM. Supplier of double side polished substrates (excellent flatness/low surface roughness). Contact: Brion Hoffman, President, brionhoffman@oharacorp.com; Chris Ghio, Director of Sales, chrisghio@oharacorp.com

#420

## NTFL

**SPIE** Corporate Member

13824 Magnolia Ave, Chino, CA, 91710-7027 (USA)

+1 909 591 0276; fax +1 909 902 1638

sales@newportlab.com; www.newportlab.com

**Featured Product: UV/VIS/IR Custom Thin Film Coatings.**

Newport Thin Film Laboratory, Inc. (NTFL) is a leading manufacturer of high performance thin film coatings. For more than four decades, custom thin film coatings produced by NTFL have contributed to engineering progress worldwide. NTFL is a fully equipped cleanroom coating facility specializing in the design and manufacture of vacuum deposited optical thin films. We have the capability to deposit high performance coatings on glass, metal, and polymer micro optics 1mm to larger optics 54" dia. Contact: Ever Mata, General Manager, emata@newportlab.com; P. Scott Powers, President, pspowers@newportlab.com

#335

## Omega Optical Filters

#540

21 Omega Dr, Brattleboro, VT, 05301-4444 (USA)

+1 802 251 7300

sales@omegafilters.com; www.omegafilters.com

**Featured Product: Linear Variable Filters, Ultra Narrow Band Filters down to 1 Å, Hydrophobic Coatings.**

ISO 9001, ITAR Registered and SBA member; Omega designs and produces the most diverse offering of interference filters in the industry. Whether your application is Space, Industrial, Aerospace, Defense or Machine Vision, we have the solution you need. We bring a corporate commitment to understand and refine your filter needs. This support originates with our team of Scientists, Engineers, & Industry experts. Our goal: to assure the most appropriate solution will be provided to our customer. Contact: Tina Hoppock, thoppock@omegafilters.com

## OEG GmbH

Wildbahn 8i, Frankfurt, 15236 Germany

+49 335 5213894; fax +49 335 5213896

sales@oeggmbh.com; www.oeggmbh.com



**Featured Product: OEG OTS 200 / OTS 500 Optical Test Stations for single lenses and optical systems.**

Located in Germany, OEG offers a comprehensive line of optical test equipment including: optical centering stations for placing lens elements in sub cells and building doublets, complete lens measurement stations for characterizing alignments and 1st order parameters and MTF stations for characterizing the performance of imaging systems. Systems can be custom tailored for your specific needs. Contact: Frank DeWitt, f.dewitt@oeggmbh.com

**OEG OTS 200 with Lens Test - Optics Test Station for single lenses and optical systems**

#512

## Ophir-Spiricon

#220

3050 N 300 W, Ophir Photonics Group, North Logan, UT, 84341 (USA)

+1 435 753 3729; fax +1 435 753 5231

sales@us.ophir-opt.com; www.ophiropt.com/laser-measurement

Ophir is a brand within the MKS Instruments Light & Motion division. The Ophir product portfolio consists of laser and LED measurement products including power and energy meters and beam profilers, as well as high-performance IR thermal imaging lenses and optics for CO<sub>2</sub> and fiber high-power laser applications. Contact: Kenneth Ferree, Director of Sales, kenneth.ferree@usophiropt.com

## Optical Perspectives Group, LLC

#122

7011 E Calle Tolosa, Tucson, AZ, 85750-2532 (USA)

+1 520 529 2950

reparks@optiper.com; www.optiper.com

**Featured Product: CaliBall Float, an automatic rotation system for random ball test calibration with the CaliBall.**

Optical Perspectives Group is an opto-mechanical engineering consulting company with expertise in the practical, hardware side of optics. OPG can help with issues such as test and inspection of components as well as alignment and assembly of optical systems. In addition, OPG sells the Point Source Microscope (PSM), an autostigmatic microscope that aids in optical system alignment and CaliBall, an interferometer calibration artifact that is easier to use than other methods of calibration. Contact: Bob Parks, President, reparks@optiper.com

# EXHIBITOR DIRECTORY

## optics.org

#610

2 Alexandra Gate, Ffordd Pengam, Cardiff, CF24 2SA United Kingdom

+44 29 2089 4747; fax +44 29 2089 4750

sales@optics.org; www.optics.org

optics.org is the leading online resource for professionals working and using photonics in application. optics.org delivers the latest photonics business news, market trends and product applications. You can also find the latest photonics jobs, events and a comprehensive buyers guide. With thousands of users visiting the site every month it is an effective place to find news and get your products to market. Contact: Rob Fisher, Head of Sales & Marketing, rob.fisher@optics.org

## Optiforms, Inc.

#411

**SPIE** Corporate Member

42310 Winchester Rd, Temecula, CA, 92590-4810 (USA)

+1 951 296 1300; fax +1 951 296 1178

marketing@optiforms.com; www.optiforms.com

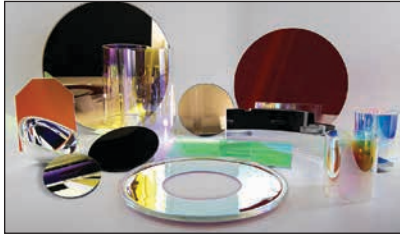
### Featured Product: Electroformed optics & deep-dish optical coatings.

Leading supplier of precision metal components and reflective surface finishes in the Photonics, Defense, Medical and Commercial industries. ELECTROFORMED OPTICS: Elliptical, Parabolic, Spherical, Off-Axis Parabolic (OAP) Reflectors, Compound Parabolic Concentrators (CPC), Condensers, Light Tubes, Troughs, custom substrates; OPTICAL COATINGS: PVD Metalized Coatings: Au, Ag, Al; Filters: Covert, IR, Band Pass; Cold/Hot Mirrors; Dielectric Platings: Rh, Au, Ni, C; 5-AXIS

MACHINING ISO 9001:

2015 Contact: Natalie Pastuszka, Optical Engineer, npastuszka@optiforms.com; Rob Brunson, VP Sales & Marketing, rbrunson@optiforms.com

**Leading manufacturer of precision metal components & reflective surface finishes**



## Optik +

#715

Leiferder Weg 44a, Braunschweig, Niedersachsen, 38122 Germany

+49 531 2379497; fax +49 531 2379601

info@optik-plus.de; www.optik-plus.de

### Featured Product: Precision spherical and aspherical lenses, optical prisms, windows, mirrors, filters, laseroptics.

The company of Optik+ specializes in manufacturing of precision spherical lenses in a range of 2-200mm made from all kinds of optical materials and crystals. We also manufacturing plan flats in a range from 5-300mm with flatness up to  $\lambda/20$ . Both product lines we can offer with a surface roughness of less than  $<0,2\text{nm}$ . We also offer a large area of prisms which we can customize with the highest level of accuracy. Contact: Michael Sandelmann, Owner, info@optik-plus.de; Yannik Sandelmann, Head of Department Machining Fine Optics, y.sandelmann@optik-plus.de

## Optikos Corporation

#324

**SPIE** Corporate Member

107 Audubon Rd, Bldg 3, Wakefield, MA, 01880 (USA)

+1 617 354 7557; fax +1 617 354 5946

sales@optikos.com; www.optikos.com

### Featured Product: Meridian® Camera Testing.

The Optical Engineering Experts®--Optikos develops and manufactures standard and custom metrology products for measuring lenses, camera systems and ophthalmic components; and offers in-house IQ Lab™ testing and qualification services. Our engineering teams provide expert design and manufacturing for optically-based product development in any industry or application, including medical devices and diagnostics,

aerospace and defense, automotive and consumer electronics. Contact: George Meyer, Key Account Manager, gmeyer@optikos.com; Jim Scott, Key Account Manager, jscott@optikos.com



**Meridian Camera Testing products generate fields of virtual objects in a compact space.**

### SPONSOR

## Optimax Systems, Inc.

#532

**SPIE** Corporate Member

6367 Dean Pkwy, Ontario, NY, 14519-8939 (USA)

+1 585 265 1020; fax +1 585 265 1033

sales@optimaxsi.com; www.optimaxsi.com

### Featured Product: Optics for High Power: precision optics with superior coatings for Directed Energy, DUV and HEL

Optimax makes laser optics for demanding applications – aspheres, cylinders, prisms, spheres, and freeforms. While remaining committed to small volume, high quality, and quick delivery, we support many prototype and research projects each year. We enjoy a good challenge – how can we help you? Contact: Joe Spilman, Director of Sales & Marketing, sales@optimaxsi.com



## OptiPro Systems

#526

**SPIE** Corporate Member

6368 Dean Pkwy, Ontario, NY, 14519-8970 (USA)  
+1 585 265 0160; fax +1 585 265 9416  
sales@optipro.com; www.optipro.com

**Featured Product: PZX Prism Machine: The latest technology to efficiently machine prisms with precise compound angles.**

OptiPro Systems, located in Rochester, NY, has over 35 years of experience designing and manufacturing precision optical fabrication machines and metrology systems. OptiPro develops cutting edge machines for a variety of precision optics, including spheres, aspheres, freeforms, aspheric cylinders, torics, and more. These solutions are designed to yield prototype to high volume production of parts manufactured from a range of materials including optical glasses, ceramics, crystals, and alloys. Contact: Mike Bechtold, President, mike@optipro.com; Ron Colavecchia, Director of Optics Technology, rcolavecchia@optipro.com



**PZX Prism Machine: The latest technology to efficiently machine prisms with precise compound angles.**

**SPONSOR**

## OptoSigma Corp.

#511

**SPIE** Corporate Member

3210 S Croddy Way, Santa Ana, CA, 92704 (USA)  
+1 949 851 5881; fax +1 949 851 5058  
sales@optosigma.com; www.optosigma.com

**Featured Product: Optics, Opto-Mechanics, Optical Coatings, Inspection Systems, Optical Tables, Objectives, Stages.**

OptoSigma is a leader in thin film coatings, opto-mechanics, manual and motorized positioning components and optical components for more than 20 years. We're committed to providing unrivalled service and engineering insight for our customers. Our global manufacturing prowess enables us to offer the best selection from stock while handling custom orders of all types and quantities. Discover why thousands of customers worldwide rely on OptoSigma as their first source for optics and hardware. Contact:

Dan Denison, Sales Manager, sales@optosigma.com



**OUCI - High value imaging and inspection unit. Incorporate Objective, Light Source and Camera.**

## Osela Inc.

#325

**SPIE** Corporate Member

1869 32nd Ave, Lachine, QC, H8T 3J1 Canada  
+1 514 631 2227; fax +1 514 631 2462  
info@osela.com; www.osela.com

Osela is a specialized manufacturer of laser illumination systems and structured lighting for industrial applications in machine vision, life sciences and research. With an experienced and skilled staff knowledgeable in the area of beam shaping optics and lasers allows us to continually innovate our product portfolio offering to our customers. Based on our standard platform and our expertise, we offer very competitive customized solution specific to the needs of our customers. Contact: Tony Marzilli, Sales Manager, tmarzilli@osela.com; Dillon Varusha, Sales, dvarusha@osela.com

**SPONSOR**

## OZ Optics Ltd.

#313

**SPIE** Corporate Member

219 Westbrook Rd, W Carleton Industrial Park, Ottawa, ON, K0A 1L0 Canada  
+1 613 831 0981; fax +1 613 836 5089  
sales@ozoptics.com; www.ozoptics.com

**Featured Product: Online Catalog.**

High Power Components/Isolators/Combiners/Patchcords/Connectors/ Intelligent Tunable Laser Diode Sources/Safety Interlocks/Shutters/ Optical Coatings, Laser to Fiber Delivery Components, Adjustable Collimators/Focusers, PM/SM/MM Fused Fiber Couplers, PM Patchcords/ Connectors/Splitters/Switch, Polarized Sources, Polarization Rotators/ Controllers/Analyzers, Polarizers, PDL Emulators, Extinction Ratio Meter, Turnkey Laser Diode Sources, Hermetically Sealable Patchcords, Fiber Optic Sensors OZ-PEN. Contact: Omur Sezerman, CEO & President, sales@ozoptics.com

## Pacific Laser Equipment

#722

**SPIE** Corporate Member

17602 17th St Ste 102-182, Tustin, CA, 92780-7915 (USA)  
+1 714 809 5588  
contact@plequipment.com; www.plequipment.com

## PerkinElmer, Inc.

#432

940 Winter St, Waltham, MA, 02451 (USA)  
+1 203 925 4602; fax +1 203 944 4904  
ehvents@perkinelmer.com; www.perkinelmer.com



# PRISM<sup>20</sup> AWARDS<sup>19</sup>

# Call for Entries

**Enter the international competition that recognizes the most innovative new products in optics and photonics.**

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Online application is open from June 2018–October 2018

## PHASICS Corp.

#1214

**SPIE**.<sup>Corporate</sup>  
Member

600 California St, 11th Fl, San Francisco, CA, 94108 (USA)  
+1 415 610 9741

contact@phasics.com; www.phasicscorp.com

**Featured Product: KaleoMultiWAVE measure wavefront error (TWE/RWE) of coated or uncoated optics with high dynamic.**

Phasics offers high resolution wavefront sensors (up to 120 000 phase pixels) from 193nm to 14µm. Their patented technology ensures both accurate measurement and ease of use. In laser facilities, a single instrument covers beam test, adaptive optics with any deformable mirror and plasma diagnosis. For lens metrology, it provides off-axis MTF and aberrations at several wavelengths on a same easy-to-align bench. Contact: Yoann Priol, Sales manager US, priol@phasics.com; Valentin



Genuer, Sales engineer Biology, genuer@phasics.com

**KaleoMultiWAVE TWE/RWE of filters and coated optics at multiple wavelengths with a single instrument**

## SPONSOR

## Photon Engineering LLC

#321

**SPIE**.<sup>Corporate</sup>  
Member

310 S Williams Blvd No. 222, Tucson, AZ, 85711 (USA)  
+1 520 733 9557

info@photonengr.com; www.photonengr.com

**Featured Product: FRED Optical Engineering software.**

Photon Engineering, LLC is a consulting and software development firm based in Tucson, Arizona. Photon Engineering develops and markets FRED, the premier proven software to solve today's challenging optical engineering problems. Users working within FRED's 3D virtual prototyping CAD environment can model and analyze virtually any optomechanical system containing arbitrary coherent, incoherent, and partially coherent sources. Engineering consulting and short courses are offered worldwide. Contact: Donata Pfisterer, Sales, donatap@photonengr.com; Patrick McNenny, VP Engineering Services, patrickm@photonengr.com

## Photonic Cleaning Technologies

#521

**SPIE**.<sup>Corporate</sup>  
Member

1895 Short Ln, Bldg 1, Platteville, WI, 53818-8977 (USA)  
+1 608 467 5396; fax +1 608 467 5397

sales@photoniccleaning.com; www.photoniccleaning.com

**Featured Product: First Contact Polymers™. Only no-residue strip coat available to clean & protect sensitive surfaces.**

Manufacturer of First Contact Polymers™. THE Cleaning and Protection System. Apply liquid polymer and peel the dried film leaving the surface nearly atomically clean. Independent XPS/ESCA and Laser Damage Threshold testing shows no residue to the molecular level! Safe with high power laser optics. Remove Dust & Fingerprints. Reduce waste: non-toxic inert polymers. Clean Nanostructures, Gratings & Phase Masks! Protect and clean microscope objectives & CCD Sensors. Safe. Low Adhesion. No residue. Contact: David Giesen, Operations and Manufacturing Manager, davidg@photoniccleaning.com; James Hamilton, CTO, hamiltonj@photoniccleaning.com

## Photonics Online #106

2009 Mackenzie Way Ste 280, Cranberry Township, PA, 16066 (USA)  
+1 724 940 7555; fax +1 724 940 7707  
info@photonicsonline.com; www.photonicsonline.com

### Featured Product: Online Resource For Photonics Professionals.

At Photonics Online, our goal is to keep our readers apprised of the various innovative applications of light. These applications range from high-level scientific endeavors — such as the detection of gravitational waves and the newest advancements in quantum systems — to more commercially applicable topics, such as advancement in solar cell technology, scientific cameras for research and development, and sensors for integration into automobiles and other platforms. Contact: Ed Biller, Editor, ebiller@vertmarkets.com; Nathan Miller, Account Executive, nmiller@vertmarkets.com

## Photonics Spectra, a Photonics Media Publication #315

**SPIE** Corporate Member  
100 West Street, 2nd Floor, Pittsfield, MA, 01201 (USA)  
+1 413 499 0514; fax +1 413 442 3180  
info@photonics.com; www.photonics.com

### Featured Product: Photonics Spectra magazine defines the science and industry of photonics.

Photonics Media brings you the latest research, product information, and business news for the entire photonics industry. Our extensive resources include four magazines - Photonics Spectra, BioPhotonics, Industrial Photonics and EuroPhotonics - available in print and digital; the Photonics Buyer's Guide - available in print and online; e-newsletters; webinars; and our website. Visit www.photonics.com for more information and to subscribe for FREE. Contact: Kim Abair, Account Manager, kim.abair@photonics.com; Michael Wheeler, Managing Editor, michael.wheeler@photonics.com



*For over 50 years, Photonics Spectra magazine has covered the science and industry of photonics.*

## Physics Today #124

One Physics Ellipse, College Park, MD, 20740-3843 (USA)  
+1 301 209 3100  
ptpub@aip.org; physicstoday.org

### Featured Product: Physics Today Magazine.

Physics Today is the most influential and closely followed physics magazine in the world. Join the community of more than 120,000 scientists and engineers engaging with the content every month. A subscription is just \$25/year at www.physicstoday.org/subscribe.

## PI (Physik Instrumente) L.P. #428

**SPIE** Corporate Member  
16 Albert St, Piezo Nano Positioning, Auburn, MA, 01501-1304 (USA)  
+1 508 832 3456; fax +1 508 832 0506  
info@pi-usa.us; www.pi-usa.us

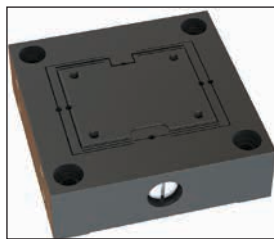
ISO-9001-Certified, Global Leader in Precision Motion Solutions. Piezo Mechanisms, Air Bearings, Hexapods, Photonics Alignment, Nanopositioning, Micropositioning, Piezo Positioning Systems, Linear Motors & Rotary Stages for OEM & Research. Products: Nanopositioning Systems; 6-Axis Hexapod Alignment Systems, Microscopy Stages; Lens Positioners; Tip/Tilt Mirrors; Piezo Transducers, Piezo Actuators; Piezo Motors, Piezo Drivers & Digital Motion Controllers; Voice Coil Actuators, MicroMotion Robots. Contact: Sales Dept, info@pi-usa.us

## PIEZOCONCEPT #534

**SPIE** Corporate Member  
15 rue du Bocage, Lyon, 69008 France  
+33 4 78 74 24 56  
info@piezoconcept.com; www.piezoconcept.com

### Featured Product: Picometric noise floor nanopositioner.

PIEZOCONCEPT is the leading provider of nanopositioners dedicated to applications such as Super Resolution and Atomic Force Microscopy. We developed a range of ultra-stable nanopositioner able to meet a wide range of microscopy applications with significant advantages over the



currently available nanopositioners. As one of our biggest advantages, the sensor we use outperforms high-end capacitive sensor because of their exceptionally high signal, leading to picometric noise floor. Contact: Samuel Choblet, Managing Director, info@piezoconcept.com

**The SLR300 : a very compact piezostage with 300µm travel range and subnanometric resolution**

## PiezoElectric Technology Co., Ltd. #523

Bonghwasan-ro 123, Jungnang-gu, #501 Sinnae Technotown, Seoul, 02048 Korea, Republic of  
+82 2 3421 0370; fax +82 31 572 0373  
www.piezo-tech.com

## piezosystem jena, Inc. #417

**SPIE** Corporate Member  
2B Rosenfeld Dr, Hopedale, MA, 01747 (USA)  
+1 508 634 6688; fax +1 508 634 6868  
usa@piezोजना.com; www.piezosystem.com

### Featured Product: Digital Piezo Controller: d-Drive Pro 24bit resolution, 3 channel amp with 120 mA continuous current.

Piezosystem jena for 20+ years has provided high precision nanopositioning solutions in up to 5 axis of travel. X, XY, XYZ, tip/tilt positioning with sub-nm resolution can be achieved, with high resonant frequencies which allow for fast scanning. Using a closed loop feedback we can eliminate any hysteresis and drift. Complete digital systems are also readily available with micro manager and labview drivers. A leader for Research & OEM solutions. Contact: Peter Viglas, Sales Manager, pviglas@piezोजना.com



# EXHIBITOR DIRECTORY

## Precision Glass & Optics

#621

**SPIE** Corporate Member

3600 W Moore Ave, Santa Ana, CA, 92704-6835 (USA)  
+1 714 540 0126; fax +1 714 540 1482  
info@pgo.com; www.pgo.com

**Featured Product: Precision optics, thin-film coatings, extensive glass inventory provide advanced optical solutions.**

PG&O delivers high-quality, cost-effective precision glass, reliable optics & advanced optical coatings for biomed, mil/aero, imaging, scanning, lasers, avionics & more. Celebrating its 33rd year, the company has an extremely large inventory of glass substrates, expert engineering staff, and a full optical fabrication shop to provide superior optical coatings and to



manufacture large mirror blanks. Other services include CNC machining/polishing/slicing/sawing/scribing/grinding/edging & assembly. Contact: Dan Bukaty, Jr., President, danjr@pgo.com

**Precision optics, thin-film coatings, extensive glass inventory provide advanced optical solutions.**

## Precision Optical

#517

**SPIE** Corporate Member

320 Kalmus Dr, Costa Mesa, CA, 92626-6045 (USA)  
+1 949 631 6800; fax +1 949 642 7501  
sales@precisionoptical.com; www.precisionoptical.com

**Featured Product: Custom Prisms, Large Optical Window/Mirrors, Corner Cube Retroreflector, Porro Prism, Alignment Cube.**

Precision Optical offers a diverse portfolio of capabilities for production of precision optical components. With reliable, efficient strategies for manufacturing many different prism shapes, sizes, materials, thin film coatings and assemblies, prototype to production. The company's success has been our commitment to expanding capabilities in all areas of optical component fabrication, giving Precision Optical unsurpassed process control and flexibility in responding to our customer requirements. Contact: Jeremy Gordon, Vice President of Sales & Marketing, jgordon@precisionoptical.com; James McClure, Sales Manager, jmcclure@precisionoptical.com

## Prior Scientific Inc.

#738

**SPIE** Corporate Member

80 Reservoir Park Dr, Rockland, MA, 02370-1062 (USA)  
+1 781 878 8442; fax +1 781 878 8736  
info@prior.com; www.prior.com

**Featured Product: PureFocus 850 Laser Autofocus System.**

Prior Scientific manufactures precision electro-mechanical and optical components and systems. With a variety of micro- and nano-positioning products, we can customize solutions to meet your exact needs. We make high-speed Piezo stages, linear motor stages, laser autofocus systems, filter cube changers, motorized nosepieces, micromanipulators and custom microscope stands. We specialize in OEM components and assemblies and design/prototype at reasonable costs with a long-term partnership goal! Contact: John Comnesso, Marketing Manager, jcomnesso@prior.com

## Quartus Engineering Inc.

#617

**SPIE** Corporate Member

9689 Towne Centre Dr, San Diego, CA, 92121-1964 (USA)  
+1 858 875 6000; fax +1 858 875 6001  
sales@quartus.com; www.quartus.com

Quartus Engineering is a complete engineering solutions provider with core competencies in optical/opto-mechanical design, thermal management solutions, holographic elements and system hardware integration. Quartus can provide complete system design, address specific design/analysis needs, or integrate with a team to provide increased capabilities or bandwidth. Support is available from our industry leading finite element analysis team, including STOP analysis (Structural, Thermal and Optical).

## Rainbow Research Optics, Inc.

#623

**SPIE** Corporate Member

6830 S Dawson Cir, Centennial, CO, 80112-4208 (USA)  
+1 303 371 3000  
sales@rr-optics.com; www.rr-optics.com

**Featured Product: Custom Optics and Coatings.**

Rainbow Research Optics is a custom optics manufacturer in Denver, Colorado. We manufacture optics and coating from customer supplied designs and drawings. Please contact us for a quote on your desired optics. We are ITAR registered and ISO 9001:2015 Certified. We will quote quantities from 1 through 20,000. Our 30,000 sq. ft. facility and 65 employees are standing by to assist you with every aspect of your optical component and assembly needs. Contact: Eli Bruner, Sales Manager, e.bruner@rr-optics.com; Mark Chan, Sales Engineer, m.chan@rr-optics.com

## Rigaku Innovative Technologies, Inc.

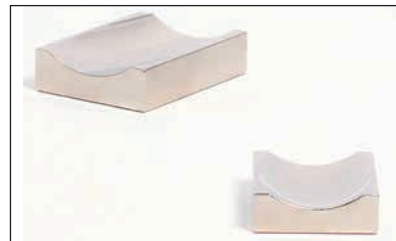
#615

**SPIE** Corporate Member

1900 Taylor Rd, Auburn Hills, MI, 48326-1740 (USA)  
+1 248 232 6400; fax +1 248 232 6500  
optics@rigaku.com; www.RigakuOptics.com

**Featured Product: High Performance Thin Film Coatings and Optics for EUV and X-ray Wavelengths.**

Rigaku Innovative Technologies (RIT) is a global supplier of high performance thin film coatings and optics used in commercial and academic institutions and government research facilities. RIT's state of the art coating facility and dedicated metrology equipment ensures the highest quality. RIT utilizes its staff of 10 PhD Scientists and 10 Engineers with over 250 years combined experience to provide the customer with the best solution to their coating and optics needs. Contact: Alex Sedlacek, Sales Engineer, alex.sedlacek@rigaku.com



**EUV through Hard X-ray multilayers, supermirrors, single films & optics; precision to  $\pm 0.005$  nm.**

## Riverhawk Company

#639

215 Clinton Rd, New Hartford, NY, 13413 (USA)  
+1 315 768 4855  
info@riverhawk.com; www.flexpivots.com

**Featured Product: Flex Pivot - A limited rotation bearing that has infinite life and requires no lubrication.**

Riverhawk Company is a custom design engineering firm that focuses on solving customers problems. We design and manufacture the Free-Flex® Pivot. It is a simply packaged, compact, and easily installed limited rotation bearing with predictable and repeatable performance. This patented pivot fills the need that standard lubricated bearings cannot meet. It is a unique bearing concept for applications with limited angular travel of up to 60° (+/- 30°) rotation. Contact: Shaun LaPolla, Business Development, shaun.lapolla@riverhawk.com

## Rochester Precision Optics, LLC

#542

**SPIE** Corporate Member

850 John St, West Henrietta, NY, 14586-9748 (USA)  
+1 585 292 5450; fax +1 585 292 5459  
bd@rpooptics.com; www.rpooptics.com

**Featured Product: Design & Engineering, High Volume Manufacturing, Precision Molding, Glass & Plastic, Visible & IR.**

Rochester Precision Optics (RPO) specializes in high volume production of precision glass molded lenses & aspheres, advanced polymer lens molding, IR optics and the design & engineering of precision optical, optomechanical and electro-optical assemblies and sub-systems. Formerly known as Kodak Optical Imaging Systems, Rochester Precision Optics serves Defense, Consumer Electronics, Industrial, Health & Life Sciences markets with complete optical design and manufacturing services. Contact: Joseph D'Ambrosia, Director of Marketing, jdambrosia@rpooptics.com; Elizabeth Bubacz, Marketing Coordinator, ebubacz@rpooptics.com

## RPMC Lasers, Inc.

#633

**SPIE** Corporate Member

203 Joseph St, O Fallon, MO, 63366-2614 (USA)  
+1 636 272 7227  
info@rpmclasers.com; www.rpmclasers.com

**Featured Product: Diode Lasers, Modules, Solid State / Fiber Lasers and Amplifiers, the Best Lasers at a Fair Price!**

RPMC Lasers Inc (Incorporated in 1996) is the leading laser distributor in North America. We offer diode lasers, laser modules, solid state lasers and amplifiers, fiber lasers and amplifiers, and laser power measurement sensors and meters. We also offer custom solid-state lasers and laser diode subsystems. Our goal is to provide high quality technical advice with an in-depth knowledge of the products we offer at an attractive value proposition, the best laser at a fair price. Contact: Dean Micke, President, dean@rpmclasers.com

## Ruda-Cardinal, Inc.

#104

**SPIE** Corporate Member

3280 E Hemisphere Loop Ste 180, Tucson, AZ, 85706 (USA)  
+1 520 546 1495; fax +1 520 546 1481  
accounting@ruda.com; ruda.com

## Safran Reosc

#126

ave de la Tour Maury, St Pierre du Perray, 91280 France  
+33 1 69 89 72 00  
www.safran-reosc.com

**Featured Product: Safran Reosc provides high-performance optics for astronomy, space, high energy laser and industry.**

Our products and services meet the most demanding requirements of major research institutes and international scientific programs. We manufacture all types of optical components (lenses, aspherical mirrors, freeforms, etc.) and subassemblies, based on either customer specifications or drawings. Safran Reosc offers a complete range of



innovative high-performance optics and high-precision opto-mechanical equipment. Contact: Vinod Ravindran, Sales Manager, vinod.ravindran@safrangroup.com; Luc Thepaut, Sales VP, luc.thepaut@safrangroup.com

**Safran Reosc provides high-performance optics for astronomy, space, high energy laser and industry.**

## SCHOTT North America, Inc.

#533

**SPIE** Corporate Member

400 York Ave, Duryea, PA, 18642-2036 (USA)  
+1 570 457 7485 x300  
info.optics@us.schott.com; www.us.schott.com

SCHOTT Advanced Optics, with its deep technological expertise, is a valuable partner for its customers in developing products and customized solutions for applications in optics, lithography, astronomy, opto-electronics, architecture, life sciences, and research. With a product



portfolio of more than 120 optical glasses, special materials and components, we master the value chain: from customized glass development to high-precision optical product finishing and metrology. Contact: David Schimmel, Marketing Manager, david.schimmel@us.schott.com

**SCHOTT IRG glasses - now available in sizes up to 200 mm in diameter**

## Schrodinger, LLC

#740

120 W 45th St, 17th Floor, New York, NY, 10036-4041 (USA)  
+1 212 295 5800  
info@schrodinger.com; www.schrodinger.com

**Featured Product: Materials Science Suite.**

Schrödinger is a leading provider of advanced molecular simulations and enterprise software solutions and services for its clients, which include all major pharmaceutical and biotechnology companies worldwide, as well as leading materials science researchers. Schrödinger also establishes deep partnerships and collaborations with companies in such fields as biotechnology, pharmaceuticals, chemicals, and electronics. Founded in 1990, Schrödinger has nearly 400 employees worldwide.

# EXHIBITOR DIRECTORY

## SCI Engineered Materials

#426

2839 Charter St, Columbus, OH, 43228 (USA)  
+1 614 486 0261; fax +1 614 486 0912

sales@targetmaterials.com; www.sciengineeredmaterials.com

SCI Engineered Materials is a global supplier and manufacturer of advanced materials for PVD Thin Film applications. Through partnerships with end users and OEM's, SCI develops innovative and customized solutions enabling commercial success. We serve the Optic, Photonic,



Solar, Media Storage, Photovoltaic and Display Applications, Semiconductor and Thin Film Battery Industries. Contact: Eric Massey, Sales Rep., emassey@sciengineeredmaterials.com

**Zinc Sulfide (ZnS) Evaporation Pieces**

## scia Systems GmbH

#636

**SPiE** Corporate Member

Annaberger Str 240, Chemnitz, Saxony, 09125 Germany  
+49 371 5347 780; fax +49 371 5347 781

info@scia-systems.com; www.scia-systems.com

**Featured Product: scia Coat 200/500 for homogeneous multilayers and scia Cube 750 for large area structuring/coating.**

scia Systems manufactures advanced ion beam and plasma processing equipment, for the production of microelectronics, MEMS and precision optical components, in both, high volume production as well as in research and development environments. scia Systems provides highly reliable tools together with a superior technology support. Due to their flexible and modular design, several vacuum process chambers can be combined into cluster or in-line solutions, according to customer-specific requirements. Contact: Marcel Demmler, Sales Director, sales@scia-systems.com

## SCIL Nanoimprint Solutions

#638

De Lismortel 31, Eindhoven, 5612 AR Netherlands  
+316 510 87938

rob.voorkamp@philips.com; www.philips.com/scil-nanoimprint

**Featured Product: Nanoimprint lithography equipment, consumable materials and processes for nanophotonics.**

Substrate Conformal Imprint Lithography (SCIL) is a cost effective, robust, high yield process enabling nanometer resolution patterns on a large variety of materials. It can be used to make high quality structures on wafer areas up to 200 mm with feature sizes down to less than 10 nm and overlay alignment down to 1µm. We help customers with optimized equipment, consumable materials and processes for high volume production. Contact: Rob Voorkamp, General Manager, rob.voorkamp@philips.com; Marc Verschuuren, R&D manager, marc.verschuuren@philips.com

## Shenzhen Youqin Electronics Co., Ltd.

#327

11B, Block A, Yuehai Bldg, Nanhai Blvd, Nanshan District, Shenzhen, Guangdong, 518054 China

+86 755 2664 8283; fax +86 755 2664 8236  
sales@fully-hong.com; www.fully-hong.com

## Shimadzu Corp.

#538

1-3 Kanda Nishiki-cho, Device Department, Chiyoda-ku, Tokyo, 101-8448 Japan

+81 3 3219 5797; fax +81 3 3219 5567

sensor@group.shimadzu.co.jp; www.shimadzu.com

**Featured Product: Refractometer, Monochromator, Diffraction Grating, Laser Mirror.**

For 142 years, Shimadzu Corporation has been providing society with high technology products used for analytical instruments, medical systems, and aircraft equipment under the corporate philosophy of "Contributing to Society through Science and Technology". Its optical device department manufactures Refractometer, Monochromator, Spectro Sensor, various types of Lasers (Fiber-coupled Blue Direct Diode Laser, RGB Laser Module etc.), Diffraction Gratings, Laser mirrors, for many applications. Contact: Yoshifumi Yoshioka, OEM Account Manager, yoshi@spi-sie.com; Masamura Kawada, Assistant Manager, mkawada@shimadzu.co.jp



**Shimadzu has released the KPR-300 Kalnew precision refractometer, using the V-block method.**

## Sierra Precision Optics

#1218

**SPiE** Corporate Member

12830 Earhart Ave, Auburn, CA, 95602-9027 (USA)  
+1 530 885 6979; fax +1 530 885 1037

sales@sierraoptics.com; www.sierraoptics.com

Flatwork-Plano Optics (Filters, Panels, Windows, Mirrors, Beam Splitters, Wedges and Prisms) Spherical Lens and Cylindrical Lens. Our specialties include Cylindrical Optics UV, VIS, IR. IR Laser Components, Laser Flow Tubes and Custom Shaped Optics.

## Siskiyou Corporation

#716

**SPiE** Corporate Member

110 SW Booth St, Grants Pass, OR, 97526-2410 (USA)  
+1 541 479 8697; fax +1 541 479 3314

reception@siskiyou.com; www.siskiyou.com

Siskiyou Corporation manufactures motion control devices with manual and computer interfaced controllers, translation stages, mirror mounts, lens positioners, adjustment screws, construction hardware, fiber grippers and other opto-mechanical components for use in research and manufacturing. Siskiyou Corporation will also custom tailor devices to fit your needs. Contact: Theeya Howell, Tradeshow Event Coordinator, reception@siskiyou.com



## SmarAct Inc.

SPIE Corporate Member

2140 Shattuck Ave Ste 1103, Berkeley, CA, 94704 (USA)

+1 415 766 9006

info-us@smaract.com; www.smaract.com

SmarAct is a fast-growing and innovative company, specialized in the development and production of customizable micro- and nano-positioning systems. The broad portfolio, from single stages to miniaturized robots and easy-to-use control systems, is completed by sophisticated metrology based on our powerful laser interferometer. With our in-house production, we can ensure an outstanding level of product quality and flexibility. We are ready to help you find the best solution for your projects. Contact:

Jorge Miguel, CEO,  
info-us@smaract.com



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*picometer precision metrology tool for displacement sensing and vibrometry*

#524

## Software Spectra, Inc.

14025 NW Harvest Ln, Portland, OR, 97229-3645 (USA)

+1 800 832 2524; fax +1 503 690 8159

staff@sspectra.com; www.sspectra.com

**Featured Product: TFCalc Thin Film Design Software.**

Software Spectra produces software for the design and manufacture of optical thin film coatings. Only Software Spectra offers you software for designing and manufacturing optical thin film coatings that won't require you to take a class or hire an expert to use. Our product TFCalc™ lets you design coatings for lenses, computer monitors, eyeglasses, windowpanes, light bulbs, hot and cold mirrors, x-rays mirrors, and more for an affordable price. Contact: Tony Noe, President, noe@sspectra.com

#712

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## Solid Sealing Technology, Inc. #413

44 Dalliba Ave, Watervliet, NY, 12189 (USA)  
+1 518 874 3600; fax +1 518 874 3610  
info@solidsealing.com; www.solidsealing.com

### Featured Product: New Hermetic Fiber Optic Adapters and Multichannel Connectors with mating connectors and plugs.

Solid Sealing Technology, Inc specializes in the design and manufacture of hermetic products using metalizing and brazing, glass-ceramic sealing, and welding. Products include: New Fiber Optic Adapters and Connectors, Feedthroughs, Coaxial, Thermocouple and Multi-pin Connectors, Isolators, and custom assemblies ideal for demanding applications including high



temperature, ultra-high vacuum, and high pressure environments for Semiconductor, Coatings, Lasers, Medical, and many other markets. Contact: Renee Nichols, Marketing Manager, rnichols@solidsealing.com; Alan Fuierer, COO, afuierer@solidsealing.com

### Fiber Optic Hermetic Products

## son-x GmbH #441

**SPIE** Corporate Member

Steinbachstr 17, Aachen, 52074 Germany  
+49 241 8904 122; fax +49 241 8904 6122  
info@son-x.com; www.son-x.com/en/home

### Featured Product: UTS2, Ultrasonic Tooling System for diamond turning of steel. Optical steel moulds, Metal Mirrors.

son-x is a leading edge technology and component supplier in the field of ultra precision machining. The technology developed and commercialized by son-x enables direct machining of stainless steel with single crystal diamond tools. A consistent surface quality of Ra=3nm and a form accuracy of 150 nm can be achieved. Furthermore we offer contract manufacturing of optical mould inserts, mirrors up to 1000 mm in diameter and plastic lens prototypes manufacturing. Contact: Benjamin Bulla, Managing Director, benjamin.bulla@son-x.com; Marius



Doetz, Project Manager Manufacturing, marius.doetz@son-x.com

### UTS2 Ultrasonic Tooling System for diamond turning of steel and other difficult to cut materials

## Spectral Instruments, Inc. #717

**SPIE** Corporate Member

420 N Bonita Ave, Tucson, AZ, 85745-2747 (USA)  
+1 520 884 8821; fax +1 520 884 8803  
info@specinst.com; www.specinst.com

CMOS cameras for ultra-high performance scientific application are shown by Spectral Instruments. Our expertise in CCD camera development provides the background for the finest in cooled, state of the art, CMOS camera platforms supporting large area, front and back illuminated, high Q.E. sensors. We can detect visible, UV, X-ray radiation, and electrons. Configurations include standard windows, fiber optic tapers or faceplates. Custom camera and sensor designs for OEM applications are available. Contact: Charles Slaughter, Systems Specialist, cdslaughter@specinst.com

## Spectrogon US, Inc. #128

**SPIE** Corporate Member

115 Route 46 W Ste A2, Mountain Lakes, NJ, 07046 (USA)  
+1 973 331 1191; fax +1 973 331 1373

sales.us@spectrogon.com; www.spectrogon.com

### Featured Product: Optical thin film filters, Broadband-antireflection windows, Holographic Diffraction Gratings.

Spectrogon specializes in the design and manufacture of optical filters, thin film coatings, and optical components for analytical, medical, and scientific applications. Spectrogon is the world leader in the design and manufacture of Holographic Diffraction Gratings for laser compression/stretching applications, tuning and spectroscopic instruments. Spectrogon offers a huge inventory of stock filters (www.spectrogon.com) that can ship within 2 weeks. Contact: Steve Finn, Sales Manager, steve.finn@spectrogon.com; Kelly Neeb, Sales Admin, sales.us@spectrogon.com

## Spectroscopy #134

485 Route 1 South Bldg 1 Ste 210, Iselin, NJ, 08830-3072 (USA)  
+1 203 523 7067

spectroscopyedit@advanstar.com; www.spectroscopyonline.com

### Featured Product: Spectroscopy.

Spectroscopy's mission is to enhance productivity, efficiency, and the overall value of spectroscopic instruments and methods as a practical analytical technology across a variety of fields. Scientists, technicians, and laboratory managers gain proficiency and competitive advantage for the real-world issues they face through unbiased, peer-reviewed technical articles, trusted troubleshooting advice, and best-practice application solutions. Contact: Stephanie Shaffer, Publisher, stephanie.shaffer@ubm.com; Melissa Devlin, Marketing Manager, melissa.devlin@ubm.com

## SPIE Career Center #610

1000 20th St, Bellingham, WA, 98225-6705 (USA)

+1 360 685 5551; fax +1 360 647 1445

sales@spicareercenter.org; www.spicareercenter.org

### Featured Product: Online Job Board; Recruitment Advertising; Job Fairs.

The SPIE Career Center is the leading recruitment resource for companies and professionals in the optics and photonics community. Whether you're looking for a new job or searching for top candidates, our resources will help you find the perfect match for your needs. Job seekers can post their resumes, search our online job board and access additional resources for career advancement. Employers can advertise jobs online, access the SPIE searchable resume database and exhibit in SPIE Job Fairs. Contact: Lacey Barnett, Career Center Manager, laceyb@spie.org; Robert Dentel, Sales and Business Development, robertd@spie.org

## SPIE Digital Library

#610

PO Box 10, Bellingham, WA, 98227-0010 (USA)  
+1 360 676 3290; fax +1 360 647 1445  
spiedlhelp@spie.org; www.spiedigitallibrary.org

**Featured Product: The SPIE Digital Library is the world's largest collection of optics and photonics applied research.**

The Digital Library contains over 470,000 research papers from the Proceedings of SPIE, the Society's 10 peer-reviewed journals, and more than 325 eBooks from SPIE Press. Approximately 18,000 new research papers and 25 eBook titles are added annually. SPIE Digital Library papers are cited in more than 100,000 patents and topics cover astronomy, biomedical optics, biophotonics, nanotechnology, sensors, lasers, electro-optics, communications, imaging, energy, and more. Contact: Patrick Franzen, Director, North America Digital Library, patrickf@spie.org

## StellarNet, Inc.

#528

SPIE<sup>Corporate</sup>  
Member

14390 Carlson Cir, Tampa, FL, 33626 (USA)  
+1 813 855 8687; fax +1 813 855 0394  
contactus@stellarnet.us; www.stellarnet.us

StellarNet, Inc. provides high performance compact spectrometer systems and software for product analysis, research, education, and OEM. StellarNet instrumentation is rugged for any environment - lab, process, or field. Spectrometer accessories include light sources, sampling fixtures, optical fibers, and probes. Applications include absorbance & transmission (190-2300nm), fluorimetry, optical metrology, thin film, reflectance & colorimetry, LED/Laser/Solar spectral analysis, LIBS, OES, & Raman. Contact: Debra Persell, Office Manager, dpersell@stellarnet.us; Jason Pierce, Director of Business Development, jpierce@stellarnet.us

## SPONSOR

## Sutter Instrument Corp.

#516

SPIE<sup>Corporate</sup>  
Member

One Digital Dr, Novato, CA, 94949-5703 (USA)  
+1 415 883 0128; fax +1 415 883 0572  
info@sutter.com; www.sutter.com

**Featured Product: Lambda OBC and Lambda 421 Optical Beam Combiners and BOB open architecture upright microscope.**

U.S. manufacturer of precision devices for scientific research and industrial OEM. Come see the Lambda 421 and Lambda OBC Optical Beam Combiners using a newly patented concept for combining separate light sources with different spectra into a single output beam, and BOB, a flexible open architecture upright microscope. We also make high-output LED, plasma and xenon light sources, optical filterwheels, the SmartShutter, X-Y translators, manipulators, and P-2000 laser-based

NSOM fiber tip puller. Contact: Chris Ballard, Product Manager, chris@sutter.com; Alex Cooper, Dir., Sales and Marketing, alex@sutter.com

**Lambda 421 Optical Beam Combiner a new way of combining separate light sources into a single output.**



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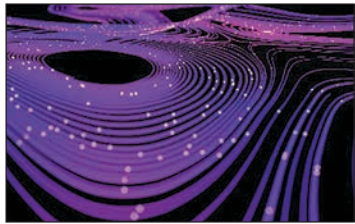
## Synopsys, Inc.

**SPIE** Corporate Member

690 E Middlefield Rd, Mountain View, CA, 94043-4010 (USA)  
+1 650 584 5000

optics@synopsys.com; www.optics.synopsys.com

Synopsys' Optical Solutions Group is a leading developer of optical design and analysis tools that produce accurate virtual prototypes leading to manufacturable optical systems. Our software packages include CODE V® imaging design software, LightTools® illumination design software, LucidShape® products for automotive lighting, the RSoft™ products



for photonic device and optical communications design, and the Phoenix OptoDesigner tools for photonic integrated circuit (PIC) layout and verification

**Synopsys offers the PIC Design Suite for a seamless photonic integrated circuit design flow**

#232

## TDK-Lambda Americas - HP Division

#433

405 Essex Rd, Neptune, NJ, 07753 (USA)  
+1 732 922 9300; fax +1 732 922 1441

sales@us.tdk-lambda.com; www.us.tdk-lambda.com/hp

## The Optronics Co., Ltd.

#1238

5-5 Shin Ogawamachi, Sanken Bldg, Shinjuku-ku, Tokyo, 162-0814 Japan

+81 3 3269 3550; fax +81 3 5229 7253

intl@optronics.co.jp; www.optronicsjp.com

### Featured Product: OPIE 2019

The OPTICS & PHOTONICS International Exhibition is held annually in Japan with the OPTICS & PHOTONICS International Congress and focuses on optics and laser technologies involving both science and industry. Co-locating the Congress and the Exhibition bring together innovators from around the world to find future applications for the most advanced optics and lasers. Join us at this premier event—visit our booth #1238 for more information.

### SPONSOR

## Syntec Optics

**SPIE** Corporate Member

515 Lee Rd, Rochester, NY, 14606-4236 (USA)  
+1 585 768 2513; fax +1 585 464 8043

sales@syntecoptics.com; www.syntecoptics.com

### Featured Product: Diamond turned & injection molded polymer optics & optical assemblies.

Syntec Optics is North America's largest, private manufacturer of custom plastic optics serving the Medical, Defense, Consumer, and Biometric Industries by producing "Precision Plastic Optics for Tomorrow's Technologies" from our headquarters in Rochester, NY. We specialize in Design for Manufacturability, Precision Plastic Optics, Diamond Turning, Electro-Optical Assembly Opto-Mechanical Assembly, IR Optics Assembly, Coating, & Metrology. Contact: Sara Hart, Sales Manager, shart@syntecoptics.com; Robert Parada, President, rparada@syntecoptics.com

#410

## Thermo Fisher Scientific Inc.

#732

**SPIE** Corporate Member

101 Commerce Blvd, CIDTEC Cameras & Imagers, Liverpool, NY, 13088-4507 (USA)

+1 315 451 9410; fax +1 315 451 9421

sales.cidtec@thermo.com; www.thermofisher.com/cidtec

### Featured Product: 2K x 2K Random access camera with eXtreme Dynamic Range (XDR). Radiation hard digital color cameras.

Thermo Scientific - CIDTEC manufactures high performance UV-NIR sensitive cameras for demanding scientific imaging applications, radiation environments, and unique machine vision inspection applications.

Cameras include eXtremely wide Dynamic Range (XDR) for the SpectraCAM line of scientific cameras with unparalleled linear dynamic range, as well as KiloRAD PTZ, MegaRAD and ColorRAD cameras for operation in radiation environments. Deep UV coating services are also available. Contact: Tony Chapman, Sales & Marketing, tony.chapman@thermofisher.com; Suraj Bhaskaran, Engineering Manager, suraj.bhaskaran@thermofisher.com



**KiloRAD PTZ for Color imaging in radiation environments, with remote Pan, Tilt, Zoom control**

## Taiyo Optics (Dong Guan) Corp. #713

**SPIE** Corporate Member

No 2 Xiang Long Rd, Dongguan, Guangdong, 523326 China  
+86 769 86080166; fax +86 769 86080088

inquire@taiyooptics.com; www.taiyooptics.com

### Featured Product: Prisms, Cylindrical Lens, Mirrors, Parallel Plate, Assembled Prism and in-house Coating.

Taiyo Optics is a professional manufacturer of prisms and cylindrical lens since 1993. Our featured products including but not limited to optical prisms, cylindrical lenses, and other planar optical components. With advanced testing instruments and strict quality control system, Taiyo Optics is dedicated to provide best quality and service to meet our customers' needs. Contact: Olivia Li, Sales Representative, olivia@taiyooptics.com

## Tianjin University

#438

Room 606 Bldg 26C, 92 Weijin Rd, School of Precision Instrument & Opto-Electronics Engineering, Tianjin, 300072 China  
+86 022 2789 1015; fax +86 022 2789 1103  
jyxy@tju.edu.cn; www.tju.edu.cn

**Featured Product: Tianjin University is an institution for higher education and research.**

Tianjin University (TJU), founded in 1895 with Peiyang University being its predecessor, is the first modern University in China. It is one of the "985", "211" and "Double First-Class" universities directly sponsored by the Ministry of Education (MOE) of China. The Optics and Photonics program in the School of Precision Instrument & Opto-Electronics Engineering is consecutively rated as the top 3 national key disciplines by MOE. You are welcome to join the Center for Optics & Photonics at TJU. Contact: Jianming Dai, Professor, jianmingdai@tju.edu.cn; Benjamin Seeberger, Deputy dean, benseberger@tju.edu.cn

## TMC

**SPIE** Corporate Member

15 Centennial Drive, Peabody, MA, 01960-7993 (USA)  
+1 978 532 6330; fax +1 978 531 8682  
sales@techmfg.com; www.techmfg.com

#742

**Featured Product: Vibration Isolation Systems.**

TMC manufactures a complete line of Optical Tops and Precision Vibration Isolation Systems. New products include the patented Everstill™ Bench-top Active Vibration Cancellation Platform and CleanBench™ Vibration Isolation Tables with Gimbal Piston™ Isolators. Other products include CleanTop® II Spill-proof Optical Tops, Non-Magnetic Tops, Vacuum compatible Tops, Lightweight Breadboards, and STACIS® III piezoelectric active vibration cancellation systems. Contact: Jack Prior, Sales Engineer, jack.prior@ametec.com; Kyle Erlandsen, Applications Manager, Micro-g, kyle.erlandsen@ametec.com

## Trillium US Inc.

#726

13011 SE Jennifer St Ste 204, Clackamas, OR, 97015 (USA)  
+1 503 682 3837  
insides@trilliumus.com; www.trilliumus.com

**Featured Product: M350 Helium Compressor - Drives (2) 8" or (1) 10" Cryopump using 30% Less Energy than a CTI 9600.**

Trillium specializes in helping customers using vacuum systems and related products in a wide range of industries. We offer new and refurbished products, as well as repair services supporting dry pumps, oil-sealed pumps, blowers, cryogenic pumps, cold heads, helium compressors, chillers and gas abatement systems. We provide service on-site or from one of our 3 manufacturing and repair centers in the USA and Trillium's management systems are registered to the ISO-9001:2015 standard. Contact: Rob Breisch, VP, Sales and Marketing, rob.breisch@trilliumus.com



**M350 Helium Compressor - Drives (2) 8" or (1) 10" Cryopump using 30% Less Energy than a CTI 9600.**

## TRIOPTICS USA

#214

**SPIE** Corporate Member

9087 Arrow Rte Ste 180, Rancho Cucamonga, CA, 91730-4451 (USA)  
+1 626 962 5181; fax +1 626 962 5188  
sales@trioptics-usa.com; www.trioptics-usa.com

We have the largest portfolio of optical test systems for R&D and production for manufacturing optics: From refractive index measurement, to lens test systems, up to MTF test systems and camera module testers, we can supply the appropriate optical measurement system for every process step. We have used our competence in optical measurement technology to develop systems for the active alignment and assembly of lenses and camera modules. This is key for today's automated production systems.

## Universal Photonics, Inc.

#320

**SPIE** Corporate Member

85 Jetson Lane, Central Islip, NY, 11722 (USA)  
+1 516 935 4000; fax +1 516 935 4039  
info@universalphotonics.com; www.universalphotonics.com

**Featured Product: Hastilite FIN. High-Performance Cerium Oxide Slurry for Best Surface Finish.**



Universal Photonics is a world-leader in critical surfacing preparation materials. Our dedication to the advancement of surfacing technology in all phases of fabrication spans nearly a century, and is supported with state-of-art laboratory, manufacturing and distribution facilities throughout the (USA), Europe, and the Far East. Contact: Jen Laico, Senior Director of Sales, jenl@universalphotonics.com; Angelika Criscione, Senior Director of Marketing, angelika@universalphotonics.com

**SOMOS TPM. Internally-cooled, temperature-controlled, double-sided polishing & lapping.**

## US Fiberoptec

#434

**SPIE** Corporate Member

175 Bernal Rd Ste 15, San Jose, CA, 95119-1343 (USA)  
+1 408 834 7410; fax +1 408 834 7430  
info@usfiberoptec.com; www.usfiberoptec.com

**Featured Product: Silica/Silica Non Circular Core Fibers.**

100% vertically integrated world leader in silica and glass optical fibers, assemblies, bundles and hybrid photonics solutions. Producing silica (Quartz), silica/silica and hard polymer clad/silica (HPCS), glass and MIR (Mid Infrared) optical fibers and value added assemblies for a wide variety of industries and applications. We offer fibers from 40 microns to 2,000 microns in core sizes with N.A. range of 0.12 to 0.53 and wavelengths range from 193nm to 16 microns. Contact: Ilya Rotenstein, Business Development Manager, info@usfiberoptec.com; Aleksander Yam, COO, aleksander.yam@usfiberoptec.com

# EXHIBITOR DIRECTORY

## Vermont Photonics Technologies Corp. #1208

**SPIE** Corporate Member

22 Browne Ct Unit 110, Brattleboro, VT, 05301 (USA)  
+1 802 275 5210; fax +1 802 275 5215  
mail@vermontphotonics.com; www.vermontphotonics.com

We offer expertise in angle measurement, precision alignment, and optical testing as the exclusive U.S. distributor for Möller-Wedel Optical for over 30 years. Our line of autocollimators, telescopes, goniometers, and more is well-known around the world as the industry standard. The ELCOMAT 3000 is the most well-regarded autocollimator out there. The GONIOMAT line has established itself in a similar position for measuring prism geometry and other optical systems. See both of these at our booth. Contact: Christian Guertin, Physicist, cguertin@vermontphotonics.com; Michael Mross, President, mmross@vermontphotonics.com

## Vincent Associates #625

803 Linden Ave, Rochester, NY, 14625-2709 (USA)  
+1 585 385 5930; fax +1 585 385 6004  
info@uniblitz.com; www.uniblitz.com

**Featured Product: The new ES6B, 6mm aperture bi-stable laser shutter with industry first 25-million-cycle guarantee.**

Since 1969 Vincent Associates has been designing and manufacturing precision shutter systems for use in laser safety, microscopy, biomedical research, camera systems, industrial, astronomy and defense applications.



Our UNIBLITZ products are known for their reliability and long lifetimes. Contact us today to see how we can help you with your next project. Contact: Dave Viglione, VP of Engineering, dviglione@uniblitz.com; Stephanie Schaffer, Sales Manager, sschaffer@uniblitz.com

**The new ES6B, 6mm aperture bi-stable laser shutter with industry first 25-million-cycle guarantee.**

## Wacom Corporation #1224

146 Red Schoolhouse Rd, Spring Valley, NY, 10977 (USA)  
+1 845 735 1303  
kwacom@aol.com

**Featured Product: Surfclear-100; Optron's Hydrophobic, Oleophobic and Scratch Resistant Optical Coating Material.**

Wacom Corporation is a supplier of high quality optical coating material manufactured by Canon Optron. We offer granules, tablets and capsules for evaporation deposition. Also offering functional thin films that repel water, oil and scratches. Anti-Static Material. Oxides with high laser damage threshold and Fluorides that deposit thicker with less spitting and scattering. 90:10 and 95:5 Indium Tin Oxide, Ta2O5, Al2O3 and degassed OS-50. Contact: Konrad Soong, Sales Manager, ksoong@wacomcorp.com

## Wordingham Technologies #410

515 Lee Rd, Rochester, NY, 14606 (USA)  
+1 585 924 2294; fax +1 585 464 8043  
sales@wordingham.com; www.wordingham.com

**Featured Product: Precision Optical Barrels, Housings, Mounts & Retainers.**

Wordingham Technologies has built a solid foundation in manufacturing Optical Barrels, Housings, Mounts and Retainer components for optical sub-assemblies. We focus our services on custom components for the Laser, Imaging, Machine Vision, Consumer, Bio instrument and Opto-Mechanical industries; producing intricate parts with the utmost aesthetics & non-symmetric geometries. Wordingham produces components with Ultem, Titanium, Stainless Steel, and most non-ferrous materials. Contact: Tim Bechtold, Sales Manager, tbechtold@wordingham.com; Rob Parada, President, rparada@syntecoptics.com

## Xonox Technology GmbH #512

**SPIE** Corporate Member

Kirchstr 9, Hüttenberg, 35625 Germany  
+49 6441 96364 0; fax +49 6441 96364 10  
info@xonox-tec.com; www.xonox-tec.com

**Featured Product: X-fiz100 / X-fiz130 Fizeau Interferometer with associated XO4+ Fizeau Transmission Spheres.**

XONOX Technology GmbH, Germany, develops and manufactures metrology systems for optics manufacturing and testing. Products include innovative devices and software tools for testing thickness, diameter and centration of optical components. In addition, advanced Interferometer systems and Transmission Spheres allow easy, precise testing of RoC and form accuracy. The X-metroLINK system features fully interlinked and automated QC, from job planning to final documentation of complete production lots. Contact: Frank DeWitt, f.dewitt@xonox-tec.com; Peter Flug, peter.flug@xonox-tec.com



**XONOX CT 200 NC non-contact center thickness measuring system**



## Zaber Technologies Inc.

#312

**SPIE** Corporate Member

#2-605 W Kent Ave N, Vancouver, BC, V6P 6T7 Canada  
 +1 604 569 3780; fax +1 604 648 8033  
 contact@zaber.com; www.zaber.com

### Featured Product: Can a linear motor stage have a built-in controller? Introducing Zaber's X-LDQ-AE.

At Zaber, we design and manufacture precision positioning devices such as linear actuators, linear stages, and multi-axis systems, that are affordable, integrated, and easy to use. Our devices are used in many different applications and markets, such as photonics and optics, life sciences, and industrial automation. Since introducing our first series, our product offering has grown to include over 100 motion control products, which are distributed worldwide. Contact: Sofia Moreno, contact@zaber.com



**Zaber's X-LDQ-AE - high speed, high precision linear motor stage with built-in controller.**

## Zygo Corporation

#328

**SPIE** Corporate Member

21 Laurel Brook Rd, Middlefield, CT, 06455-1291 (USA)  
 +1 860 347 8506; fax +1 860 347 8372  
 inquire@zygo.com; www.zygo.com

For more than 40 years, Zygo Corporation has delivered leading edge optical metrology solutions to optics and photonics manufacturers. With unparalleled experience and reputation, ZYGO provides interferometric instruments, and precision optical components, assemblies, and electro-optical design to the aerospace, defense, semiconductor, automotive, and optical industries. Contact: David Melton, Director Sales & Support, dmelton@zygo.com; Michael Albrecht, Product Manager, malbrecht@zygo.com



### Fight Bias, Embrace Diversity

SPIE seeks to cultivate a culture of openness and inclusivity. Help us eradicate bias and make the world of optics and photonics a shining example of all minds coming together to innovate regardless of gender, race, nationality, culture, educational background, politics, sexuality, body type, and age, for the betterment of life.

Educate yourself on the issues faced by a diverse workforce, challenge your own assumptions, and tap into the rich pool of talent, perspectives and ideas offered by people different from you.

**SPIE. DIVERSITY+ INCLUSION**

# STUDENT CHAPTERS

Visit the student section of the exhibition and see what our Student Chapters have accomplished in research and outreach. Meet some of the best and brightest students from across the globe.

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## **Changchun Univ. of Science and Technology Chapter**

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Brussel, Belgium, Koen Vanmol

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Applied Surface Technologies  
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CoorsTek Technical Ceramics  
Dynamic Optics  
Dynasil Corporation of America  
EMF Corp.  
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Isuzu Glass, Inc.  
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Minus K Technology  
Navitar Inc.  
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PHASICS Corp.  
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Riverhawk Company  
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scia Systems GmbH  
SCIL Nanoimprint Solutions  
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Syntec Optics  
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Laser Components USA, Inc.  
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Rigaku Innovative Technologies, Inc.  
Solid Sealing Technology, Inc.  
StellarNet, Inc.  
Sutter Instrument Corp.

## COMMUNICATIONS & NETWORKING

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JENOPTIK Optical Systems, LLC  
Meadowlark Optics, Inc.  
Micro Laser Systems, Inc.  
SPIE Career Center

## COMPUTING SYSTEMS, DATA PROCESSING

attocube systems Inc.  
BeamIO  
Schrodinger, LLC

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GS Plastic Optics  
Lambda Research Corp.  
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OEG GmbH  
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Optikos Corporation  
Photon Engineering LLC  
SPIE Career Center  
Xonox Technology GmbH

## CONSUMER ELECTRONICS

Accumold  
ALIO Industries Corp.  
All Flex Flexible Circuits and Heaters  
Himax IGI  
HOYA Corp. USA  
Lambda Research Corp.  
SCHOTT North America, Inc.  
SCIL Nanoimprint Solutions

## DEFENSE, SECURITY, LAW ENFORCEMENT

All Flex Flexible Circuits and Heaters  
Andover Corporation  
asphericon  
BeamIO  
Chroma Technology Corp.  
CoorsTek Technical Ceramics  
Diverse Optics Inc.  
Himax IGI  
Isuzu Glass, Inc.  
JENOPTIK Optical Systems, LLC  
Laser Components USA, Inc.  
Laser Focus World  
Meadowlark Optics, Inc.  
MegaWatt Lasers, Inc.  
Millennium Optical System Co., Ltd.  
Optikos Corporation  
Optimax Systems, Inc.  
OZ Optics Ltd.  
piezosystem jena, Inc.  
Precision Optical  
Rainbow Research Optics, Inc.  
Rigaku Innovative Technologies, Inc.  
Riverhawk Company  
SCHOTT North America, Inc.  
SCIL Nanoimprint Solutions  
Solid Sealing Technology, Inc.  
Syntec Optics  
Thermo Fisher Scientific Inc.  
Wordingham Technologies

## DETECTORS, SENSORS

ADIT Electron Tubes  
Avantes, Inc.  
BeamIO  
Chroma Technology Corp.  
Dynasil Corporation of America  
Energetiq Technology, Inc.  
GPD Optoelectronics Corp.  
Hamamatsu Corporation  
Hangzhou Freqcontrol Electronic Technology Ltd.  
Hinds Instruments, Inc.  
Laser Components USA, Inc.  
Motion Controls, LLC  
OZ Optics Ltd.  
Prior Scientific Inc.  
Rigaku Innovative Technologies, Inc.  
StellarNet, Inc.

## DISPLAYS

CoorsTek Technical Ceramics  
EMF Corp.  
Himax IGI  
Meadowlark Optics, Inc.  
Syntec Optics

## DISPLAYS: CONSUMER, INFORMATION, ENTERTAINMENT

Diverse Optics Inc.  
EMF Corp.  
Filmetrics, Inc.  
HOYA Corp. USA  
Lambda Research Corp.  
Optimax Systems, Inc.  
Precision Glass & Optics  
Schrodinger, LLC  
SCIL Nanoimprint Solutions



## DISTRIBUTOR, RESELLER, INTEGRATOR

Universal Photonics, Inc.  
Xonox Technology GmbH

## EARTH SCIENCES, ENVIRONMENTAL MONITORING, CLIMATE

Avantes, Inc.  
GPD Optoelectronics Corp.  
Hamamatsu Corporation  
Hinds Instruments, Inc.  
Micro Laser Systems, Inc.  
Motion Controls, LLC  
OZ Optics Ltd.  
Spectrogon US, Inc.

## EDUCATION AND TRAINING

College of Optical Sciences, The Univ. of Arizona  
Laser Focus World  
Photon Engineering LLC  
Photonics Spectra, a Photonics Media publication  
SPIE Career Center  
SPIE Digital Library  
StellarNet, Inc.  
Tianjin University

## ELECTRICAL/SIGNAL ANALYSIS EQUIPMENT

Hinds Instruments, Inc.

## ELECTRONIC COMPONENTS

ADIT Electron Tubes  
All Flex Flexible Circuits and Heaters  
CoorsTek Technical Ceramics  
Hinds Instruments, Inc.  
Laser Components USA, Inc.  
NIL Technology ApS  
Siskiyou Corporation  
Solid Sealing Technology, Inc.

## ELECTRONIC, DIGITAL IMAGING

BeamIO  
CoorsTek Technical Ceramics  
Minus K Technology  
Navitar Inc.  
OEG GmbH  
piezosystem jena, Inc.  
Precision Glass & Optics  
Prior Scientific Inc.  
Siskiyou Corporation

## EMERGING PHOTONICS TECHNOLOGIES

Avantes, Inc.  
MilliporeSigma  
NIL Technology ApS  
Riverhawk Company  
SCIL Nanoimprint Solutions

## FIBER OPTICS AND ACCESSORIES

AdlOptica Optical Systems GmbH  
Aerotech, Inc.  
Diverse Optics Inc.  
Energetiq Technology, Inc.  
GPD Optoelectronics Corp.  
Hangzhou Freqcontrol Electronic Technology Ltd.  
Himax IGI  
Ibsen Photonics A/S  
Micro Laser Systems, Inc.  
Motion Controls, LLC  
NKT Photonics Inc.  
OZ Optics Ltd.  
PIEZOCONCEPT  
piezosystem jena, Inc.  
Riverhawk Company  
Solid Sealing Technology, Inc.  
StellarNet, Inc.  
US Fiberoptec

## INDUSTRIAL SENSING AND MEASUREMENT

Apre Instruments, LLC  
attocube systems Inc.  
CoorsTek Technical Ceramics  
Dynasil Corporation of America  
GPD Optoelectronics Corp.  
Hamamatsu Corporation  
Ibsen Photonics A/S  
Laser Components USA, Inc.  
Motion Controls, LLC  
Navitar Inc.  
Optical Perspectives Group, LLC  
PHASICS Corp.  
piezosystem jena, Inc.  
Rainbow Research Optics, Inc.  
Spectrogon US, Inc.  
StellarNet, Inc.  
Syntec Optics  
TMC  
US Fiberoptec  
Wordingham Technologies

## INFORMATION PROCESSING AND COMPUTING

BeamIO

## LASER COMPONENTS AND ACCESSORIES

Diverse Optics Inc.  
Dynamic Optics  
GPD Optoelectronics Corp.  
Hinds Instruments, Inc.  
Ibsen Photonics A/S  
Laser Quantum Inc.  
Lasertec, Inc.  
MegaWatt Lasers, Inc.  
Millennium Optical System Co., Ltd.  
NKT Photonics Inc.  
Optik +  
OZ Optics Ltd.  
PHASICS Corp.  
piezosystem jena, Inc.  
Precision Glass & Optics  
Precision Optical  
Riverhawk Company

SCHOTT North America, Inc.  
Solid Sealing Technology, Inc.  
US Fiberoptec  
Vincent Associates

## LASER INDUSTRY

Aerotech, Inc.  
ALIO Industries Corp.  
asphericon  
CoorsTek Technical Ceramics  
Ibsen Photonics A/S  
Laser Focus World  
Laser Quantum Inc.  
Lasertec, Inc.  
MegaWatt Lasers, Inc.  
NKT Photonics Inc.  
OptoSigma Corp.  
Osela Inc.  
PHASICS Corp.  
Photonics Spectra, a Photonics Media publication  
Precision Optical  
Rainbow Research Optics, Inc.  
SCHOTT North America, Inc.  
Shimadzu Corp.  
Solid Sealing Technology, Inc.  
TMC  
Vincent Associates  
Zaber Technologies Inc.

## LASERS AND SYSTEMS

AdlOptica Optical Systems GmbH  
ALIO Industries Corp.  
Energetiq Technology, Inc.  
Hamamatsu Corporation  
Laser Components USA, Inc.  
Laser Quantum Inc.  
MegaWatt Lasers, Inc.  
Micro Laser Systems, Inc.  
NKT Photonics Inc.  
Osela Inc.  
OZ Optics Ltd.  
Photonic Cleaning Technologies  
Riverhawk Company  
Shimadzu Corp.

## LED, OLED, NON-LASER LIGHT SOURCES

GS Plastic Optics  
Hamamatsu Corporation  
Laser Quantum Inc.  
Motion Controls, LLC  
Optik +  
OZ Optics Ltd.  
Sutter Instrument Corp.

## LIGHTING AND ILLUMINATION

Diverse Optics Inc.  
Energetiq Technology, Inc.  
Himax IGI  
Lambda Research Corp.  
Moulded Optics GmbH  
Optik +  
Shimadzu Corp.  
StellarNet, Inc.  
US Fiberoptec

## LITHOGRAPHIC EQUIPMENT

Energetiq Technology, Inc.  
Laser Quantum Inc.  
Mad City Labs., Inc.  
Rigaku Innovative Technologies, Inc.  
SCIL Nanoimprint Solutions

## MACHINE VISION, FACTORY AUTOMATION

4D Technology Corp.  
Aerotech, Inc.  
Chroma Technology Corp.  
JENOPTIK Optical Systems, LLC  
Lasertec, Inc.  
Mad City Labs., Inc.  
Minus K Technology  
Motion Controls, LLC  
OEG GmbH  
Photonics Spectra, a Photonics Media publication  
PIEZOCONCEPT  
Prior Scientific Inc.  
Thermo Fisher Scientific Inc.  
TMC  
Vincent Associates  
Wordingham Technologies  
Zaber Technologies Inc.

## MATERIALS PROCESSING, LASERS IN MANUFACTURING

AdlOptica Optical Systems GmbH  
Aerotech, Inc.  
attocube systems Inc.  
Laser Components USA, Inc.  
Lasertec, Inc.  
MegaWatt Lasers, Inc.  
NKT Photonics Inc.  
OZ Optics Ltd.  
Precision Glass & Optics  
son-x GmbH  
US Fiberoptec

## MATERIALS, ABRASIVES, CHEMICALS

DCM Tech  
HOYA Corp. USA  
MilliporeSigma  
Ohara Corp.  
Photonic Cleaning Technologies  
SCHOTT North America, Inc.  
Universal Photonics, Inc.

## MICROSCOPES

AdlOptica Optical Systems GmbH  
attocube systems Inc.  
Bruker Nano Surfaces, Inc.  
Hangzhou Freqcontrol Electronic Technology Ltd.  
Mad City Labs., Inc.  
Meadowlark Optics, Inc.  
Minus K Technology  
Navitar Inc.  
Optical Perspectives Group, LLC  
Optik +

# PRODUCT CATEGORIES

PHASICS Corp.  
PIEZOCONCEPT  
piezosystem jena, Inc.  
Prior Scientific Inc.  
Sutter Instrument Corp.  
US Fiberoptec  
Vincent Associates

## MICROTECHNOLOGY

AdlOptica Optical Systems GmbH  
ALIO Industries Corp.  
Meadowlark Optics, Inc.

## MISC CONSUMABLES AND EQUIPMENT

Aerotech, Inc.  
Applied Surface Technologies  
OEG GmbH

## MOUNTS, TABLES, VIBRATION ISOLATION

Aerotech, Inc.  
Minus K Technology  
OptoSigma Corp.  
TMC  
Zaber Technologies Inc.

## NANOTECHNOLOGY PRODUCTS

ALIO Industries Corp.  
Himax IGI  
MilliporeSigma  
NIL Technology ApS  
PIEZOCONCEPT  
SCIL Nanoimprint Solutions

## OPTICAL COATINGS, THIN FILMS

AccuCoat Inc.  
Andover Corporation  
Applied Surface Technologies  
asphericon  
Chroma Technology Corp.  
Diverse Optics Inc.  
Dynasil Corporation of America  
EMF Corp.  
GS Plastic Optics  
Hardin Optical Co.  
HOYA Corp. USA  
Isuzu Glass, Inc.  
LaCroix Precision Optics  
Laser Components USA, Inc.  
Lasertec, Inc.  
Millennium Optical System Co., Ltd.  
MilliporeSigma  
Moulded Optics GmbH  
NiPro Optics, Inc.  
Optimax Systems, Inc.  
Precision Glass & Optics  
Precision Optical  
Rainbow Research Optics, Inc.  
Rigaku Innovative Technologies, Inc.  
Safran Reosc  
SCHOTT North America, Inc.  
Spectrogon US, Inc.  
Wacom Corporation

## OPTICAL COMMUNICATION, NETWORKING DEVICES

JENOPTIK Optical Systems, LLC  
Siskiyou Corporation

## OPTICAL COMPONENTS - FILTERS, MIRRORS, OTHER

AccuCoat Inc.  
Andover Corporation  
asphericon  
Chroma Technology Corp.  
CoorsTek Technical Ceramics  
Diverse Optics Inc.  
Dynamic Optics  
Dynasil Corporation of America  
EMF Corp.  
GS Plastic Optics  
Hardin Optical Co.  
Himax IGI  
HOYA Corp. USA  
Ibsen Photonics A/S  
LaCroix Precision Optics  
Laser Components USA, Inc.  
Lasertec, Inc.  
Millennium Optical System Co., Ltd.  
Minus K Technology  
Moulded Optics GmbH  
Ohara Corp.  
Optik +  
Optimax Systems, Inc.  
OptoSigma Corp.  
Precision Glass & Optics  
Precision Optical  
Rainbow Research Optics, Inc.  
Rigaku Innovative Technologies, Inc.  
Safran Reosc  
SCHOTT North America, Inc.  
Shimadzu Corp.  
Solid Sealing Technology, Inc.  
son-x GmbH  
Spectrogon US, Inc.  
Syntec Optics  
Taiyo Optics (Dong Guan) Corp.

## OPTICAL COMPONENTS - LENSES

Accumold  
asphericon  
Diverse Optics Inc.  
Dynasil Corporation of America  
EMF Corp.  
GS Plastic Optics  
Hardin Optical Co.  
Himax IGI  
HOYA Corp. USA  
Isuzu Glass, Inc.  
JENOPTIK Optical Systems, LLC  
LaCroix Precision Optics  
Lasertec, Inc.  
Micro Laser Systems, Inc.  
Millennium Optical System Co., Ltd.  
Moulded Optics GmbH  
Navitar Inc.  
NiPro Optics, Inc.  
Ohara Corp.  
Optik +

Optimax Systems, Inc.  
OptoSigma Corp.  
Precision Glass & Optics  
Rainbow Research Optics, Inc.  
Safran Reosc  
SCHOTT North America, Inc.  
son-x GmbH  
Syntec Optics  
Taiyo Optics (Dong Guan) Corp.  
Xonox Technology GmbH

## OPTICAL DATA STORAGE

AdlOptica Optical Systems GmbH  
Meadowlark Optics, Inc.

## OPTICAL DESIGN AND ENGINEERING

AdlOptica Optical Systems GmbH  
Andover Corporation  
asphericon  
Breault Research Organization, Inc.  
Chroma Technology Corp.  
Dynasil Corporation of America  
EMF Corp.  
Energetiq Technology, Inc.  
GS Plastic Optics  
Himax IGI  
Ibsen Photonics A/S  
Lambda Research Corp.  
Laser Focus World  
MegaWatt Lasers, Inc.  
Micro Laser Systems, Inc.  
Millennium Optical System Co., Ltd.  
Moulded Optics GmbH  
Navitar Inc.  
NiPro Optics, Inc.  
OEG GmbH  
Optical Perspectives Group, LLC  
Optik +  
Optikos Corporation  
Optimax Systems, Inc.  
OptiPro Systems  
OptoSigma Corp.  
PHASICS Corp.  
Precision Glass & Optics  
Precision Optical  
Prior Scientific Inc.  
Rainbow Research Optics, Inc.  
Rigaku Innovative Technologies, Inc.  
Riverhawk Company  
Safran Reosc  
scia Systems GmbH  
Shimadzu Corp.  
Software Spectra, Inc.  
son-x GmbH  
Syntec Optics  
Taiyo Optics (Dong Guan) Corp.  
Trillium US Inc.  
Xonox Technology GmbH

## OPTICAL FABRICATION EQUIPMENT

Accumold  
Andover Corporation  
Applied Surface Technologies  
DCM Tech  
Dynamic Optics  
Meadowlark Optics, Inc.  
OEG GmbH  
OptiPro Systems  
Safran Reosc  
scia Systems GmbH  
SCIL Nanoimprint Solutions  
son-x GmbH  
Universal Photonics, Inc.

## OPTICS MANUFACTURING

AccuCoat Inc.  
Accumold  
Aerotech, Inc.  
Andover Corporation  
Applied Surface Technologies  
Apre Instruments, LLC  
asphericon  
DCM Tech  
Diverse Optics Inc.  
Dynamic Optics  
Dynasil Corporation of America  
EMF Corp.  
Energetiq Technology, Inc.  
Filmetrics, Inc.  
GS Plastic Optics  
Hardin Optical Co.  
Himax IGI  
Hinds Instruments, Inc.  
HOYA Corp. USA  
LaCroix Precision Optics  
Laser Focus World  
Lasertec, Inc.  
MegaWatt Lasers, Inc.  
Micro Laser Systems, Inc.  
Millennium Optical System Co., Ltd.  
Moulded Optics GmbH  
Navitar Inc.  
NiPro Optics, Inc.  
OEG GmbH  
Optical Perspectives Group, LLC  
Optik +  
Optikos Corporation  
Optimax Systems, Inc.  
OptiPro Systems  
OptoSigma Corp.  
PHASICS Corp.  
Precision Glass & Optics  
Precision Optical  
Prior Scientific Inc.  
Rainbow Research Optics, Inc.  
Rigaku Innovative Technologies, Inc.  
Riverhawk Company  
Safran Reosc  
scia Systems GmbH  
Shimadzu Corp.  
Software Spectra, Inc.  
son-x GmbH  
Syntec Optics  
Taiyo Optics (Dong Guan) Corp.  
Trillium US Inc.  
Xonox Technology GmbH

## OPTOMECHANICAL COMPONENTS, DEVICES

Aerotech, Inc.  
Dynasil Corporation of America  
JENOPTIK Optical Systems, LLC  
OptoSigma Corp.  
Prior Scientific Inc.  
Rainbow Research Optics, Inc.  
Vincent Associates  
Wordingham Technologies

## PHOTONIC INTEGRATION

JENOPTIK Optical Systems, LLC  
Micro Laser Systems, Inc.  
SCIL Nanoimprint Solutions

## POSITIONING EQUIPMENT, MOTION CONTROL AND ACCESSORIES

Aerotech, Inc.  
ALIO Industries Corp.  
attocube systems Inc.  
HIWIN Corp.  
KOHZU Precision c/o Daniel F Crews,  
LLC  
Mad City Labs., Inc.  
Motion Controls, LLC  
OptoSigma Corp.  
PIEZOCONCEPT  
piezosystem jena, Inc.  
Prior Scientific Inc.  
Siskiyou Corporation  
Sutter Instrument Corp.  
TMC  
Zaber Technologies Inc.

## PUBLISHERS, ASSOCIATIONS, CLUSTERS, SOCIETIES

IOP Publishing Ltd.  
Laser Focus World  
Novus Light Technologies Today  
Photonics Spectra, a Photonics Media  
publication  
SPIE Digital Library

## SEMICONDUCTOR DEFENSE SECURITY

Hangzhou Freqcontrol Electronic  
Technology Ltd.  
Optimax Systems, Inc.

## SEMICONDUCTOR MANUFACTURING

Aerotech, Inc.  
ALIO Industries Corp.  
Applied Surface Technologies  
Energetiq Technology, Inc.  
Filmetrics, Inc.  
Hangzhou Freqcontrol Electronic  
Technology Ltd.  
JENOPTIK Optical Systems, LLC  
Laser Quantum Inc.  
OEG GmbH  
Optimax Systems, Inc.  
Riverhawk Company  
scia Systems GmbH  
Solid Sealing Technology, Inc.  
TMC  
Trillium US Inc.  
Wacom Corporation  
Zaber Technologies Inc.

## SOFTWARE

4D Technology Corp.  
BeamIO  
Breault Research Organization, Inc.  
Lambda Research Corp.  
Photon Engineering LLC  
Schrodinger, LLC  
Software Spectra, Inc.  
SPIE Career Center  
Xonox Technology GmbH

## SOLAR & ALTERNATIVE ENERGY

AdOptica Optical Systems GmbH  
Avantes, Inc.  
CoorsTek Technical Ceramics  
Hinds Instruments, Inc.  
Lambda Research Corp.  
MilliporeSigma  
Moulded Optics GmbH  
Software Spectra, Inc.  
Wacom Corporation

## SOLAR AND ALTERNATIVE ENERGY TECHNOLOGY

Isuzu Glass, Inc.  
MilliporeSigma  
Syntec Optics  
US Fiberoptec

## SPECTROSCOPY DEVICES AND EQUIPMENT

Avantes, Inc.  
Filmetrics, Inc.  
GPD Optoelectronics Corp.  
Hamamatsu Corporation  
Ibsen Photonics A/S  
Lambda Research Corp.  
Laser Quantum Inc.  
NiPro Optics, Inc.  
Shimadzu Corp.  
StellarNet, Inc.  
US Fiberoptec  
Vincent Associates

## STRUCTURAL AND INFRASTRUCTURE SENSING

BeamIO  
Ibsen Photonics A/S  
Motion Controls, LLC  
OZ Optics Ltd.

## TEST AND MEASUREMENT, METROLOGY

4D Technology Corp.  
Apre Instruments, LLC  
asphericon  
attocube systems Inc.  
Avantes, Inc.  
Bruker Nano Surfaces, Inc.  
Filmetrics, Inc.  
GPD Optoelectronics Corp.  
Hinds Instruments, Inc.  
Lambda Research Corp.  
Mad City Labs., Inc.  
Motion Controls, LLC  
OEG GmbH  
Ohara Corp.  
Optical Perspectives Group, LLC  
Optikos Corporation  
Optimax Systems, Inc.  
OptiPro Systems  
PHASICS Corp.  
PIEZOCONCEPT  
Rainbow Research Optics, Inc.  
Safran Reosc  
StellarNet, Inc.  
Wordingham Technologies  
Xonox Technology GmbH

## VACUUM, COOLING, GAS HANDLING EQUIPMENT

attocube systems Inc.  
Mad City Labs., Inc.  
Micro Laser Systems, Inc.  
scia Systems GmbH  
Trillium US Inc.  
Zaber Technologies Inc.

## VEHICLE SENSING AND CONTROL

JENOPTIK Optical Systems, LLC  
Laser Components USA, Inc.  
Moulded Optics GmbH  
Optikos Corporation





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- Optical Design and Systems Engineering
- Deep Learning
- Advanced Metrology
- Remote Sensing
- Detectors and Imaging
- Optics Educators
- Industry Professionals and Exhibitors

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[www.spie.org/education/course-attendees](http://www.spie.org/education/course-attendees)

#### NEW AND FEATURED COURSES

- Polarized Light and Optical Design
- Imaging Spectrometry
- Physiological Optics of the Eye for Engineers
- Deep Learning and Its Applications in Image Processing
- Introduction to Optomechanical Design
- Optomechanical Systems Engineering
- Stray Light Analysis and Control
- Practical Optical System Design

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See descriptions online or onsite. Course daily schedule pages 52-53.  
Register at the SPIE Cashier.

### Advanced Metrology

- Sun SC1164 **Wavefront Data Analysis (Mahajan)** 1:30 pm to 5:30 pm, \$465 / \$283 / \$520
- Mon SC213 **Introduction to Interferometric Optical Testing (Wyant)** 8:30 am to 12:30 pm, \$425 / \$267 / \$480

### Detectors and Imaging

- Sun SC1222 **Deep Learning and Its Applications in Image Processing (Nasrabadi)** 8:30 am to 5:30 pm, \$625 / \$369 / \$735
- Mon SC504 **Introduction to CCD and CMOS Imaging Sensors and Applications (Crisp)** 8:30 am to 12:30 pm, \$530 / \$309 / \$585
- Mon SC916 **Digital Camera and Sensor Evaluation Using Photon Transfer (Crisp)** 1:30 pm to 5:30 pm, \$445 / \$275 / \$500

### Industry and Exhibitors

- Mon SC1170 **The Very Least You Need To Know About Optics (Diehl)** 1:30 pm to 3:30 pm, \$125 / \$60 / \$150

### Optical Design and Systems Engineering

- Sun SC690 **Optical System Design: Layout Principles and Practice (Greivenkamp)** 8:30 am to 5:30 pm, \$660 / \$383 / \$770
- Mon SC1247 **NEW Polarized Light and Optical Design (Chipman, Young)** 8:30 am to 5:30 pm, \$750 / \$419 / \$860
- Tue SC915 **Radiometry Revealed (Shaw)** 8:30 am to 12:30 pm, \$390 / \$253 / \$445
- Tue SC1199 **Stray Light Analysis and Control (Fest)** 8:30 am to 5:30 pm, \$670 / \$387 / \$780
- Wed SC003 **Practical Optical System Design (Youngworth)** 8:30 am to 5:30 pm, \$730 / \$411 / \$840
- Wed SC863 **Introduction to Modern Optical Drawings – the ISO 10110 Standard (Aikens)** 1:30 pm to 5:30 pm, \$390 / \$253 / \$445
- Thu SC1086 **Optical Materials, Fabrication and Testing for the Optical Engineer (DeGroot Nelson)** 8:30 am to 12:30 pm, \$390 / \$253 / \$445
- Thu SC1221 **Physiological Optics of the Eye for Engineers (Lakshminarayanan)** 8:30 am to 5:30 pm, \$660 / \$383 / \$770

### Optical Systems and Lens Design

- Thu SC1086 **Optical Materials, Fabrication and Testing for the Optical Engineer (DeGroot Nelson)** 8:30 am to 12:30 pm, \$390 / \$253 / \$445

### Optics + Photonics for Sustainable Energy

- Tue SC915 **Radiometry Revealed (Shaw)** 8:30 am to 12:30 pm, \$390 / \$253 / \$445

### Optomechanics and Optical Manufacturing

- Sun-Mon SC014 **Introduction to Optomechanical Design (Vukobratovich)** 8:30 am to 5:30 pm, \$1125 / \$627 / \$1380
- Mon SC213 **Introduction to Interferometric Optical Testing (Wyant)** 8:30 am to 12:30 pm, \$425 / \$267 / \$480
- Tue SC010 **Introduction to Optical Alignment Techniques (Castle)** 8:30 am to 5:30 pm, \$625 / \$369 / \$735
- Tue SC1019 **Mounting of Optical Components (Kasunic)** 8:30 am to 5:30 pm, \$705 / \$401 / \$815
- Tue SC781 **Optomechanical Analysis (Hatheway)** 8:30 am to 5:30 pm, \$670 / \$387 / \$780
- Tue SC015 **Fastening Optical Elements with Adhesives (Daly)** 1:30 pm to 5:30 pm, \$390 / \$253 / \$445
- Wed SC1120 **Finite Element Analysis of Optics (Genberg)** 8:30 am to 5:30 pm, \$695 / \$397 / \$805
- Thu SC1086 **Optical Materials, Fabrication and Testing for the Optical Engineer (DeGroot Nelson)** 8:30 am to 12:30 pm, \$390 / \$253 / \$445
- Thu SC1085 **Optomechanical Systems Engineering (Kasunic)** 8:30 am to 5:30 pm, \$695 / \$397 / \$805

### Remote Sensing

- Tue SC915 **Radiometry Revealed (Shaw)** 8:30 am to 12:30 pm, \$390 / \$253 / \$445
- Tue SC567 **Introduction to Optical Remote Sensing Systems (Shaw)** 1:30 pm to 5:30 pm, \$390 / \$253 / \$445
- Wed SC1220 **Imaging Spectrometry (Hagen)** 8:30 am to 12:30 pm, \$390 / \$253 / \$445

### Optics Educators


- Mon WS1248 **Training the Trainer in OPTIKS: Outreach for Professionals Who Teach in Informal Environments and K-12 Schools (McKee, Magnani)** 1:30 pm to 5:30 pm, \$10 / \$10 / \$15
- Tue WS1156 **Dumpster Optics: Teaching Optics with Junk (Donnelly, Magnani)** 10:30 am to 12:30 pm, \$10 / \$10 / \$15
- Tue WS1201 **I SEE THE LIGHT! An Introduction to Basic Properties of Light (McKee)** 1:30 pm to 5:30 pm, \$10 / \$10 / \$15
- Wed WS1141 **Problem-Based Learning: Engaging Students in STEM (Donnelly)** 10:30 am to 12:30 pm, \$10 / \$10 / \$15

### Professional Development

- Sat WS1249 **Student Chapter Leadership Workshop (Dumont)** 8:00 am to 5:00 pm, \$50 / \$50 / \$50
- Sun WS1250 **Think Like an Entrepreneur (Samadani)** 10:30 am to 5:30 pm, \$65 / \$30 / \$75
- Sun WS897 **Making the Most of Your Presentation (Dumont)** 1:30 pm to 5:30 pm, Free to attendees
- Mon WS1202 **Conveying Messages with Graphs (Dumont)** 1:30 pm to 5:30 pm, Free to attendees
- Mon WS908 **Structuring your Research Paper (Dumont)** 8:30 am to 12:30 pm, Free to attendees
- Mon WS1059 **Resumes to Interviews: Strategies for a Successful Job Search (Welch)** 3:30 pm to 5:30 pm, Free to attendees
- Tue WS1240 **Essential Skills for a Career in Industry (Giltner)** 8:30 am to 12:30 pm, Free to attendees

**PRICE KEY:** SPIE Member / Student Member / Non-Member

# COURSES

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
<b>Advanced Metrology</b>				
SC1164 <b>Wavefront Data Analysis</b> ( <i>Mahajan</i> ) 1:30 pm to 5:30 pm, \$465 / \$283 / \$520	SC213 <b>Introduction to Interferometric Optical Testing</b> ( <i>Wyant</i> ) 8:30 am to 12:30 pm, \$425 / \$267 / \$480			
<b>Detectors and Imaging</b>				
SC1222 <b>Deep Learning and Its Applications in Image Processing</b> ( <i>Nasrabad</i> ) 8:30 am to 5:30 pm, \$625 / \$369 / \$735	SC504 <b>Introduction to CCD and CMOS Imaging Sensors and Applications</b> ( <i>Crisp</i> ) 8:30 am to 12:30 pm, \$530 / \$309 / \$585			
	SC916 <b>Digital Camera and Sensor Evaluation Using Photon Transfer</b> ( <i>Crisp</i> ) 1:30 pm to 5:30 pm, \$445 / \$275 / \$500			
<b>Industry and Exhibitors</b>				
	SC1170 <b>The Very Least You Need To Know About Optics</b> ( <i>Diehl</i> ) 1:30 pm to 3:30 pm, \$125 / \$60 / \$150			
<b>Optical Design and Systems Engineering</b>				
SC690 <b>Optical System Design: Layout Principles and Practice</b> ( <i>Greivenkamp</i> ) 8:30 am to 5:30 pm, \$660 / \$383 / \$770	 SC1247 <b>Polarized Light and Optical Design</b> ( <i>Chipman, Young</i> ) 8:30 am to 5:30 pm, \$750 / \$419 / \$860	SC915 <b>Radiometry Revealed</b> ( <i>Shaw</i> ) 8:30 am to 12:30 pm, \$390 / \$253 / \$445	SC003 <b>Practical Optical System Design</b> ( <i>Youngworth</i> ) 8:30 am to 5:30 pm, \$730 / \$411 / \$840	SC1086 <b>Optical Materials, Fabrication and Testing for the Optical Engineer</b> ( <i>DeGroote Nelson</i> ) 8:30 am to 12:30 pm, \$390 / \$253 / \$445
		SC1199 <b>Stray Light Analysis and Control</b> ( <i>Fest</i> ) 8:30 am to 5:30 pm, \$670 / \$387 / \$780	SC863 <b>Introduction to Modern Optical Drawings – the ISO 10110 Standard</b> ( <i>Aikens</i> ) 1:30 pm to 5:30 pm, \$390 / \$253 / \$445	SC1221 <b>Physiological Optics of the Eye for Engineers</b> ( <i>Lakshminarayanan</i> ) 8:30 am to 5:30 pm, \$660 / \$383 / \$770
<b>Optical Systems and Lens Design</b>				
				SC1086 <b>Optical Materials, Fabrication and Testing for the Optical Engineer</b> ( <i>DeGroote Nelson</i> ) 8:30 am to 12:30 pm, \$390 / \$253 / \$445
<b>Optics and Photonics for Sustainable Energy</b>				
		SC915 <b>Radiometry Revealed</b> ( <i>Shaw</i> ) 8:30 am to 12:30 pm, \$390 / \$253 / \$445		

Price key: SPIE Member / Student Member / Non-Member



SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
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## Optomechanics and Optical Manufacturing

		SC213 <b>Introduction to Interferometric Optical Testing</b> ( <i>Wyant</i> ) 8:30 am to 12:30 pm, \$425 / \$267 / \$480	SC010 <b>Introduction to Optical Alignment Techniques</b> ( <i>Castle</i> ) 8:30 am to 5:30 pm, \$625 / \$369 / \$735	SC1120 <b>Finite Element Analysis of Optics</b> ( <i>Genberg</i> ) 8:30 am to 5:30 pm, \$695 / \$397 / \$805	SC1086 <b>Optical Materials, Fabrication and Testing for the Optical Engineer</b> ( <i>DeGroot Nelson</i> ) 8:30 am to 12:30 pm, \$390 / \$253 / \$445
	SC014 <b>Introduction to Optomechanical Design</b> ( <i>Vukobratovich</i> ) 8:30 am to 5:30 pm, \$1125 / \$627 / \$1380		SC1019 <b>Mounting of Optical Components</b> ( <i>Kasunic</i> ) 8:30 am to 5:30 pm, \$705 / \$401 / \$815		SC1085 <b>Optomechanical Systems Engineering</b> ( <i>Kasunic</i> ) 8:30 am to 5:30 pm, \$695 / \$397 / \$805
			SC781 <b>Optomechanical Analysis</b> ( <i>Hatheway</i> ) 8:30 am to 5:30 pm, \$670 / \$387 / \$780		
			SC015 <b>Fastening Optical Elements with Adhesives</b> ( <i>Daly</i> ) 1:30 pm to 5:30 pm, \$390 / \$253 / \$445		

## Remote Sensing

			SC915 <b>Radiometry Revealed</b> ( <i>Shaw</i> ) 8:30 am to 12:30 pm, \$390 / \$253 / \$445	SC1220 <b>Imaging Spectrometry</b> ( <i>Hagen</i> ) 8:30 am to 12:30 pm, \$390 / \$253 / \$445	
			SC567 <b>Introduction to Optical Remote Sensing Systems</b> ( <i>Shaw</i> ) 1:30 pm to 5:30 pm, \$390 / \$253 / \$445		

## Optics Educators

		WS1248 <b>Training the Trainer in OPTIKS: Outreach for Professionals Who Teach in Informal Environments and K-12 Schools</b> ( <i>McKee, Magnani</i> ) 1:30 pm to 5:30 pm, \$10 / \$10 / \$15	WS1156 <b>Dumpster Optics: Teaching Optics with Junk</b> ( <i>Donnelly, Magnani</i> ) 10:30 am to 12:30 pm, \$10 / \$10 / \$15	WS1141: <b>Problem-Based Learning: Engaging Students in STEM</b> ( <i>Donnelly</i> ) 10:30 am to 12:30 pm, \$10 / \$10 / \$15	
			WS1201 <b>I SEE THE LIGHT! An Introduction to Basic Properties of Light</b> ( <i>McKee</i> ) 1:30 pm to 5:30 pm, \$10 / \$10 / \$15		

## Professional Development

WS1249 <b>Student Chapter Leadership Workshop</b> ( <i>Doumont</i> ), 8:00 am to 5:00 pm, \$50 / \$50 / \$50	WS1250 <b>Think Like an Entrepreneur</b> ( <i>Samadani</i> ) 10:30 am to 5:30 pm, \$65 / \$30 / \$75	WS1202 <b>Conveying Messages with Graphs</b> ( <i>Doumont</i> ) 1:30 pm to 5:30 pm, Free to attendees	WS1240 <b>Essential Skills for a Career in Industry</b> ( <i>Giltner</i> ) 8:30 am to 12:30 pm, Free to attendees		
	WS897 <b>Making the Most of Your Presentation</b> ( <i>Doumont</i> ) 1:30 pm to 5:30 pm, Free to attendees	WS908 <b>Structuring your Research Paper</b> ( <i>Doumont</i> ) 8:30 am to 12:30 pm, Free to attendees			
		WS1059 <b>Resumes to Interviews: Strategies for a Successful Job Search</b> ( <i>Welch</i> ) 3:30 pm to 5:30 pm, Free to attendees			

**SPIE.**

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# THE INTERNATIONAL DAY OF LIGHT

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## 2018 PHOTO CONTEST

### ENTER THE CONTEST

Send us your photo that best  
highlights the world of light.  
Get details and submit a photo:  
[www.spie.org/contest](http://www.spie.org/contest)

### CASH PRIZES:

First Prize: US \$2,500  
Second Prize: US \$1,000  
Third Prize: US \$500

### SUBMISSION DEADLINE:

16 September 2018



## SPIE OPTICS + PHOTONICS PLAN YOUR WEEK



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COURTESY OF  
**SPIE.**

## Annual General Meeting of the SPIE Corporation

Tuesday 21 August 2018 · 6:00 to 7:00 pm  
Location: San Diego Marriott Marriott Marquis, Marina E

The Society of Photo-Optical Instrumentation Engineers (SPIE)  
Agenda

### 2018 Election Results Report on the “State of the Society” Treasurer’s Report Q & A with SPIE Officers

This is the general business meeting of the Society. All SPIE Members are welcome and encouraged to attend. This is your forum for expressing your ideas about the Society. Results of the 2018 election will be announced and the President and CEO will report on the “State of the Society.” If you are unable to attend, Members will receive an email with instructions on how to live stream the Annual General Meeting. This meeting will be followed by the Member Reception. Both events are open to Members only.

## Student Chapter Exhibit Mixer

Tuesday 21 August 2018 · 3:30 to 5:00 pm  
Location: Conv. Ctr. Sails Pavilion, Exhibition Hall

Join us for refreshments and a late-afternoon mixer in the Student Chapter section of the Exhibition Hall. Meet our amazing students and learn about the innovative activities of some of the best and brightest Student Chapters across the globe!

## SPIE Career Lab Meetup

Tuesday 21 August 2018 · 3:30 to 5:00 pm  
Location: Conv. Ctr. Sails Pavilion, Exhibition Hall

The SPIE Career Lab is a Facebook group for people in optics & photonics to help each other by communicating professional advice, questions, and opportunities. This reception is to celebrate the informative discussion and collegiality in the group. Meet other members of the Career Lab in person, propose new discussion topics, and turn online connections into real-life colleagues. Appetizers and cash bar available.

## SPIE Meetings Code of Conduct

SPIE is committed to providing a harassment and discrimination free experience for everyone at our events; an experience that embraces the richness of diversity where participants may exchange ideas, learn, network, and socialize in the company of colleagues in an environment of mutual respect.

- If you are the subject of unacceptable behavior or have witnessed such behavior, please notify an SPIE staff member or SPIE volunteer in a leadership position. Or you may go to the SPIE Cashier Desk in the Sails Pavilion, where someone will assist you.
- Or report online at [www.spie.ethicspoint.com](http://www.spie.ethicspoint.com).
- Anyone experiencing or witnessing behavior that constitutes an immediate threat to personal safety should dial 911.

## Essential Skills for a Career in Industry

Tuesday 21 August 2018 · 8:30 am to 12:30 pm  
Location: Conv. Ctr. Room 23C

### WS1240

Course Level: Introductory  
Course Length: Half-day (4 hours)  
Continuing Education Units (CEU): 0.4 Available upon request.

Working in industry is very different than academia. An advanced degree in science and engineering gives you many technical skills that are valuable in the private sector, but there are a lot of important aspects of working in a company that aren't taught in school. This course gives you the industry primer you need.

The course will start with an overview of the five most important ways that working in industry is different than the academic research environment STEM graduate students are trained in. Next, we will cover five habits that scientists and engineers who are successful in industry learn quickly. We will also cover some basics of company finance, how projects are managed in industry, and some tricks for keeping your projects on schedule.

### LEARNING OUTCOMES

- After completing this course, attendees will be able to
- describe five ways that technical work in industry is different than academic research
  - list the five habits that scientists and engineers who are successful in industry learn quickly
  - explain a corporate financial statement and point out where engineering/R&D fits into the profit model
  - describe why making decisions quickly is so important in industry, and explain a new technique for making a decision when the 'right' answer is not clear
  - list the key elements of a typical industry development project, and describe tactics for keeping it on schedule

### INTENDED AUDIENCE

This course is intended for graduate students in science and engineering programs who are looking to pursue careers in industry. Scientists and engineers who are already working in industry and want to accelerate their career progress will also find this course very helpful.

### INSTRUCTOR

**David M. Giltner** is the author of the book *Turning Science into Things People Need*, and is an internationally recognized speaker and mentor for early career scientists and engineers seeking careers in industry. He has spent the last 20 years commercializing photonics technologies in a variety of roles for several companies including JDS Uniphase and Ball Aerospace. Through his time in the private sector, David learned how to function well in both highly technical and business circles, and has often functioned as an interpreter to help these two worlds communicate more productively. David has a BS and PhD in physics and holds six patents in the fields of laser spectroscopy and optical communications.

Note: This course is free to technical attendees. No advance registration required.

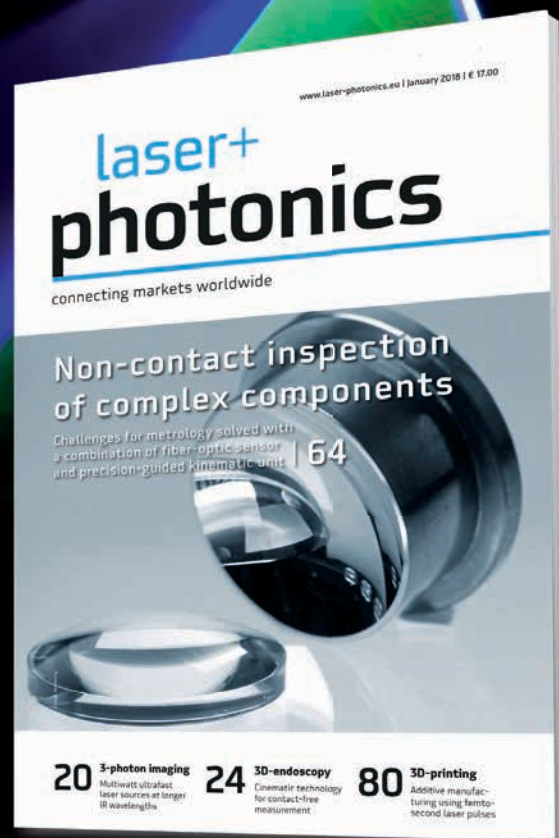
## Job Fair

Tuesday–Wednesday 21–22 August 2018 · 10:00 am to 5:00 pm  
Location: Conv. Ctr. Sails Pavilion, Exhibition Hall

Top employers are coming together to interview and hire candidates at SPIE Optics + Photonics 2018. Whether you are looking for employees or looking for a job, this is your chance to connect with the best. Meet 25 recruiters on the exhibit floor.



# See the whole SPECTRUM of Photonik



Check out our website: [www.photonik.de](http://www.photonik.de)

## Registration

### Onsite Registration and Badge Pick-up Hours

#### CONFERENCE REGISTRATION

Marriott Marquis, Marina Foyer (Level 3)  
Saturday 18 August · 10:00 am to 5:00 pm

#### CONFERENCE AND EXHIBITION REGISTRATION

San Diego Convention Center, Sails Pavilion (Upper Level)  
Sunday 19 August · 7:00 am to 5:00 pm  
Monday 20 August · 7:30 am to 5:00 pm  
Tuesday 21 August · 7:30 am to 5:00 pm  
Wednesday 22 August · 7:30 am to 5:00 pm  
Thursday 23 August · 7:45 am to 4:00 pm

#### CONFERENCE REGISTRATION

Includes admission to all conference sessions, plenaries, panels, and poster sessions, admission to the Exhibition, Welcome Reception, coffee breaks, and a choice of online proceedings.

#### EXHIBITION VISITOR REGISTRATION

Exhibition-Only visitor registration is complimentary.  
Tuesday 21 August · 7:30 am to 5:00 pm  
Wednesday 22 August · 7:30 am to 5:00 pm  
Thursday 23 August · 7:45 am to 2:00 pm

#### COURSE AND WORKSHOP REGISTRATION

Courses and workshops are priced separately. Course-only registration includes your selected course(s), course notes, coffee breaks, and admittance to the exhibition. Course prices include applicable taxes. Onsite, please go to Course Materials Desk after you pick up your badge.

Multiple facilities may be used for courses; allow yourself enough time to register, pick up your materials, and possibly walk to a nearby facility before your course begins.

#### PRESS REGISTRATION

For credentialed press and media representatives only. Please email contact information, title, and organization to [media@spie.org](mailto:media@spie.org).

## Onsite Services

### Internet Access

Complimentary wireless access is available throughout the upper level lobbies of the Convention Center; instructions will be posted onsite.

### SPIE Conference and Exhibition App

Search and browse the program, special events, participants, exhibitors, courses, and more. Free Conference App available for iPhone and Android phones.



### SPIE Bookstore

Conv. Ctr. Sail Pavilion (Upper Level)

Stop by the SPIE Bookstore to browse the latest SPIE Press Books, proceedings, and educational materials. While there, get a t-shirt or educational toy to bring home to the family.

### SPIE Education Services

Conv. Ctr. Sail Pavilion (Upper Level)

Browse course offerings or learn more about SPIE courses available in portable formats such as Online and customized, In-company courses.

### SPIE Luggage & Coat Check

Conv. Ctr. Hall D Lobby (Ground Level)  
Sunday through Wednesday · 7:30 am to 6:00 pm  
Thursday · 8:00 am to 6:00 pm

Complimentary luggage, package, and coat storage are available. Please note hours; no late pickup available.

### Business Center

FedEx Kinko, Convention Center, Hall D Lobby (Ground Level)  
Monday through Thursday · 8:00 am to 6:00 pm

Services include photocopying, faxing, printing services, and shipping. Office supplies are also available. Phone 619.525.5450

### Restaurant and City Information

Conv. Ctr. Hall D Lobby (Ground Level)  
Sunday through Thursday · 9:00 am to 6:00 pm

Services include sightseeing, shopping, and restaurant information

### Child Care Services

Marion's Childcare, Inc.  
Email: [amy@hotelchildcare.com](mailto:amy@hotelchildcare.com)  
Office: 619.303.4379 or text 619.663.4379  
Make a Reservation Online

Note: SPIE does not imply an endorsement nor recommendation of these services. They are provided on an "information only" basis for your further analysis and decision. Other services may be available.

### Urgent Message Line

An urgent message line is available during registration hours: 619.525.6200

### Lost and Found

Cashier, Conv. Ctr. Sail Pavilion (Upper Level)  
Open during Registration Hours

Found items will be kept at Cashier the duration of the meeting. At the end of the meeting, all found items will be turned over to the San Diego Convention Center Security, lost and found hotline: 619.525.5407



### New data laws are in effect

Unless you opt in to receive **email** from us, you will not receive any SPIE info about SPIE Optics + Photonics.

[www.spie.org/signup](http://www.spie.org/signup)






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## Food and Beverage Services

### Coffee Breaks

Sunday, Monday - Upper Level Lobby

Tuesday, Wednesday and Thursday morning - Exhibition Hall, Sails Pavilion (Upper Level)

Thursday - Upper Level Lobby

Complimentary coffee will be served between 10:00 am and 4:00 pm daily. Check individual conference listings for exact times and locations.

## Food & Refreshments for Purchase

### STARBUCKS

Conv. Ctr. Lobby E (Ground Level)

Sunday and Monday · 7:00 am to 3:00 pm

Tuesday and Wednesday · 7:00 am to 4:00 pm

Thursday · 7:00 am to 2:00 pm

### MRS. FIELDS COOKIES / AUNTIE ANNE'S PRETZELS

Conv. Ctr. Lobby 20A (Upper Level)

Sunday through Thursday · 7:30 am to 4:00 pm

### SNACK CART

Conv. Ctr. Lobby 20B (Upper Level)

Tuesday and Wednesday · 11:00 am to 2:00 pm

Assorted Gourmet Salads and Sandwiches, Fruit, Chips, Snacks and Assorted Beverages are available for purchase. Cash and credit cards accepted

## Exhibition Ice Cream Social

Exhibition Hall

Thursday · 12:30 to 1:30 pm

Join the exhibition and celebrate with an ice cream treat.

## Travel

### Welcome to San Diego

With 70 miles of beautiful beaches, near-perfect weather year-round, and a variety of magnificent settings countywide, San Diego offers a fun and inexpensive getaway, for kids and adults, any time of year. No stay in San Diego is complete without a trip to the waterfront. San Diego Bay is bustling with activity, as it serves as the homeport for Navy ships, a large sportfishing fleet, thousands of pleasure craft, and the USS Midway Museum is a retired aircraft carrier that now serves as a fascinating interactive floating museum. The largest urban cultural park in the USA, Balboa Park is often referred to as the "Smithsonian of the West." Its 1,200 lush acres are home to 85 cultural attractions, including 15 museums, eight gardens and the San Diego Zoo.

### Airport Information

San Diego International Airport (SAN) is conveniently located three miles northwest of downtown San Diego.

### TRANSPORTATION FROM THE AIRPORT

Taxi service from the San Diego Airport to the downtown hotels is approximately \$15-25 depending on traffic.

Uber or Lyft from the San Diego Airport to the downtown hotels is approximately \$6-8 (shared ride) or \$12-17

## Shuttles and Public Transportation

### SUPERSHUTTLE

SPIE Optics + Photonics attendees will receive a discount of \$1 off one way, or \$2 off roundtrip when booking SuperShuttle with an advance reservation. Make a reservation online or call 1-800-258-3826. Refer to the group code SS15 to receive the discount. If you do not provide the group code to the phone agent, you will not receive the discount. You do not have to make an advance reservation to ride SuperShuttle, but without a reservation, you will pay the full rate at the ticket counter.

### Ground Transportation Instructions for

Arriving in Terminal 1 - Follow the signs to Ground Transportation Sky Bridge. Proceed to the 'Shuttle for Hire Island' and ask the Transportation Coordinator for a Supershuttle van.

Arriving in Terminal 2 - Exit the Terminal 2 doors; cross the street using the cross walk to the 'Shuttle for Hire Island' and ask the Transportation Coordinator for a Supershuttle van.

### Complimentary Shuttle for guests at the Westin Hotel

Westin Hotel guests receive complimentary shuttle to/from SAN. On arrival, at baggage claim, call the hotel from the Westin Kiosk or dial 619-239-4500. The shuttle will arrive within 20 minutes. Departing guests should sign up with the front desk bellman one day prior to departure. Shuttle leaves every 30 minutes at the top and bottom of the hour from 6:00 am.

### Bayfront Shuttle

Bayfront Shuttle - \$3 to ride all day - Hop on the Big Bay Shuttle to visit the numerous hotels, attractions, shops and restaurants along the scenic San Diego bay. Shuttle route includes Hilton Bayfront, Marriott Marquis & Marina, Seaport Village, Broadway/Navy Pier, Maritime Museum, Sheraton Hotel & Marina.

### San Diego Trolley - Metropolitan Transit System

Trolley cars are red and travel above ground on light rail lines every 15 minutes. If guests purchase Day Tripper Passes from the Transit e-store (on-line), before their arrival date, they can then use Bus 992 from the airport to the America Plaza Trolley Station to your hotel and to and from the convention center for unlimited rides at that one flat rate. Or you can purchase a day pass for \$5 (subject to change) when you board the 992 bus at the airport from any Terminal. Get off at Broadway & Kettner Blvd. and walk to the America Plaza Trolley Station. From there, take the Orange Line with signage 'Downtown/Convention Center' to your hotel or to the convention center.

## Driving Directions and Parking

Find links to the PDFs of **Driving Directions** to the San Diego Convention Center and Hotels, the **San Diego Convention Center Parking**, and rates, and for **Parking in the vicinity** of the San Diego Convention Center online, on the SPIE Optics + Photonics travel information page.

Use Parking Panda to reserve parking at the lots and garages surrounding the San Diego Convention Center.

## Car Rental

**Hertz** Hertz Car Rental is the selected as the official car rental agency for this Event. To reserve a car, identify yourself as an Optics + Photonics conference attendee using the Hertz Meeting Code CV# 029B0023. Discount rates apply for rentals up to one week prior through one week after the conference dates. Note: When booking from International Hertz locations, the CV # must be quoted with the letters CV before the number, i.e. CV029B0023. Click here to book online Book Hertz Online. Be sure to enter the code to receive the meeting discount rate.

- In the USA call 1-800-654-2240.
- In Canada call 1-800-263-0600, or 1-416-620-9620 in Toronto.
- In Europe and Asia call the nearest Hertz Reservation Center or travel agent.
- Outside of these areas call 1-405-749-4434.

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## SPIE Event Policies

# Acceptance of Policies and Registration Conditions

The following Policies and Conditions apply to all SPIE Events. As a condition of registration, you will be required to acknowledge and accept the SPIE Registration Policies and Conditions contained herein.

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### Attendee Registration and Admission Policy

SPIE, or their officially designated event management, in their sole discretion, reserves the right to accept or decline an individual's registration for an event. Further, SPIE, or event management, reserves the right to prohibit entry or to remove any individual whether registered or not, be they attendees, exhibitors, representatives, or vendors, whose conduct is not in keeping with the character and purpose of the event. Without limiting the foregoing, SPIE and event management reserve the right to remove or refuse entry to anyone who has registered or gained access under false pretenses, provided false information, or for any other reason whatsoever that they deem is cause under the circumstances.

### Payment Policy

Registrations must be fully paid before access to the conference is allowed. SPIE accepts VISA, MasterCard, American Express, Discover, Diner's Club, checks and wire transfers. Onsite registrations can also be paid with cash.

### SPIE Safe Meeting and Misconduct Policy

SPIE is a professional, not-for-profit society committed to providing valuable and safe conference and exhibition experiences. SPIE is dedicated to equal opportunity and treatment for all its members, meeting attendees, staff, and contractors. Attendees are expected to be respectful to other attendees, SPIE staff, and contractors. Harassment and other misconduct will not be tolerated; violations will be addressed promptly and seriously. Consequences up to and including expulsion from the event as appropriate may be implemented immediately.

The SPIE anti-harassment policy can be found at <http://spie.org/policy>

### Reporting of Unethical or Inappropriate Behavior

Onsite at an SPIE meeting, contact any SPIE Staff with concerns or questions for thorough follow-up. If you feel in immediate danger, please dial the local emergency number for police intervention.

SPIE has established a confidential reporting system for staff and all meetings participants to raise concerns about possible unethical or inappropriate behavior within our community. Complaints may be filed by phoning toll-free to +1-888-818-6898 from within the United States and Canada, or online at [www.SPIE.ethicspoint.com](http://www.SPIE.ethicspoint.com) and may be made anonymously.

### Identification Requirement Policy

To verify registered participants and provide a measure of security, SPIE will ask attendees to present a government-issued photo identification at registration to collect registration materials.

Individuals are not allowed to pick up badges for other attendees. Further, attendees may not have some other person participate in their place at any conference-related activity. Such other individuals will be required to register on their own behalf to participate.

### Access to Conference Events / Children Younger than 18

All conference technical and networking events require a badge for admission. Registered attendees may bring children with them as long as they have been issued a badge. Registration badges for children under 18 are free and available at the SPIE registration desk onsite. Children under 14 years of age must be accompanied by an adult at all times, and guardians are asked to help maintain a professional, disturbance-free conference environment.

### Unauthorized Solicitation Policy

Unauthorized solicitation in the Exhibition Hall is prohibited. Any nonexhibiting manufacturer or supplier observed to be distributing information or soliciting business in the aisles, or in another company's booth, will be asked to leave immediately.

### Recording Policy

Conferences, courses, and poster sessions: For copyright reasons, recordings of any kind are prohibited without prior written consent of the presenter or instructor. Attendees may not capture or use materials presented in any meeting/course room or in course notes on display without written permission. Consent forms are available at Speaker Check-In or SPIE Registration. Individuals not complying with this policy will be asked to leave a given session and/or asked to surrender their recording media. Refusal to comply with such requests is grounds for expulsion from the event.

## Capture and Use of a Person's Image

By registering for an SPIE event, you grant full permission to SPIE to capture, store, use, and/or reproduce your image or likeness by any audio and/or visual recording technique and create derivative works of these images and recordings in any SPIE media now known or later developed, for any legitimate SPIE marketing or promotional purpose.

By registering for an SPIE event, you waive any right to inspect or approve the use of the images or recordings or of any written copy. You also waive any right to royalties or other compensation arising from or related to the use of the images, recordings, or materials. By registering, you release, defend, indemnify and hold harmless SPIE from and against any claims, damages or liability arising from or related to the use of the images, recordings or materials, including but not limited to claims of defamation, invasion of privacy, or rights of publicity or copyright infringement, or any misuse, distortion, blurring, alteration, optical illusion or use in composite form that may occur or be produced in taking, processing, reduction or production of the finished product, its publication or distribution.

## Laser Pointer Safety Information/Policy

SPIE supplies tested and safety-approved laser pointers for all conference meeting rooms. For safety reasons, SPIE requests that presenters use provided laser pointers.

Use of a personal laser pointer represents the user's acceptance of liability for use of a non-SPIE-supplied laser pointer. If you choose to use your own laser pointer, it must be tested to ensure <5 mW power output. Laser pointers in Class II and IIIa (<5 mW) are eye safe if power output is correct, but output must be verified because manufacturer labeling may not match actual output. You are required to sign a waiver releasing SPIE of any liability for use of potentially non-safe, personal laser pointers. Waivers are available at Speaker Check-In.

## Unsecured Items Policy

Personal belongings should not be left unattended in meeting rooms or public areas. Unattended items are subject to removal by security. SPIE is not responsible for items left unattended.

## Wireless Internet Service Policy

At most events, SPIE provides wireless access for attendees. Properly secure your computer before accessing the public wireless network. SPIE is not responsible for computer viruses or other computer damage.

## No-Smoking Policy

Smoking, including e-cigarettes, is not permitted at any SPIE event.

## Agreement to Hold Harmless

Attendee agrees to release and hold harmless SPIE from any and all claims, demands, and causes of action arising out of or relating to your participation in the event you are registering to participate in and use of any associated facilities or hotels.

## Event Cancellation Policy

If for some unforeseen reason SPIE should have to cancel an event, processed registration fees will be refunded to registrants. Registrants will be responsible for cancellation of travel arrangements or housing reservations and the applicable fees.

## SPIE International Headquarters

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