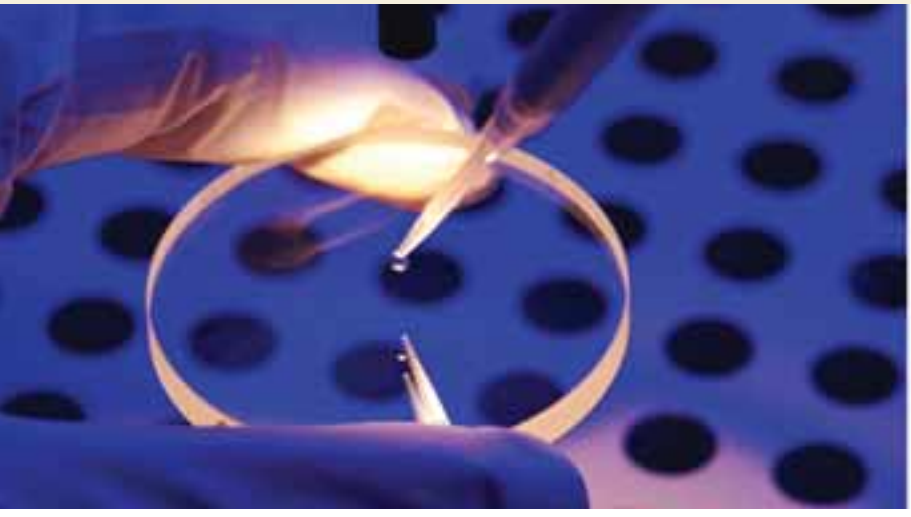
2009
Event Preview

SPIE Optifab

Exhibition Dates: 12-14 May 2009
Conference Dates: 11-14 May 2009
Rochester Riverside Convention Center
Rochester, New York, USA

CONFERENCES COURSES EXHIBITIONS SPECIAL EVENTS



Co-sponsored by

The American Precision Optics Manufacturers Association

Sponsored by

SPIE
Connecting minds. Advancing light.

SPIE Optifab is a one-of-a-kind optical fabrication event

Consisting of technical and commercial presentations, courses, and an exhibition



SPIE Optifab

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Conference Dates: 11-14 May 2009
Rochester Riverside Convention Center
Rochester, New York, USA

CONFERENCE

This four-day conference will cover the latest technical and commercial presentations on enabling technologies and applications for optical fabrication.

Technical topics:

- Optical Materials
- Optical Manufacturing
- Aspheric Manufacturing
- Optical Engineering
- Metrology
- Metrology and Coatings
- Commercial Presentations
- Aspheric Metrology
- Meter Class Optics

Commercial topics:

- Quartz crystals for optical applications
- Software assisted inspection
- Metrology and manufacturing of free form optics
- Polishing of precision surfaces
- Cost effectiveness strategies
- Product of high precision aspheres
- IR and UV materials
- Outlook for optimal glass at Schott
- Fizeau interferometers

Conference Chairs

James J. Kumler, Coastal Optical Systems Inc. (USA)

Matthias Pfaff, OptoTech Optikmaschinen GmbH (Germany)

Steering Committee

Michael J. Bechtold, OptiPro Systems (USA)
Christopher T. Cotton, ASE Optics, Inc. (USA)
Walter C. Czajkowski, Edmund Optics Inc. (USA)
Thomas Danger, Schneider GmbH & Co. KG (Germany)
Toshihide Dohi, Optiworks, Inc. (Japan)
Edward M. Fess, Univ. of Rochester (USA)
Thomas Godin, Satisloh North America Inc. (USA)
Donald Golini, QED Technologies Inc. (USA)
Michael F. Kuechel, Zygo Corp. (Germany)
Hans Lauth, JENOPTIK Laser, Optik, Systeme GmbH (Germany)
Justin Mahanna, Universal Photonics Inc. (USA)
Michael P. Mandina, Optimax Systems, Inc. (USA)
Richard A. Nasca, Corning Tropel Corp. (USA)
John J. Nemechek, Metrology Concepts LLC (USA)
Basilio Nesti, Naked Optics Corp. (USA)

Attend SPIE Optifab 2009 in Rochester, New York, USA

spie.org/ofbpreview



COURSES

Get the latest certified technical training. Choose from 10 half-and-full day courses in optical fabrication testing, machining, coating, bonding, and more.

New

SC013: Precision Mounting of Optical Components

SC848: Fundamentals of Single Point Diamond Turning

SC863: Understanding ISO-10110: The Optics Drawing Standard

EXHIBITION

Be part of a 3-day Exhibition that is dedicated to optical manufacturing. This is an event where you'll see the machines and the people that use them.

See the latest in

- Optical fabrication equipment
- Optical components, materials, and systems
- Optomechanical components/ devices
- Laser system components
- Optical thin film coatings
- Optical metrology and testing equipment
- Clean room equipment
- With product demonstrations

Meet your key suppliers . . .

Optifab is an international event showcasing optical manufacturing technology, including operations, machines, tools, materials, instrumentation, metrology, and processes. Don't miss the chance to do months of product research and take advantage of teaming opportunities at *the* premier optical fabrication exhibition.

. . . in an area rich in photonics

Don't miss this opportunity to travel to Rochester, one of the highest ranked areas for growth in the photonics industry arena. The Rochester-Ithaca-Corning triangle is rich with companies involved in high-tech, light-driven technologies, including Xerox, Eastman Kodak, Bausch & Lomb, ITT, and Corning. Optifab also attracts buyers from around the world.

Exhibition Chairs

James M. Sydor,
Sydor Optics, Inc. (USA)

Richard A. Nasca,
Corning Tropel Corp. (USA)

Robert F. Novak, APOMA (USA)
Yazid Tohme, Moore NanoTechnology Systems, LLC (USA)
James M. Sydor, Sydor Optics, Inc. (USA)
Paul R. Tolley, Syntec Optics, Inc. (USA)
Martin J. Valente, College of Optical Sciences/ The Univ. of Arizona Center (USA)
Paul Meier-Wang, AccuCoat Inc. (USA)
Kirk Warden, LaCroix Optical Co. (USA)

"Our time spent at SPIE Optifab is invaluable because we learn about the latest advances in materials and fabrication technology, and at the same time work on securing new business opportunities."

Kirk Warden,
LaCroix Optical

SPIE Courses

KNOWLEDGE — NETWORKING — ADVANCEMENT

Money-back Guarantee

We are confident that once you experience an SPIE course for yourself you will look to SPIE for your future education needs. However, if for any reason you are dissatisfied, SPIE will gladly refund your money. We just ask that you tell us what you did not like; suggestions for improvement are always welcome.

Continuing Education Units

SPIE has been approved as an authorized provider of CEUs by IACET, The International Association for Continuing Education and Training (Provider #1002092). In obtaining this approval, SPIE has demonstrated that it complies with the ANSI/IACET Standards which are widely recognized as standards of good practice.

SPIE instructors are the best in the business.

The Society has hand picked some of the top minds from academia and industry to lead a variety of courses at SPIE Events.

Register for a course:

- Take advantage of the industry's best instructors
- Further your career through ongoing education
- Earn CEUs for your continuing education

Understanding ISO-10110: The Optics Drawing Standard

SC863

Course Level: Introductory
Wednesday 8:30 am to 5:30 pm
CEU: 0.65 $625 / $720 USD

This course provides attendees with an understanding of ISO-10110, the International Standard for Optics drawing notations. The course concentrates on the fundamentals of the drawing layout and notations required for typical optics, such as glass parameters, radius, wavefront, surface imperfections and roughness. Attendees are also introduced to all other sections of the drawing standard, including proper notation for aspheres, laser damage threshold, and transmitted wave front error. Practical and useful examples are included throughout. The course price includes copies of the basic drawing standards, ISO 10110-1 and ISO 10110-10.

LEARNING OUTCOMES

This course will enable you to:

- read and interpret an optical drawing prepared to ISO-10110
- identify the meaning of the symbology of ISO 10110
- describe which symbol corresponds to each of the fundamental optical parameters
- compose a ISO-10110-compliant optical element drawing

INTENDED AUDIENCE

This material is intended for anyone who encounters or generates optical drawings in the course of their work, and is called on to specify or interpret them. Those who either design their own optics, work with optical designers, or manufacture optics to ISO 10110 tolerances will find this course valuable.

INSTRUCTOR

David Aikens is President and founder of Savvy Optics Corp., and has been involved in optics drawings and specifications for over 20 years. He is a past Chairman of the Board of the Optics and Electro-Optics Standards Council.

COURSE PRICE INCLUDES copies of both ISO 10110-1:2006 Optics and photonics - Preparation of drawings for optical elements and systems - Part 1: General, and ISO 10110-10:2004 Optics and photonics - Preparation of drawings for optical elements and systems - Part 10: Table representing data of optical elements and cemented assemblies. Additional parts need to be purchased separately.

Fundamentals of Single Point Diamond Turning

SC848

Course level: Introductory
Tuesday 1:30 to 5:30 pm
CEU .35 $255 / $305 USD

This course provides attendees with a basic working knowledge of single point diamond turning of optical components. The course covers a wide range of topics and should provide the attendee with an understanding of the process capabilities of this technology. Key subject matter includes; equipment, processes, cutting mechanics, material selection, fixturing, metrology, applications, component design, optical tolerancing, and producibility.

LEARNING OUTCOMES

This course will enable you to:
- gain valuable insight into process capabilities
- make informed decisions with regards to material selections and part geometries
- properly specify and tolerance component drawings
- identify cost and producibility drivers
- understand the current state-of-the-art in diamond turning technology

INTENDED AUDIENCE

This material is intended for anyone who designs, fabricates, or procures, single-point diamond turned components and wishes to gain valuable insight into the overall fabrication process for the purpose of making better decisions.

INSTRUCTOR

John Schaefer is a Sr. Principal Process Engineer for ELCAN Optical Technologies, a Raytheon Company, and has more than 20 years of hands-on experience in single point diamond turning. He has extensive experience in process development, concurrent engineering, productionization, interferometry, asphere metrology, and equipment specification and procurement.

Cost-Conscious Tolerancing of Optical Systems

SC720

Course level: Introductory
Wednesday 8:30 am to 12:30 pm
CEU .35 $255 / $305 USD

The purpose of this course is to present concepts, tools, and methods that will help attendees determine optimal tolerances for optical systems. Topics in the course apply to all volumes of systems being developed from single systems to millions of units. The course provides a background to effective tolerancing with discussions on variability and relevant applied statistics. Tolerance analysis and assignment with strong methodology and examples are then covered, with comments on treatment of active versus passive systems. The course concludes by giving a short introduction to useful tools like design of experiments and statistical process control. References and examples are included to help researchers, designers, engineers, and technicians practically apply the concepts to plan, design, engineer, and build high-quality cost-competitive optical systems.

LEARNING OUTCOMES

This course will enable you to:
- define variability and comprehend its impact on nominal systems
- utilize fundamental applied statistics in tolerancing
- construct tolerance analysis budgets
- perform detailed tolerance analysis
- recognize the differences in treatment of active versus passive optical systems
- summarize different design of experiment and statistical process control strategies

INTENDED AUDIENCE

This material is intended for managers, engineers, and technical staff involved in product design from concept through manufacturing.

INSTRUCTOR

Richard Youngworth is the Director of Optical Engineering at Light Capture, Inc. Dr. Youngworth has 15 years of experience spanning numerous facets of the optics field including optical metrology, design, manufacturing, and analysis. He has authored and delivered sundry papers, talks, and lectures on optical design and engineering and also teaches a workshop for SPIE on “Strategies and Delivery of Professional Conference Presentations”. He is an active SPIE program committee member and chair for conferences and society committees. Dr. Youngworth has a B.S. in electrical engineering from the University of Colorado at Boulder and earned his Ph.D. in optics at the University of Rochester by researching tolerance analysis of optical systems.

Understanding Scratch and Dig Specifications

SC700

Course level: Introductory
Tuesday 8:30 am to 12:30 pm
CEU .35 $305 / $355 USD

Surface imperfection specifications (i.e. Scratch-Dig) are among the most misunderstood, misinterpreted, and ambiguous of all optics component specifications. This course provides attendees with an understanding of the source of ambiguity in surface imperfection specifications, and provides the context needed to properly specify surface imperfections using a variety of specification standards, and to evaluate a given optic to a particular level of surface imperfection specification. The course will focus on the differences and application of the Mil-PRF-13830, ISO 10110-7, and BSR/OP1.002. Many practical and useful specification examples are included throughout, as well as a hands-on demonstration on visual comparison evaluation techniques.

LEARNING OUTCOMES

This course will enable you to:
- describe the various surface imperfection specifications that exist today
- compose a meaningful surface imperfection specification for cosmetic imperfections using ISO, ANSI, or Mil standards
- identify the different illumination methods and comparison standards for evaluation
- demonstrate a surface imperfection visual inspection
- understand the options available for controlling surface imperfections in a vendor/supplier relationship

INTENDED AUDIENCE

This material is intended for anyone who needs specify, quote, or evaluate optics for surface imperfections. Those who either design their own optics or who are responsible for optics quality control will find this course valuable.

INSTRUCTOR

David Aikens is the president and CEO of Savvy Optics, and has been designing and specifying optics for more than 20 years. He has been active in the development of surface imperfection standards since 1996, and is currently serving as past Chairman of the Board for the ANSI accredited Optics and Electro-Optics Standards Council, and is a technical advisor for the American delegation to ISO TAG TC172.

COURSE PRICE INCLUDES a copy of the latest ANSI approved surface imperfections specification standard.

Courses

Aspheric Optics: Design, Fabrication, and Test

SC552

Course level: Introductory
Wednesday 1:30 to 5:30 pm
CEU .35 $340 / $390 USD

This course will provide attendees with a broad and useful understanding of aspheric surfaces and components. Aspheric or non-spherical surfaces in a lens or mirror system can bring significant benefits to the optical performance. This is not without the liabilities of added cost, delivery time, and even producibility. The course will begin with lens design, and specifically how and when to incorporate aspherics into a variety of lens design forms. We discuss what aspherics will do for a design, and also what they will not do. We then will discuss how aspheric surfaces are manufactured along with recommendations on how to specify aspherics. Several methods for predicting performance for systems with asphere induced wavefront irregularities will be shown. We also will discuss the testing of aspherics.

LEARNING OUTCOMES

This course will enable you to:
- identify when and where in a lens or mirror design to consider aspheric surfaces
- optimize your design using aspherics
- specify the resulting aspheric component and predict performance due to errors
- understand how aspherics are manufactured and tested

INTENDED AUDIENCE

This course is intended for anyone who designs optical systems. It will be of value to those who either design their own optics or those who work directly or indirectly with optical designers, as you will now understand what is really going on with aspheric surfaces and how to ask the right questions of your designers or fabricators.

INSTRUCTOR

Robert Fischer is President and founder of OPTICS 1, Inc., and has been involved in optical system design and engineering for over 25 years. Fischer is co-author of Optical System Design co-published by SPIE and McGraw-Hill. He is also a past president of SPIE.

COURSE PRICE INCLUDES the text *Optical System Design, 2nd Edition* (SPIE Press, 2008) by Robert E. Fischer, Biljana Tadic-Galeb, and Paul R. Yoder, Jr.

Optical Manufacturing Overview

SC350

Course level: Introductory
Monday 8:30 am to 5:30 pm
CEU .65 $450 / $545 USD

This course provides a basic understanding of the methodology and processes used in the fabrication of precision optical elements. Emphasis is placed on the selection and use of tooling, materials and equipment used in the manufacturing process with specific examples.

LEARNING OUTCOMES

This course will enable you to:
- describe the normal process flow in the manufacturing of spherical optical components
- explain blank preparation, curve generating, grinding, polishing, and centering processes
- classify the metrology needed for each step in the manufacturing process cycles
- select the proper tooling for the part in the manufacturing sequence
- compare various optical fabrication techniques and equipment

INTENDED AUDIENCE

Engineers, technicians and buyers who require an awareness of current optical fabrication methodology as well as “lead times” associated with low volume production.

INSTRUCTOR

Robert Novak is the president and CEO of BAN Optical, and has been designing and delivering courses in optical engineering for over 37 years. He is professor emeritus of optics at Monroe Community College where he was chairman of Optical Systems Technology for over 30 years. He is currently the Secretary of APOMA (American Precision Optics Manufacturing Association) a position he has held for over 20 years and is an Honorary Member of the Rochester Section of the OSA.

Optical Alignment Mechanisms

SC220

Course level: Intermediate
Tuesday 1:30 to 5:30 pm
CEU .35 $255 / $305 USD

This is a practical “how to” course dealing with the design and fabrication of precision optical alignment and adjustment devices. The course uses example optical systems to identify typical alignment requirements and provides a catalog of proven adjustment techniques.

LEARNING OUTCOMES

This course will enable you to:
- learn to assess degrees-of-freedom an optical element must have to align it in its system
- define range-of-adjustment vs. resolution-of-adjustment for these mechanisms
- identify appropriate design guidelines and pitfalls
- understand material choices, important tolerances, and mount stability
- determine where to get the hardware made.

INTENDED AUDIENCE

This course is intended to help the mechanical or opto-mechanical design engineer identify and characterize the degrees-of-freedom necessary to align an optical system and to provide him with a catalog of proven configurations. While the course primarily addresses small optics, the concepts apply to larger systems as well. A general knowledge of optics is required; familiarity with optical measurement and mounting techniques is highly recommended.

INSTRUCTOR

Robert Guyer specializes in the design of lasers, stable optical mounts, gimbaled systems, and precision mechanisms. Mr. Guyer is an Engineering Fellow at BAE Systems in Nashua, New Hampshire, and has over 40 years military, space, and commercial opto-mechanical product development experience with BAE Systems, RCA, GE, Lockheed Martin, and AFAB Group. He is a registered Professional Engineer and committed Corvette enthusiast.

Modern Optical Testing

SC212

Course level: Intermediate
Monday 1:30 to 5:30 pm
CEU .35 $285 / $335 USD

This course describes the basic interferometry techniques used in the evaluation of optical components and optical systems. It discusses interferogram interpretation, computer analysis, and phase-shifting interferometry, as well as various commonly used wavefront-measuring interferometers. The instructor describes specialized techniques such as testing windows and prisms in transmission, 90-degree prisms and corner cubes, measuring index inhomogeneity, and radius of curvature. Testing cylindrical and aspheric surfaces, determining the absolute shape of flats and spheres, and the use of infrared interferometers for testing ground surfaces are also discussed. The course also covers state-of-the-art direct phase measurement interferometers.

LEARNING OUTCOMES

This course will enable you to:
- better specify optical components and systems
- produce higher-quality optical systems
- determine if an optics supplier can actually supply the optics you are ordering
- evaluate optical system performance
- explain basic interferometry and interferometers for optical testing
- analyze interferograms
- test flat and spherical surfaces
- test ground and aspheric surfaces
- make absolute measurements and discuss state-of-the-art direct phase - measurement interferometers.

INTENDED AUDIENCE

Engineers and technical managers who are involved with the construction, analysis or use of optical systems will find this material useful.

INSTRUCTOR

James Wyant is Dean of the College of Optical Sciences and Professor of Optical Sciences at the University of Arizona. He was a founder of the WYKO Corporation and served as its president from 1984 to 1997. Dr. Wyant was the 1986 President of SPIE.

COURSE PRICE INCLUDES the text, *Field Guide to Interferometric Optical Testing* (SPIE Press, 2006) by Eric P. Goodwin and James C. Wyant.

Structural Adhesives for Optical Bonding

SC015

Course level: Intermediate
Tuesday 8:30 am to 12:30 pm
CEU .35 $255 / $305 USD

Optomechanical systems require secure mounting of optical elements. This important aspect of the design can cause a production to stop if sound engineering is not applied. A wide variety of adhesives are discussed with respect to their relevant properties. Design considerations, differing mounting techniques, production concerns, and reliability are reviewed. The instructor gives success and failure case histories.

LEARNING OUTCOMES

This course will enable you to:
- understand and classify adhesives and how they work (epoxy, urethane, silicone, acrylic, RTV, VU-cure, etc.)
- identify properties that affect use
- obtain a users guide to adhesive selection and an adhesive property matrix
- make optic-to-mount considerations
- understand contamination/outgassing
- identify uses of testing; witness sample testing, pull tests, outgassing testing, stress birefringence, optical stability

INTENDED AUDIENCE

This course is for engineers, managers, and technicians, this course provides a foundation for the correct design for successful optical mounting; an understanding of the best options to employ for each application, and the selection and approach conducive to production. A bound course outline is provided including summaries of popular adhesives and their properties. Some adhesive samples are available.

INSTRUCTOR

John Daly has been a consultant for the past 10 years. He has experience in the applications of adhesives to our industry. Daly has more than 20 years of experience in academia, aerospace, medical, commercial, and industrial fields. He has a B.S. in Mechanical Engineering Ph.D. in Applied Physics. His exposure to these areas for applications of laser, electro-optic, and photonic technologies has covered research, development, production, and management.

Precision Mounting of Optical Components

SC013

Course level: Introductory
Monday 8:30 am to 5:30 pm
CEU .65 $535 / $630 USD

This introductory-level, one-day course reviews key influences of adverse environments on optical components and instruments, important characteristics of materials, and techniques commonly used to mount individual and multiple lenses, windows, shells, optical filters, prisms and small to moderate sized mirrors. Mounting means include retaining rings, flanges, spring clips, adhesives, sealing compounds, and flexures. Techniques for estimating stress buildup within typical optical components due to imposed mounting forces are summarized. Effects of temperature changes on optomechanical assemblies and athermalization techniques are also summarized. Examples of component mountings in typical optical instrument applications are considered throughout the course in order to illustrate successful design configurations.

LEARNING OUTCOMES

This course will enable you to:
- appreciate the effects of the environment on optics
- identify critical aspects of the optic-to-mount interface
- compare alternative mounting designs for individual lenses, lens assemblies, catadioptric systems, windows, shells, filters, prisms, and small to moderate sized mirrors
- estimate axial contact stresses in optics due to mounting forces
- anticipate how temperature changes may affect optical instruments

INTENDED AUDIENCE

Participation in this course will help optical and mechanical technicians, engineers, designers, scientists, project managers, and team supervisors as well as individuals from other technical disciplines learn how optical components can best be integrated into instruments and basic techniques for analyzing optomechanical designs.

INSTRUCTOR

Paul Yoder, Jr. has continued to serve various clients as an independent consultant in optical and optomechanical engineering following a 40-year career in optical engineering with U.S. Government and industrial organizations. During this period, he designed optical instruments for military, aerospace, commercial, and medical applications. He is a fellow of both OSA and SPIE, and a founding member of SPIE's Optomechanical Instrument Working Group. For many years, Yoder also has taught short courses on optical and optomechanical engineering for industry, government agencies, and SPIE as well as graduate-level courses for the University of Connecticut.

COURSE PRICE INCLUDES the newly revised and expanded text, *Mounting Optics in Optical Instruments, 2nd edition* (SPIE Press, 2008), by Paul R. Yoder, Jr.

"Good course and instructor. Excellent examples. Very good, knowledgeable, clear and directional."
(Optifab SC720, instructor David Aikens)

Technical Program

Monday-Thursday 11-14 May 2009

SPIE Optifab

Conference Chairs: **James J. Kumler,** Coastal Optical Systems, Inc.; **Matthias Pfaff,** OptoTech Optikmaschinen GmbH (Germany); **James M. Sydor,** Sydor Optics, Inc.; **Richard A. Nasca,** Corning Inc.

Program Committee: **Michael J. Bechtold,** OptiPro Systems; **Christopher T. Cotton,** ASE Optics, Inc.; **Walter C. Czajkowski,** Edmund Optics Inc.; **Thomas Danger,** Schneider GmbH & Co. KG (Germany); **Toshihide Dohi,** OptiWorks, Inc. (Japan); **Edward M. Fess,** Univ. of Rochester; **Thomas Godin,** Satisloh North America Inc.; **Donald Golini,** QED Technologies, Inc.; **Michael F. Küchel,** Zygo Corp. (Germany); **Hans Lauth,** Jenoptik Laser Optik Systeme GmbH (Germany); **Justin Mahanna,** Universal Photonics Inc.; **Michael Mandina,** Optimax Systems, Inc.; **John J. Nemechek,** Metrology Concepts LLC; **Buzz Nesti,** Naked Optics Corp.; **Robert F. Novak,** APOMA; **Yazid E. Tohme,** Moore Nanotechnology Systems, LLC; **Paul R. Tolley,** Infotonics Technology Ctr.; **Martin J. Valente,** College of Optical Sciences/The Univ. of Arizona; **Paul Meier-Wang,** AccuCoat Inc.; **Kirk Warden,** LaCroix Optical Co.

Monday 11 May

SESSION 1 . . . . . Mon. 8:00 to 10:00 am

Optical Materials

Session Chair: **James M. Sydor,** Sydor Optics, Inc.

Optical glass: status and perspective, Peter Hartmann, SCHOTT AG (Germany); Herbert Gross, Uwe Hamm, Carl Zeiss AG (Germany); Joachim Giesekus, Spectaris e.V. (Germany) . . . . . [TD06-01]

Say Cheese - Food for thought about materials properties and processing, Ray Williamson, Ray Williamson Consulting (United States) . . . . . [TD06-02]

Optimization strategy for aluminum optics using the melt spinning technology, Albert J. Bosch, Roger Senden, RSP Technology B.V. (Netherlands); Guido P. H. Gubbels, Bart van Venrooy, TNO Science and Industry (Netherlands) . . . . . [TD06-03]

Frequency response of polishing pitch samples, Brigid A. Mullany, Elizabeth Corcoran, The Univ. of North Carolina at Charlotte (United States) . . . [TD06-04]

Fabrication and bonding of single crystal silicon, Roger A. Paquin, Douglas R. McCarter, Eloise T. McCarter, McCarter Machine, Inc. (United States) . . . . . [TD06-05]

Impact of outgassing organic contamination on laser induced damage of optics, Karell Bien-Aime, Commissariat à l'Energie Atomique (France) and Univ. Bordeaux I (France); Jerôme Néauport, Isabelle Tovena-Pecault, Commissariat à l'Energie Atomique (France); Evelyne Fargin, Univ. Bordeaux I (France) . . . . . [TD06-06]

SESSION 2 . . . . . Mon. 10:30 am to 12:10 pm

Optical Manufacturing

Session Chair: **Peter Hartmann,** SCHOTT AG (Germany)

Fabrication of V grooves on freeform surface, Wenda Jiang, LPI Precision Optics Ltd. (Hong Kong, China) . . . . . [TD06-07]

Increased UV transmission by improving the polishing processes for fused silica, Jessica E. DeGroote, Tobias Nitzshe, Jonathan T. Watson, Donald K. Henry, Andrew A. Haefner, Robert A. Wiederhold, Optimax Systems, Inc. (United States) . . . . . [TD06-08]

Design and development of a new mechanical actions measurement device for a glass grinding machine: impact on SSD, Jean-Philippe Champreux, Olivier Cahuc, Philippe Darnis, Jean-Yves K'nevez, Raynald Laheurte, Univ. Bordeaux I (France); Jerome Neauport, Nathalie Darbois, Commissariat à l'Energie Atomique (France); Gaetan Albert, Univ. Bordeaux I (France) . . . . . [TD06-09]

New developments in edging technology, Steffan Moos, Volker Bickel, OptoTech Optikmaschinen GmbH (Germany) . . . . . [TD06-10]

Recent advances in hydrodynamic polishing using HyDRa, Erika Sohn, Elfego Ruiz, Esteban A. Luna, Luis Salas, Jorge Valdéz, Manuel Núñez, Univ. Nacional Autónoma de México (Mexico) . . . . . [TD06-11]

Lunch Break . . . . . 12:10 to 1:40 pm

SESSION 3 . . . . . Mon. 1:40 to 3:20 pm

Aspheric Manufacturing I

Session Chair: **Richard A. Nasca,** Corning Inc.

Improved asphere production using MRFÎ and SSÎ, Alex Pisarski, Christopher A. Hall, Christopher M. Supranowitz, Robert W. Hallock, QED Technologies, Inc. (United States) . . . . . [TD06-12]

Rapid fabrication of aspheres: a new paradigm, Pradeep K. Subrahmanyan, George Gardopee, David Proscia, Thomas Metz, Steve Shifman, RAPT Industries, Inc. (United States) . . . . . [TD06-13]

Closing the gap in precision asphere manufacturing, Paul Dumas, William J. Messner, Chris Barns, Andrew Jones, Marc Tricard, QED Technologies, Inc. (United States) . . . . . [TD06-14]

3D processing of optical surfaces: grinding, polishing, measuring, Roland Mandler, OptoTech Optikmaschinen GmbH (Germany) . . . . . [TD06-15]

Strategies for grinding optical free forms using ball shaped grinding wheels, Christian Vogt, Fachhochschule Deggendorf (Germany) . . . . [TD06-16]

SESSION 4 . . . . . Mon. 3:50 to 5:30 pm

Aspheric Manufacturing II

Session Chair: **Kevin P. Thompson,** Optical Research Associates

Corrective polishing of strongly curved aspheric silicon carbide mirrors, Guido Gubbels, Fred Kamphues, Bob den Dulk, Casper van Drunen, TNO Science and Industry (Netherlands) . . . . . [TD06-17]

Finishing complex mold inserts by abrasive vibration polishing, Heiko Schulte, Oltmann Riemer, Ekkard Brinksmeier, Univ. Bremen (Germany) . . . . . [TD06-18]

Ion beam figuring (IBF) plants for the correction of surface errors of high performance optics and mirrors between 5 and 700mm in diameter, Thomas Franz, NTG Neue Technologien GmbH & Co. KG (Germany) . [TD06-19]

Single point diamond turning of aspheric surfaces: processing parametric interplay effects on profile accuracies, RamaGopal V. Sarepaka, Vinod K. Mishra, Dole Ram, Amandeep Singh, Arvinder Singh, Amrinder Kumar, Ganga Sharan Singh, Central Scientific Instruments Organisation (India) . . . . [TD06-20]

Active optics and stress polishing for VLT AO instrumentation, Emmanuel Hugot, Marc Ferrari, Gérard R. Lemaitre, Kacem ElHadi, Pascal Vola, Observatoire Astronomique de Marseille-Provence (France); Jean-Francois Carré, Denis Fappani, Société Européenne de Systèmes Optiques (France); Kjetil Dohlen, Observatoire Astronomique de Marseille-Provence (France); Pascal Puget, Jean-Luc Beuzit, Observatoire de Grenoble (France); Robin Arsenault, Norbert Hubin, European Southern Observatory (Germany) [TD06-21]

Tuesday 12 May

SESSION 5 . . . . . Tues. 8:00 to 11:50 am

Optical Engineering

Session Chair: **James J. Kumler,** Coastal Optical Systems, Inc.

Design, fabrication and testing of wafer chucks, Marcel Achtsnick, Oliver Baldus, Volker Schmidt, Berliner Glas KGaA Herbert Kubatz GmbH & Co. (Germany) . . . . . [TD06-22]

Opto-mechanical design and fabrication of a highly reliable and light weight stray light baffle, Thomas Zeh, Kayser-Threde GmbH (Germany); Joe Jachlewski, Berl Stein, NiCoForm, Inc. (United States) . . . . . [TD06-23]

21st century radius tolerancing, Brandon Light, Richard Plympton, Optimax Systems, Inc. (United States) . . . . . [TD06-24]

Designing cost-effective systems that incorporate high-precision aspheric optics, Greg Forbes, QED Technologies, Inc. (United States); Chris Brophy, Optical Engineering Services (United States) . . . . . [TD06-25]

Develop alignment insensitive 4-mirror coaxial telescope designs using nodal aberration theory *(Invited Paper)*, Kevin P. Thompson, Optical Research Associates (United States); William P. Kuhn, Opt-E (United States); Tobias Schmid, Jannick P. Rolland, CREOL,The College of Optics and Photonics (United States). . . . . [TD06-26]

Method of optical alignment using a laser tracking system, Robert E. Parks, Optical Perspectives Group, LLC (United States). . . . . [TD06-27]

Aligning optical elements to interferometric level accuracies, Taeyoung Choi, Bob Harned, Noreen Harned, ASML Wilton (United States) . . . . [TD06-28]

The surface sag calculation of the off axis parabolic surface, Hyun Kyoung An, The Univ. of Arizona (United States) . . . . . [TD06-29]

Third-order compensation of misalignment-induced wavefront aberrations, Lin Li, Jabil Circuit, Inc. (United States) . . . . . [TD06-30]

An optical focus verification system for launch tracking telescopes, Stephen D. Fantone, David A. Imrie, Daniel Orband, Jian Zhang, Optikos Corp. (United States). . . . . [TD06-31]

Wednesday 13 May

SESSION 6 . . . . . Wed. 8:00 to 10:00 am

Metrology

Session Chair: **Matthias Pfaff,**
OptoTech Optikmaschinen GmbH (Germany)

Characterization of a point diffraction interferometer with a quasicircular aperture, Fermín-Solomon Granados-Agustín, Alejandro Cornejo Rodriguez, Esteban Rueda Soriano, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico). . . . . [TD06-32]

Finish assessment of ultra precision optical surfaces using light scattering techniques, Sven Schröder, Tobias Herffurth, Angela Duparré, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) . . . . . [TD06-33]

Adding quantum dots to abrasive slurries to detect subsurface damage in polished glass, Wesley B. Williams, Brigid A. Mullany, Patrick J. Moyer, Wesley C. Parker, The Univ. of North Carolina at Charlotte (United States); Mark H. Randles, Northrop Grumman SYNOPTICS (United States) . . . . . [TD06-34]

Possibility to measure the reflectance of spherical samples, Hervé Piombini, Commissariat à l'Energie Atomique (France) . . . . . [TD06-35]

Practical considerations for assessing the spatial frequency measurement capability of an instrument, Paul E. Murphy, QED Technologies, Inc. (United States); Richard N. Youngworth, Light Capture, Inc. (United States) . . [TD06-36]

Transmittance measurements of a large surface laser system, Shen Zhu, U.S. Army Aviation and Missile Command (United States). . . . . [TD06-37]

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SESSION 7 . . . . . Wed. 10:20 to 11:40 am

Metrology and Coatings

Session Chair: **Arnie J. Bazensky,** SCHOTT North America, Inc.

What's new in MTF testing? *(Invited Paper)*, Stephen D. Fantone, Daniel Orband, Jian Zhang, Optikos Corp. (United States) . . . . . [TD06-38]

Reactive pulse magnetron sputtered multifunctional optical coatings for high performance and for consumer optics, Kerstin Taeschner, Hagen Bartzsch, Peter Frach, Eberhardt Schultheiss, Fraunhofer-Institut für Elektronenstrahl- und Plasmatechnik (Germany) . . . . . [TD06-39]

TBD *(Invited Paper)*, Turan Erdogan, Semrock Inc. (United States) . . . [TD06-40]

TBD *(Invited Paper)*, Rob Andosca, Infotonics Technology Ctr. (United States). . . . . [TD06-41]

Lunch Break . . . . . .11:40 am to 1:00 pm

SESSION C1 . . . . . Wed. 1:00 to 3:00 pm

Commercial Presentations

Session Chair: **Walter C. Czajkowski,** Edmund Optics Inc.

Additional commercial presentations will be added to the program. Check the website for updates.

Additional commercial presentations will be added to the program. Check back for future updates.

Large quartz crystals for radiation-hard optical applications, Vladimir Klipov, Sawyer Technical Materials, LLC (United States) . . . . . [TD06-100]

Wavefront measurement of miniature aspheric lenses: a fast and accurate inspection technology, Iris Erichsen, Trioptics GmbH (Germany); Marie Cherrier, Trioptics France (France); Aiko Ruprecht, Trioptics GmbH (Germany) . . . . . [TD06-101]

Software assisted scratch inspection, Dave Aikens, Savvy Optics Corp. (United States); Ari Siletz, CCDMETRIX (United States) . . . . . [TD06-102]

Metrology of freeform optics using scanning low-coherence dual-wavelength interferometry, Damon W. Diehl, Christopher J. Ditchman, Christopher T. Cotton, ASE Optics, Inc. (United States). . . . . [TD06-103]

Bound-abrasive polishing of precision surfaces of optic materials, Yuriy D. Filatov, Olexandr Y. Filatov, Volodymyr I. Sidorko, National Academy of Sciences of Ukraine (Ukraine) . . . . . [TD06-104]

Human resources: what you don't know can cost you, Jack Roche, Universal Photonics Inc. (United States). . . . . [TD06-105]

Advances in the production of high precision aspheres, Michael Sander, Satisloh GmbH (Germany); Lori B. Heller, Satisloh North America Inc. (United States) . . . . . [TD06-106]

Manufacturing of freeform optics at Jenoptik, Uwe P. Birnbaum, Tobias Moeller, JENOPTIK Laser, Optik, Systeme GmbH (Germany) . . . . . [TD06-107]

Infrared and ultraviolet materials from SCHOTT, Ed Hart, SCHOTT North America, Inc. (United States). . . . . [TD06-108]

Optical glass program of Schott news and outlook, Peter Hartmann, SCHOTT AG (Germany). . . . . [TD06-109]

Dynamic Fizeau interferometers, Brian Medower, Bradley T. Kimbrough, 4D Technology Corp. (United States). . . . . [TD06-110]

Technical Program

POSTERS–Wednesday . . . . . Wed. 4:30 to 5:30 pm

Poster authors may set up their posters on Wednesday from 10:00 am to 4:00 pm. Poster authors should check in at the SPIE Registration prior to displaying their posters.

Authors will be present for discussion during the Networking Reception from 4:30 to 5:30 pm.

Characteristics of angle tuning and conversion efficiency of $ZnGeP_2$-DFG in mid-infrared laser, Li Wang, Beijing Univ. of Technology (China). . [TD06-53]

Substrate temperature influence on the properties of ZnO thinfilms deposited by pulsed laser deposition, Li Wang, Beijing Univ. of Technology (China) . . . . . [TD06-54]

Application of electrooptic polymer probe in low frequency range, Maobin Yi, Zhaoxu Yan, Rulong Jin, Han X. Yan, Hongbo Sun, Jilin Univ. (China) . . . . . [TD06-55]

A new method of angle measurement with high-precision in computer vision based on spot array, Weimin Li, Xiaofeng Li, Univ. of Science and Technology of China (China) . . . . . [TD06-56]

The vision measurement technology of multi-object at a long range, Xiaofeng Li, Weimin Li, Univ. of Science and Technology of China (China) . . . . . [TD06-57]

Real-time imaging stokes spectropolarimetry on the basis of polarization-holographic diffraction element, Barbara N. Kilosanidze, George A. Kakauridze, Institute of Cybernetics (Georgia) . . . . . [TD06-58]

The method of the precision measurement of an angle of rotation of polarization plane by means of polarization-holographic gratings, Barbara N. Kilosanidze, George A. Kakauridze, Institute of Cybernetics (Georgia) . . . . . [TD06-59]

Polarization-holographic protection system, Barbara N. Kilosanidze, George A. Kakauridze, Institute of Cybernetics (Georgia) . . . . . [TD06-60]

Comparison of methods to determine power spectral density functions and rms roughness, Sven Schröder, Marcus Trost, Tobias Herffurth, Angela Duparré, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) . . . . . [TD06-61]

Absolute planarity test with multiple measurements and iterative data reduction algorithm, Maurizio M. Vannoni, Giuseppe Molesini, Consiglio Nazionale delle Ricerche (Italy) . . . . . [TD06-62]

Pulsed Solid-State Laser Induced Annealing of Amorphous-Si Thin-Films on Different Substrates, M. Singaperumal, Nilesh J. Vasa, I. A. Palani, Indian Institute of Technology Madras (India) . . . . . [TD06-63]

Thursday 14 May

SESSION 8 . . . . . Thurs. 8:00 to 10:00 am

Aspheric Metrology

Session Chair: **Michael Mandina,** Optimax Systems, Inc.

New metrology approach for the production of aspheric lenses, Andreas Beutler, Carl Mahr Holding GmbH (Germany) . . . . . [TD06-42]

Freeform optics measurements with the NANOMEFOS non-contact measurement machine, Rens Henselmans, TNO Science and Industry (Netherlands) . . . . . [TD06-43]

Subaperture stitching interferometry of high-departure aspheres by incorporating configurable null optics, Andrew W. Kulawiec, Markus Bauer, Gary M. DeVries, Jon F. Fleig, Gregory W. Forbes, Marcelo F. Guimaraes, Dragisha Miladinovic, Paul E. Murphy, QED Technologies, Inc. (United States) . . . . . [TD06-44]

Cross-testing of aspheric metrology techniques with subaperture stitching interferometry based on configuarable null optics, Marcelo F. Guimaraes, Jon F. Fleig, Gary M. DeVries, Paul E. Murphy, QED Technologies, Inc. (United States) . . . . . [TD06-45]

Measurement of aspheric lenses on a variety of instruments, Raymond Castonguay, Piotr Szwaykowski, Engineering Synthesis Design, Inc. (United States) . . . . . [TD06-46]

A LUPI interferometer with unusual positioning capability for IR testing, Peter Domenicali, Stephen D. Fantone, Optikos Corp. (United States) [TD06-47]

SESSION 9 . . . . . Thurs. 10:20 am to 12:00 pm

Meter Class Optics

Session Chair: **Robert F. Novak,**
APOMA and Monroe Community College

Meter-class vacuum-compatible optical collimators available for use at Ball Aerospace & Technologies Corp., Donald A. Byrd, Mark A. Martella, J. Parker, Ball Aerospace & Technologies Corp. (United States) . . . . . [TD06-48]

Precision figure correction of two-meter optics with magnetorheological finishing, François Piché, Andrew R. Clarkson, L-3 Brashear (United States); William Messner, Christopher M. Supranowitz, Paul Dumas, QED Technologies, Inc. (United States) . . . . . [TD06-49]

Cost effective fabrication of meter class optics, Pradeep K. Subrahmanyan, David Proscia, Steve Shifman, Thomas E. Metz, RAPT Industries, Inc. (United States); Paul R. Shore, Carlo Fanara, Will O'Brien, Renaud Jordain, Cranfield Univ. (United Kingdom) . . . . . [TD06-50]

A novel method of reducing the warp of sheet glass, Mireille Akilian, Mark L. Schattenburg, Massachusetts Institute of Technology (United States) [TD06-51]

Applying the dynamical model of drying process of a polymer solution coated on a flat substrate to effects of pinning the substrate, Hiroyuki Kagami, Nagoya College (Japan) . . . . . [TD06-52]

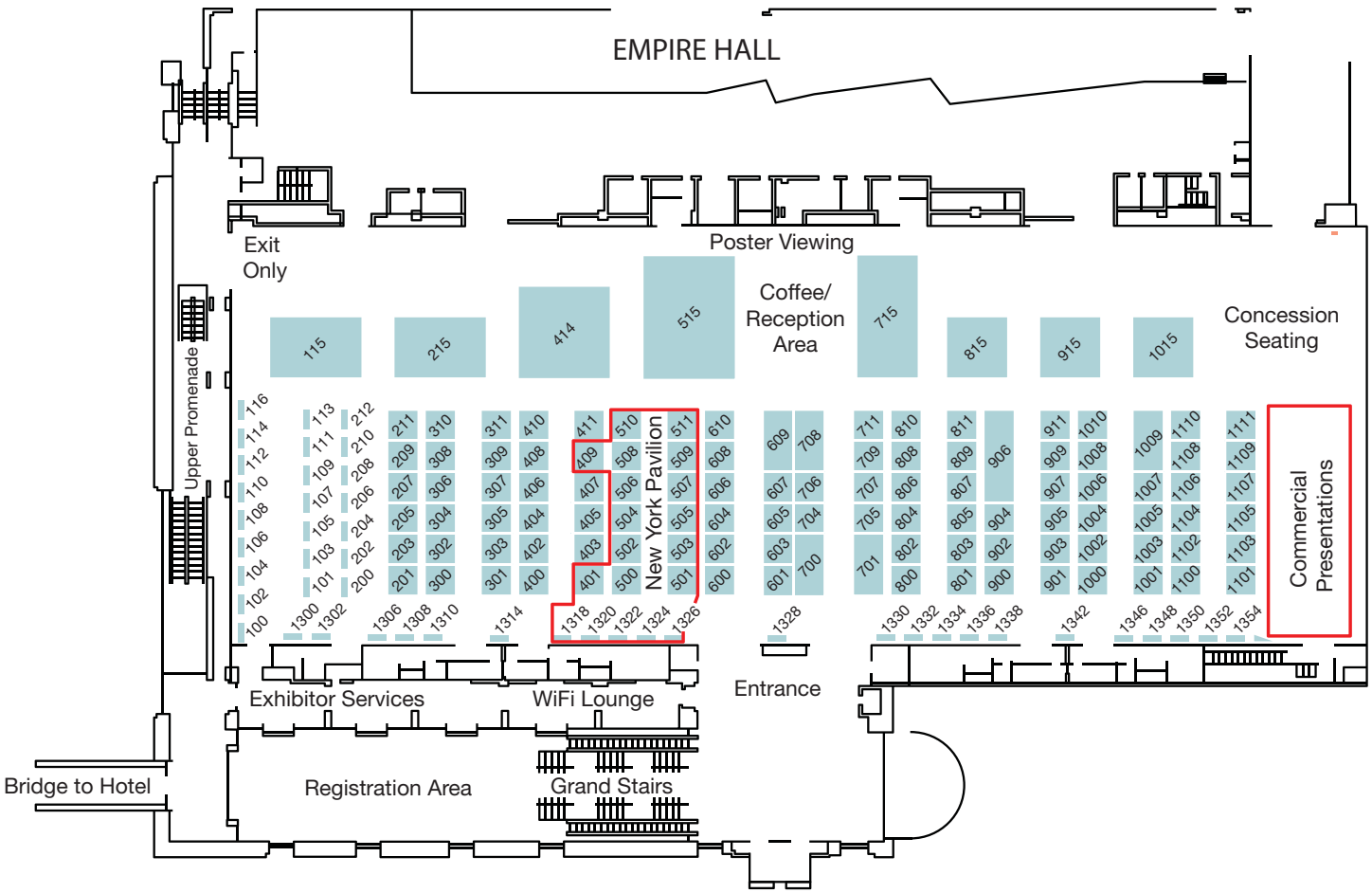
Important News for All Visitors from Outside the United States

Find important new requirements for visiting the United States on the SPIE Optifab website. There are new steps that ALL visitors to the United States need to follow.

spie.org/ofbpreview

SPIE Optifab

Preliminary Exhibitor Listing as of 9 January 2009



Exhibition Hours

Rochester Riverside Convention Center · Empire Hall

Tuesday 12 May . . . . . 10:00 am to 5:00 pm
Wednesday 13 May . . . . . 10:00 am to 5:30 pm
Networking Reception and Poster Viewing . . . . 4:30 to 5:30 pm
Thursday 14 May . . . . . 10:00 am to 3:00 pm

Company representatives will be on hand during the official exhibition hours to answer questions about new products and services.

For information about exhibiting at SPIE Optifab 2009, visit spie.org/exhibitions/ofb.

Exhibition Preview

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QED Technologies

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General Refreshments

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4D Technology Corp. #601

SPIE Corporate Member

Tucson, AZ

New Product: FizCam 3000 dynamic, on-axis interferometer for long stand-off measurement of mirrors & other optics.

4D designs and manufactures dynamic laser interferometers for non-contact metrology of optical quality surfaces, even in the presence of vibration and turbulence. 4D systems offer high spatial resolution acquisition of phase data in as little as 1µs. 4D combines expertise in metrology, optical/mechanical design, software and manufacturing to develop and commercialize innovative products for applications in space and terrestrial astronomy, optics and data storage.

AccuCoat, Inc. #511

APOMA

Rochester, NY

AccuCoat Inc. is a supplier of thin film coatings on plastic, metal, glass and a variety of other components. Producing a wide variety of antireflective, beamsplitter, hot & cold mirror, filter and metallic coatings as well as custom coatings to meet your dynamic applications. Experienced in handling prototype thru OEM volumes. Coatings available from the UV to the IR on sizes up to 24". Over 60 years combined engineering experience can provide custom designed solutions.

Advanced Glass Industries #502

APOMA

Rochester, NY

Manufacturer of molded and precision machined glass products. Services include precision custom molding, annealing, slumping, sawing, grinding, CNC machining, generating, edging, cutting, and machining. Products include optical filter glass, Fused Quartz, Fused Silica, industrial glass, and exotic materials. Prototype to production quantities.

Ametek Precitech, Inc. #609

SPIE Corporate Member

Keene, NH

New Product: PGI Blu - A high precision 3D metrology instrument for steep-sided aspheric optics.

Taylor Hobson is an ultra-precision technology company operating at the highest levels of accuracy. We provide contact and non-contact measurement solutions to the most demanding applications on a global basis. We are continually evolving our products to meet the ever-increasing demands of today's industries. Taylor Hobson products are widely used in the development and production of next generation technologies, particularly in semiconductor, hard disk and precision optics.

Apollo Optical Systems Inc. #1010

SPIE Corporate Member

Rochester, NY

Manufacturer of custom precision optical components specializing in Single Point Diamond Turning and injection molded polymer optics in prototype and production volumes. In-house capabilities include SPDT, extensive metrology, injection molding, optical/mechanical design and engineering. AOS specializes in design and manufacturing of diffractive and refractive optics.

Applied Image, Inc. #909

SPIE Corporate Member

Rochester, NY

"Your Single Source Photonics Solution Provider" dedicated to innovative OPTO-IMAGING Products & Services. Providing custom and "off the shelf" linear scales, test targets, reticles, encoders, image analysis standards, sinusoidal arrays, photo masks, ronchi rulings & other imaged components on various substrate materials for today's complex photonics needs. Now offering Imatest software with Applied targets for analyzing image quality. APPLIED IMAGE, where image concepts become reality.

Applied Surface Technologies #1314

SPIE Corporate Member

New Providence, NJ

We demonstrate precision cleaning solutions using CO_2 Snow - a safe and nondestructive process for removing particles of all sizes, down to 0.03 microns, and hydrocarbon residues. We will demonstrate manual and semi-automated units for cleaning application in research, development, and manufacturing. The CO_2 Snow Cleaning process cleans metals, ceramics, optics, substrates, vacuum parts, fiber optics, diamond turned optics, disk drives, sensors, analytical samples, and many other materials.

AudioDev USA, Inc. #807

Agoura Hills, CA

New Product: Unique non-contact tester for coated curved surfaces.

AudioDev specializes in complete solutions for quality assurance and increased productivity in optical media manufacturing and industries that employ thin film coatings. Our customer base covers all sectors of the optical media industry, as well as manufacturers of flat panel displays, precision glass, solar cells and other industrial applications where thin layers need to be checked for quality with respect to color determination, measuring thickness and density.

Unique non-contact tester for coated curved surfaces. No more witness pieces or destructive measurements.

Australian Centre for Precision Optics. CSIRO #1328

Sydney, NSW, Australia

New Product: Roundest objects in the world? Ultrasmooth spheres of silicon to redefine the kilogram.

Specialists in design, fabrication and certification of ultra-high precision optical systems and components. Custom optics created in most common materials. Products include: super-polished flats (100th wave p/v, roughness <1Å rms, <500 mm dia.); precision spheres (<40 nm asphericity); ultra-high precision assemblies; low-loss dielectric coatings; wide aperture, tunable Fabry-Perot etalon filters; precision metrology (surface figure to 100th wave, micro-roughness <1Å rms).

Coastal Optical Systems, Inc. #407

SPIE Corporate Member APOMA

Jupiter, FL

Coastal Optical Systems (www.coastalopt.com) specializes in rapid design and manufacture of custom precision lens assemblies and sensor integration for aerospace and defense, biomedical, machine vision, astronomical research, telecom and 3-D entertainment markets. Design, optical fabrication, assembly, system alignment and optical testing are performed in-house in Jupiter, Florida. COSI is a subsidiary of Jenoptik.

Contour Fine Tooling #709

Marlborough, NH

Contour Fine Tooling supplies single crystal diamond tools for manufacturing I/R, transmissive and reflective optics for Aero-Space/ Defense and Consumer industries in addition to Ultra-precision mechanical components. Diamond tools for 2-axis, Freeform and Fast Tool Servo technologies supplied with edge waviness down to 50 nm P-V and < 3 micron tip radius. Contour tools achieve part-cutting results that can be measured in Angstrom Ra value for surface finish and Nanometer form accuracy.

Corning Inc. #915

SPIE Corporate Member

Corning, NY

Corning Specialty Materials is a world-leading supplier of complete optical solutions. Building upon over 150 years of Corning's innovation and material science, the Corning Specialty Materials group provides its customers "One Stop Shopping" for their most challenging optical requirements. The markets we serve include Aerospace and Defense, Astronomy, Display, Semiconductor and many more.

CTM #1338

Frankfurt, NY

Davidson Optronics, Inc. #704

SPIE Corporate Member

West Covina, CA

DCM Tech, Inc. #803

Winona, MN

New Product: Rotary Surface Grinder for flat grinding crystal materials - Model IG 180 SD.

DCM Tech is a US manufacturing company which primarily designs and manufactures a line of Industrial Rotary Surface Grinders.

Diacut, Inc. #903

Palmer Lake, CO

Diacut is a customer-oriented manufacturer specializing in high precision diamond and CBN wheels. Our wheels are used for slot-grinding, slicing and dicing, grooving and cut-off operations for glass, ceramics, quartz, sapphire and ferrite. Our wheels are made to customer specifications and are used on high production machines such as K&S, MTI, ITI, Disco and standard surface grinders.

Exhibition Preview

Diffraction International Ltd. #310

Minnetonka, MN

New Product: Our new 6025-format CGH nulls provide larger apertures and greater precision with faster delivery.

Diffraction International is the leader in supplying custom CGH diffractive null correctors for interferometric testing of cylinders and aspheres. We provide design, fabrication, certification and full documentation. Durango Interferometry Software brings phase shifting and static analysis to any interferometer. An intuitive graphical interface provides full control of analysis and complete access to raw data. Durango supports most hardware and imports several interferometry data formats.

Displays & Optical Technologies, Inc. #711

APOMA

Round Rock, TX

Dynasil Corp. #401

SPIE Corporate Member APOMA

West Berlin, NJ

E.T. Precision Optics, Inc. #402

SPIE Corporate Member

Rochester, NY

Since 1992, ET Precision Optics specializes in precision component machining. Our customers are optical manufacturers, medical, telecommunication, aerospace and military industries. We utilize 5-axis CNC mills, 9-axis lathes and EDM to machine high precision rotational and prismatic components. We hold tolerances as close as ±0.0002" and finishes of four RA. What sets us apart is our customer focus, commitment to quality (ISO-9001:2000 registered), attention to detail and on-time delivery.

Engineering Synthesis Design, Inc. #1001

SPIE Corporate Member

Tucson, AZ

ESDI is a globally recognized leader in providing innovative surface & wavefront metrology solutions for astronomical, aerospace, bio-medical, optical fabrication, & production metrology applications. ESDI products include the world-renowned IntelliWave™ software; Intellium™ Fizeau, Shearing & Point-Diffraction Interferometers (classical & vibration-insensitive); Scatterometers; Interferometer Accessories, Upgrades, and Training; and Custom Metrology Solutions.

Equipment Acquisition Resources, Inc. #808

SPIE Corporate Member

Palatine, IL

New Product: Leading Service Provider for Electronic Materials Abrasive Technology.

EAR Technology is a leading service provider for electronic materials abrasive technology, maintaining the world's largest inventory of secondary market equipment for the photonics industry. EARBid is an online auction service that specializes in the remarketing and selling of semiconductor equipment. We have extensive experience in managing the disposition of surplus capital assets for the photonics industry.

Ferson Technologies, Inc. #1346

APOMA

Ocean Springs, MS

Glass Fab Inc. #801

SPIE Corporate Member APOMA

Rochester, NY

Manufacture of custom blanks. Products include fused quartz, fused silica, optical glasses, filter glasses and low/ultra low expansion glasses. Capabilities include annealing, slumping, sawing, grinding, edging, drilling, water jet cutting, CNC shaping and CNC generating.

G-S PLASTIC OPTICS #410

SPIE Corporate Member APOMA

Rochester, NY

G-S PLASTIC OPTICS specializes in the custom manufacture of precision polymer optics for use in imaging, scanning, detection and illumination applications worldwide. The company has in-house capability to provide diamond turned and injection molded prototypes, production injection molding, thin film and reflective coatings and integrated optical solutions to meet a wide range of military, medical, commercial and consumer markets.

GSPO manufactures precision polymer optics for imaging, scanning, detection, illumination.

GTI Technologies #201

Shelton, CT

GTI Technologies is a world wide supplier providing sales, applications and services for multi-wire saws for slicing of hard, brittle and expensive materials and wafer lamination, delaminating and mounting and bonding tools from Takatori for the back grinding process, carbon fiber and effectors from Astel, wafer scribing and die bonding equipment from JFP. For more information, contact: bob@gti-usa.com or visit on the web at www.gti-usa.com.

Heraeus Quartz America #804

SPIE Corporate Member

Buford, GA

Hinds Instruments, Inc. #1308

SPIE Corporate Member

Hillsboro, OR

Hinds Instruments Exicor® product line measures low-level retardation in FPD materials. It is designed to measure and display both the magnitude and fast axis orientation of the retardation in both laboratory and manufacturing settings. A unique design eliminates moving parts and offers unsurpassed sensitivity and precision.

II-VI Infrared #1110

APOMA

Saxonburg, PA

II-VI INFRARED, the world leader in CO_2 laser and infrared optics, designs and produces lenses, mirrors, windows, partial reflectors, beam splitters, phase retarders, rhombs, beam expanders, polarizers, wave plates, modulators and more. IR materials include ZnSe, ZnS and ZnS MultiSpectral. Capabilities include optical design and engineering, optics manufacturing, diamond turning, thin film coating, optical assemblies, world-class quality assurance and international sales and support.

IRD Glass #211

Litchfield, MN

New Product: IRD Glass has recently perfected a new process to manufacture cylindrical laser reflector mirrors.

IRD Glass specializes in manufacturing optical & industrial glass components from a wide range of raw materials, borosilcate to Spinel to Zerodur. They excel at holding very precise tolerances to help their customers solve excessive variation issues. Due to their customer-intimate solutions, IRD has become the sole-source provider to large and small corporations across the globe in the machine vision, sensors, medical, pressure transducer, defense, aerospace and process control industries.

Manufacturers of precision optical technical glass and ceramic components

Isuzu Glass Inc. #1306

SPIE Corporate Member

Torrance, CA

New Product: Non Toxic Chalcogenide IR Transmitting Glass.

Custom manufacturer of molded glass optical components and optical filter glass. Aspheric, fly eye, rod lenses and lens arrays. CPC's and secondary concentrators. Manufacturer of laser safety glass, UV absorbing, neutral density, heat absorbing and contrast enhancing filter glasses.

JENOPTIK Polymer Systems, Inc. #409

Rochester, NY

Jenoptik Polymer Systems is a technology driven company delivering high quality polymer optical components and optoelectronic assemblies to customer specifications. We offer the full process chain with complete in-house capabilities in optical design, diamond turning, injection molding, thin film coating and optoelectronic assembly and packaging to provide solutions from prototyping to high volume manufacturing. We also offer custom LEDs, photodiodes and color measurement sensors.

JML Optical Industries Inc. #1322

Rochester, NY

New Product: New updated web-site and catalog. www.jmloptical.com.

Designer, manufacturer and coater of precision optical systems and components. Thousands of stock catalog items as well as custom made prototype and large quantities. Everything done under one roof from polishing, to final testing. New web-site and 4th edition catalog available. Optics for medical, security, robotics, aircraft, military, scanning and industrial applications.

Kopp Glass, Inc. #1336

Pittsburgh, PA

Kreischer Optics, Ltd. #210

APOMA

McHenry, IL

New Product: Aspheric manufacturing capacity doubled with added versatility and ability for rapid prototyping.

Custom manufacture of precision optical components and sub-assemblies including aspherical, cylindrical and spherical lenses, mirrors, prisms, windows and master test glasses. In house capabilities include rapid prototyping, lens design, optical testing services and coating.

Kugler of America LTD #707

SPIE Corporate Member

Somers, CT

New Product: Micro Gantry System GU, 3-5 axis freeform, Laser and Mechanical micro machining, 3 sigma < 250nm.

We are a leading manufacturer of ultra-precision Machining Systems for Optical Surfaces, Optical 3D Structured Surfaces, Waver-thinning and Micromachining applications, as well as Laser Micro machining E.g.: Fly-cutters, Drum -Turning machines, Micromachining Systems, Custom Metal Mirrors, Optical structured surfaces, CO_2-Laser Beam Delivery Systems and Laser Mirrors for OEM and Scientific end users.

Micro Gantry System GU, 3-5 axis freeform, Laser & Mechanical micro machining, 3 sigma < 250nm

LaCroix Optical Co. #311

SPIE Corporate Member APOMA

Batesville, AR

LaCroix Optical Co., a leading manufacturer of custom precision optics for more than 60 years, specializes in achromats, lenses, windows, prisms, wedges and mirrors. An ISO 9001:2000 registered company, LaCroix Optical Co. can supply your optical components in any volume. With a unique combination of modern and conventional production and testing equipment plus an in-house coating facility LaCroix Optical Co. is your source for custom precision optics.

Larsen Equipment Design, Inc. #904

APOMA

Seattle, WA

Larsen Equipment Design specializes in superior quality benchtop polishing equipment for micro and miniature lenses. Since 1981 we have been recognized as the source for your micro optics manufacturing needs. Our polishers are made with sturdy stainless steel cases and sealed spindles for worry free operation. Have tooling requirements? Our engineering department can help. Turn to us for your precision optics manufacturing resource.

Exhibition Preview

Laser Focus World #116

SPIE Corporate Member

Nashua, NH

Leybold Optics USA, Inc. #800

SPIE Corporate Member

Cary, NC

Metrology Concepts LLC #1326

APOMA

Rochester, NY

Mildex, Inc. #708

SPIE Corporate Member

Rochester, NY

Moore Nanotechnology Systems LLC #700

APOMA

Keene, NH

Nanotech® Ultra-Precision Machining Systems are available in various models with 2 to 5 axes of CNC motion control for single point diamond turning or deterministic microgrinding. All Nanotech machines utilize a programming resolution of 1.0 nanometer, and a system feedback resolution of only 0.034 nanometer. Our 10,000rpm heavy duty work holding spindle allows for high speed machining of IR crystals but is not limited by the same weight load restrictions as other high speed spindles.

Nanovea #1000

Irvine, CA

Nanovea, a Division of Micro Photonics Inc., manufactures testing Instruments for Instrumented Indentation, Scratch/Adhesion, Wear/Friction, Non-Contact 3D Profilometry and is also a provider of Contract Laboratory Services. Nanovea's instruments can be found in distinguished educational and industrial organizations around the world. Thousands of clients rely on Nanovea for innovative solutions, technically superior products, and comprehensive laboratory contract service.

Norland Products Inc. #606

Cranbury, NJ

New Product: NBA 108 temporary UV adhesive for heavy polishing and grinding that can be released with acetone.

Manufacturer of high quality optical and electronic UV and heat curing adhesives. These one component, solventless adhesives cure quickly when exposed to UV light and are designed for precision bonding applications. Our Optical adhesives are designed for bonding components where low strain, optical clarity or low outgassing are required in military, aerospace, fiber optics and commercial optics applications. Norland Products also sells a selection of UV curing light sources.

North American Coating Laboratories #706

Mentor, OH

North American Coating Laboratories provides optical coatings for a variety of customers in the polymer and glass optics markets. Our experience in both dip and vacuum-applied processes make NACL one of the most respected organizations in the optical coatings field. Our coating competencies include Protective, Scratch-resistant, Reflective, Anti-reflective, Filter, Conductive, ITO, and Chemically Resistive coatings. North American Coating Laboratories is certified to ISO 9001:2000 standards.

Ocean Optics, Inc. #1101

SPIE Corporate Member

Dunedin, FL

Ohara Corp. #901

SPIE Corporate Member APOMA

Branchburg, NJ

New Product: Ohara is now a one stop shop for optical materials: Optical Glass, IR materials, CaF_2 & Fused Silica.

Ohara is a producer of optical glass, zero expansion CCZ, and polished substrates. Other offerings now include Calcium Fluoride and other IR materials such as Germanium, Sapphire, ZnSe, ZnS, BaF_2, Silicon and many other materials. We are also pleased to announce our newest group, Ohara Quartz, specializing in fused silica materials. Index measurement services are also available.

Optics & Laser Europe - optics.org #1310

Bristol, United Kingdom

Optics & Laser Europe magazine provides news, R&D, features, show previews and EOS newsletter. Published 11 times a year, along with the quarterly supplement Optics Products, the annual Technology Guide and the new Optics Careers recruitment guide. For a free subscription complete the online form at http://optics.org/subscribe. For further information on how the optics portfolio can help with your marketing strategy, visit http://optics.org/cws/advertising.

Optics Technology, Inc. #500

APOMA

Pittsford, NY

Optics Technology, Inc. designs, manufactures and assembles custom application microscope objective and micro-optical lens systems. Wavelength region spans the UV through the far IR. OTI offers rapid design and prototyping services and works with all the standard optical glasses and crystals.

Optikos Corp. #811

SPIE Corporate Member

Wakefield, MA

Optikos Corporation is the world's largest manufacturer of equipment for the measurement of optical image quality and a leading provider of optical product development services. As the world leader in the field of MTF testing, Optikos offers complete solutions for both component and system level tests on imaging systems operating from the ultraviolet to the far infrared. Optikos's product line includes testing suites for measuring the performance of optical and electro-optical imaging systems.

Optimax Systems, Inc. #508

SPIE Corporate Member APOMA

Ontario, NY

Optimax is dedicated to small volume, high quality, and quick delivery of precision optical components. Specializing in aspheres, cylinders, plano-optics and spheres, manufactured to customer-supplied specifications. With more than 100 opticians, we enjoy a good challenge, call us! Tel: 877-396-7846, Fax: 585-286-1033, www.optimaxsi.com.

OptiPro Systems #414

SPIE Corporate Member APOMA

Ontario, NY

New Product: OptiPro UltraForm Finishing (UFF) - Aspherical and Conformal 5-axis CNC Polishing machine.

Fabrication products include CNC Optical Machining Centers and Cad/Cam software for 4/5 axis grinding and polishing of spherical, aspherical and conformal optics. Popular low-cost "eSX 150" is quickly becoming the industry standard for manufacturing complex optical components. Manufacturer and distributor of optical/surface metrology equipment - Electronic Spherometers, Zeiss Surface Profilometers and STIL MicroMeasure non-contact surface measurement systems with resolution to 1 nm.

Optiworks, Inc. #605

Osaka, Japan

OptiWorks is independent optics engineering company from Osaka Japan. OptiWorks will propose and provide optical system design, prototyping and production line to all worldwide customers. From 2008, OptiWorks adds new product line based on optical metrology especially digital interferometer and related optics. OptiWorks started optical polishing service by QED MRF system with his own metrology capability. OptiWorks will provide optics global supply chain network.

OPTIX Co. #1111

Sofia, Bulgaria

Optix specializes in the design and production of optical elements, optomechanical and optoelectronic systems, devices and components with laser, medical imaging, and defense applications.

OPTIX manufactures prisms, flat-parallel lamellae, windows, wedges, optical scales, filters and mirrors of various dimensions and configurations.

OptoTech Optical Machinery #715

APOMA

East Greenville, PA

Designs, develops and manufactures machinery and new process technology for precision optics and ophthalmics. CNC and conventional high-speed generators/polishers (1 to 800 mm diam), 5-axis processing centers, centering/edging, plano/prism, rod, cylinder, aspheric machines, interferometers, autocollimators and software. In-house tool design and manufacture. Consumables, parts, repairs and maintenance contracts.

Photon Gear, Inc. #1324

APOMA

Ontario, NY

Photon Gear specializes in design, assembly and characterization of high-precision optical systems. Custom lens assemblies are verified with interferometric test capabilities from 266 nm to 1600 nm. Supported application areas include semiconductor inspection and processing, military, metrology, biomedical, laser scanning and polymer optics. We also provide contract optical engineering and optical design services as well as systems engineering support for custom software and optical hardware.

Photonics Media #906

Pittsfield, MA

Photonics Media is Laurin Publishing Company's international suite of media and as such the pulse of the industry. More than 50 years as the leading publications. In print with the Photonics Directory, Photonics Spectra, Biophotonics International, EuroPhotonics, and Photonics Showcase magazines and online at Photonics.com.

Plan Optik AG #400

Elsoff, Germany

New Product: Micro lenses in glass, plano-convex and plano-concave micro lenses made of borosilicate glass.

Plan Optik AG from Germany produces optical components from glass, fused silica, glass ceramics as well as glass-silicon-compounds. The core competence is wafers for opto electronic applications, micro lenses and large, polished substrates. From glass and glass ceramics - maximum dimension of such plano parallel substrates is 3,000 mm (10 ft). These substrates are used for large laser mirrors and as scale substrates for 3D measuring devices of most measuring device producers worldwide.

Precision Glass & Optics #911

SPIE Corporate Member

Santa Ana, CA

New Product: PG&O now offers laser marking and waterjet cutting capabilities.

PG&O combines the high volume, low cost manufacturing of the commercial glass industry with the technical precision of optical and thin film coating. This single facility approach makes us uniquely qualified to satisfy today's optical component needs. We focus on both technical needs and the cost controls so vital to customer satisfaction. Our experts will work with your staff to make the transition from prototype to production both smooth and cost-effective.

COFFEE BREAK SPONSOR

QED Technologies, Inc. #215

SPIE Corporate Member APOMA

Rochester, NY

New Product: QED's ASI™ measures steep aspheres with 1000 waves of departure, without dedicated null lenses.

QED's metrology and polishing systems provide optics manufacturers with the tools to deliver quality optics with confidence. Our metrology systems make manufacturing processes even more efficient by enabling in-line and final testing of all of the optics in your shop. QED's MRF® polishing platforms are synonymous with reliability, predictability, quality and speed. More than ever, MRF® is versatile, scalable and easy to use.

Exhibition Preview

R. Mathews Optical Works, Inc. #200

APOMA

Poulsbo, WA

Manufacturer of custom precision aspheric lenses and mirrors. Aspheric lenses from 10mm to 280mm diameter can be made from all glass types for prototype and production.

RAPT Industries, Inc. #406

SPIE Corporate Member APOMA

Fremont, CA

Reflexite Optical Solutions Business #1318

Rochester, NY

Reflexite Optical Solutions Business combines expertise in optical engineering, microreplication and polymer processing to provide microstructured polymer optical films and components. Our components are used in Display Systems for military, automotive and consumer products; Lighting Systems for architectural and signal lights; Instrumentation Optics for passive infrared sensors, vision systems, photographic viewing screens; Solar Collection Systems, plus a wide variety of custom products.

Rochester Precision Optics LLC #505

SPIE Corporate Member APOMA

West Henrietta, NY

Saint-Gobain Grains & Powders #604

Worcester, MA

New Product: AmberClean L12A biodegradable metal cleaner and AmberCut 420A biodegradable lapping vehicle.

Saint-Gobain Grains & Powders manufactures precision abrasives and chemicals for the critical surface finishing and cleaning of metals, glasses, crystals, optical & electro-optical materials, semiconductor, sapphire, silicon carbide and III-V/II-VI compounds. Products include alumina, zirconia, ceria, diamond, silicon carbide and other abrasive particles and polishing slurries with sizes as small as 50 nm. Biodegradable coolants, lubricants, cleaners and polishing pads complete the range.

Biodegradable AmberClean L12A Cleaner and AmberCut 420A Lapping/Polishing Vehicle.

Salem Distributing Company, Inc. #810

SPIE Corporate Member

Winston-Salem, NC

Salem ASM offers a line of high-quality precision materials from A to Z. ABRASIVES: Alumina, Silicon Carbide, Boron Carbide; POLISHES: Cerium Oxide, Aluminum Oxide, Submicron Alumina, Colloids, Pitch, Acculap Synthetic Pitch; PADS: Stock Removal, Primary Polish, Final Polish, Polyurethane, Napped Poromeric; DIAMONDS: Blades, Core Drills. All of these materials were designed exclusively to enhance the quality and efficiency of any precision surfacing and polishing application.

GENERAL REFRESHMENT SPONSOR

Satisloh North America Inc. #515

SPIE Corporate Member APOMA

Germantown, WI

New Product: SPM/S 60 360° multi-functional swivel head with 2-tool spindle technology and process flexibility.

The Satisloh line includes generators, polishers, laser centering, and coating machines (sputtering) for all applications. A supplier of diamond wheels and pellets, spherometer rings, and spare parts, we offer a complete range of consumable products - including distribution of Mueller Diamonds, Desmopan and Desmoflex polishing pads, and Borer Chemical ultrasonic cleaning products.

Satisloh's new SPM/S-140 grind and polish spherical and aspherical lenses.

Schneider GmbH & Co. KG #115

APOMA

Steffenberg, Germany

New Product: Versatile machine for grinding spheres and aspheres with extended special-processing capabilities.

Schneider is one of the world's leading suppliers of processing solutions to the precision-optical and ophthalmic industry. Schneider innovations set the pace - in grinding and polishing of precision aspheres, in freeform generating and polishing of eye glasses and in process metrology. Schneider offers the full range of generating, polishing and centering machines as well as measuring systems for high-quality precision-optics production.

SCHOTT North America, Inc. - Advanced Optics #600

SPIE Corporate Member APOMA

Duryea, PA

Advanced Optics offers a broad range of cutting-edge components & materials for optical & lithographic applications & is a leading manufacturer of calcium fluoride crystals, fused silica, "ZERODUR" glass ceramics, filters optical & i-line glass. A global network of manufacturing facilities is integrated from material development to finishing operations, which include high-precision processing & metrology expertise.

SGS Slicing Solutions, Inc. #602

SPIE Corporate Member APOMA

Columbia, NJ

SGS Slicing Solutions is the exclusive North American agent for Meyer Burger AG of Switzerland. SGS offers sales, service, support, and spare parts, as well as process development for all Meyer Burger equipment. Meyer Burger is a world renowned machinery manufacturer which specializes in slicing equipment for the Semiconductor, Solar, Optical, Ceramic, Medical Imaging and other industries that need to slice hard or brittle materials. Wire, band, cropping, I.D. and O.D. saws.

Shanghai Optics #1342

SPIE Corporate Member

Metuchen, NJ

New Product: ZnSe, Ge, Silicon blanks. Full assembly services and high precision wafer polishing.

Shanghai Optics is a full service manufacturer of high precision optical flats, lenses, beamsplitters, light pipes, telecom filters, precision laser optics adn filters for digital imaging, aspheric surfaces, plastic optics, micro optics and UV optics. Materials include: CaF2, MgF2, GaAs, Ge, Zinc Selenide, Zinc Sulfide, Silicon, and more.

SlicingTech #806

SPIE Corporate Member

Bamgor, PA

SlicingTech combines a large capacity with state of the art Wire Saws to provide customers with a high precision manufacturing opportunity. Our services range from R&D prototyping to total production support.

Specialty Glass Products #902

Willow Grove, PA

Manufacturer of precision glass parts using borosilicate, quartz, filter glass and sapphire materials for biomedical, communications, laser and fiber optic manufacturing, aerospace and avionics, semiconductor technology and electronics applications. Fabrication of micro orifices, beam splitters, substrates and wafers. Services include CNC drilling, grinding, single and double sided lapping and polishing to 1/4 wave flatness, chemical strengthening, coating, laser cutting, fabrication and multiforming.

Spectrum Thin Films Corp. #506

SPIE Corporate Member APOMA

Hauppauge, NY

Spica Technologies, Inc. #705

Hollis, NH

Spica Technologies provides a variety of test and measurement services to the manufacturers and end users of optical components. In addition to our laser damage test capabilities, Spica also maintains a broad range of optical test services including optical density measurements, laser based reflection measurements, environmental exposure, surface roughness and flatness.

Swift Glass Co. #503

APOMA

Elmira Heights, NY

HOTEL ROOM KEY SPONSOR

Sydor Optics, Inc. #501

APOMA

Rochester, NY

Manufacturing precision, flat-surfaced, parallel and wedged optics and specializing in double-sided grinding and polishing. Sydor has been offering custom optical components with consistent delivery, quality and service for over 40 years. Sydor Optics offers prototype, to high volume OEM production. Products include: beam splitters, color filters, debris shields, glass wafers, grating substrates, light pipes, light-weighted substrates, mirrors, optical flats, wedges, and windows.

Syntec Optics #510

SPIE Corporate Member APOMA

Pavilion, NY

Hybrid solutions that push the polymer envelope. Syntec Optics is the largest independent custom manufacturer of precision plastic optics in the U.S. Capabilities consist of optical and mechanical design, including optics that combine polymer and glass; optical and opaque mold building; including fixture tooling; single-point diamond turning, including HRDTtm for high refraction, high thermal optics and also plano polishing. Fully integrated custom metrology and assembly services.

Taylor Hobson - AMETEK Ultra Precision Technologies #610

APOMA

West Chicago, IL

New Product: PGI Blu - A high precision 3D metrology instrument for steep-sided aspheric optics.

Taylor Hobson is an ultra-precision technology company operating at the highest levels of accuracy. We provide contact and non-contact measurement solutions to the most demanding applications on a global basis. We are continually evolving our products to meet the ever-increasing demands of today's industries. Taylor Hobson products are widely used in the development and production of next generation technologies, particularly in semiconductor, hard disk and precision optics.

A High Precision 3D Metrology Instrument for Steep-sided Aspheric Optics

Techmetals, Inc. #603

SPIE Corporate Member APOMA

Dayton, OH

Technodiamant USA Inc. #408

Tranquility, NJ

New Product: High-Clearance controlled waviness tools with 32 degrees of front clearance, waviness <0.05 microns!

Technodiamant offers a full range of quality diamond tools, including turning tools with nanometer-scale controlled waviness. Several tool styles are available from stock, and custom tools can be delivered in 3-5 weeks depending on the application. Natural, synthetic, and single crystal CVD diamond are offered. Quality metalbond and resinbond wheels are also offered.

Technodiamant diamond tool machining lens array on Moore Nanotechnology lathe

Exhibition Preview

Tecport Optics, Inc. #212

SPIE Corporate Member

Orlando, FL

Manufacturer of Vacuum Coating Systems for Precision Optics, Ophthalmic, Flat Panel Display, Imaging and Telecommunication applications. An industry leader in innovation, quality, reliability, software and service. Sophisticated yet user friendly systems employ leading edge technology such as plasma assisted deposition. Systems are custom built and pre-configured for your process and your volume. Process is pre-configured and installed systems are production-ready within one week.

Tempo Clean Room Foam #1330, 1332

SPIE Corporate Member APOMA

Visalia, CA

New Product: New edge protectors for rectangular glass.

Labor saving stock and custom static dissipative packages for wafers and optics. Clean room compatible foams are lint free, test reports posted on website.

Treibacher Industrie AG #404

Althoten Carinthia, Austria

Treibacher Industrie AG, has been a global player in the Rare Earth industry for over a century. Polishing Powders based on Cerium Oxide are produced under the trademark AUERPOL®. The applications vary from beveling of mirrors, polishing of LC-displays, crystal glass and polish of optical components like lenses and prisms in binoculars, microscopes, telescopes, night-vision devices and laser. The qualities Auerpol PW 70, WPP, PZ 110, PZ 250 and PZ 500 are used for precision optics.

Trioptics GmbH #1009

Wedel, Germany

New Product: OptiCentric automated cementing & bonding; WaveMaster PRO Wafer miniature waver-level lenses testing.

Manufacturer stock/custom Optical Test Equipment: OptiCentric®-automated alignment, centering, cementing & bonding, centration error measurement; OptiSpheric®-Industry's standard for complete optical characterization (EFL, BFL, MTF, radius); ImageMaster® MTF-characterization-UV-VIS-IR, mobile phone and wafer level lens testing; WaveMaster®-Real time wave front analysis; PrismMaster®-Prism measurement; SpectroMaster®-Refractive Index measurement; Electronic and visual autocollimators.

UCM AG #802

Rheineck, Switzerland

Umicore Optical Materials USA Inc. #300

APOMA

Quapaw, OK

LANYARD SPONSOR

United Lens Co., Inc. #701

APOMA

Southbridge, MA

Manufacturer of custom molded and precision machined blanks as well as flat optics and thin film coatings. Large inventories of optical glass, fused silica, fused quartz, filter glasses and various low expansion materials. Extensive manufacturing capabilities allows for rapid delivery.

Universal Photonics, Inc. #1015

SPIE Corporate Member APOMA

Hicksville, NY

New Product: Somos high-speed, double-sided lapping & polishing machines.

Specializing in developing & formulating lapping/polishing consumables & machinery for glass, plastic, crystals, infrared, semiconductor, electro, laser & fiber optics. Including polish pads & compounds, ultra-pure alumina, colloidal silicas, thermoplastic adhesives, holding foils, diamond powders, compounds & lapping film, slurries for sapphire/CaF, lens bonding material, precision pitch, waxes & cements. Machinery: Advantage & DAMA, HKS centrifuges, SOMOS Double-sided Lapping & Polishing.

SOMOS HIGH-SPEED, DOUBLE-SIDED LAPPING & POLISHING MACHINES.

University of Rochester, The Institute of Optics #509

Rochester, NY

Optical Engineering. Industries and National Laboratories can interact with The Institute's faculty and students through The Institute's Industrial Associates Program, which meets on campus twice annually. Also of interest to Industry is the Optics Summer School Program. See www.optics.rochester.edu for more details.

Vacuum Process Technology, Inc. #608

Plymouth, MA

Vacuum Process Technology, LLC (VPT) designs and manufactures precision thin film deposition systems for a wide range of applications. VPT provides physical vapor deposition systems using ion-beam, sputtering, electron-beam, and plasma assisted thin film deposition technologies. Our applications laboratory is available for development and verification of coating processes.

Valtech Corp. #607

Pottstown, PA

New Product: Valtron DP 153 and DP 154. Aqueous cleaner for removal of micro particulate on optical substrates.

Valtech Corporation is a global manufacturer of formulated detergents, specialty adhesives and custom molded polymers. Our Products are supplied into the semiconductor, computer disk drive, precision optical, ophthalmic, photovoltaic, medical, and instrumentation industries.

VisiMax Technologies, Inc. #1334

Twinsburg, OH

VisiMax is a world class provider of precision optical coatings for both glass and polymer optics. VisiMax offers an extensive range of coating types including anti-reflection, beamsplitters, hot and cold mirrors, protective hardcoatings, ND filters, bandpass filters, metal and dielectric reflectors, as well as custom coating needs. Cleanroom coating facility with state-of-the art coating systems and automation. Prototype volumes to full scale production.

Welch Allyn Lighting Products #1320

Skaneateles Falls, NY

New Product: High stability UV HPX lamp, Solarc NGX HID lamp, Solarc HID metal halide fiberoptic illuminator.

Manufacturer of high-performance lighting devices and technology for professional users and OEM's. We offer high quality and innovative custom lighting solutions. Our patent portfolio covers platforms of lamp wattages, technology types and system illuminators. Our engineering team manages wattage, output, lamp life, spectral characteristics, reflectors, bases and optics that integrate into other system components. Our products excel in the production of light from 320 nm into the near-IR.

Welch Allyn's miniature UV halogen lamp provides 99.95% output stability.

Western Photonics Technology #805

SPIE Corporate Member

Alhambra, CA

New Product: Sapphire and Germanium window, 0.8mm lens.

Headquarter in the United States and factories in China. Develops and manufactures miniature optics (lens, prism, window), optics (window, lens, prism; filter), IR, visible, UV optics (Sapphire, Germanium, ZnSe, CaF_2), laser and optical crystals(Nd:YAG, BBO), coatings, optical system, fiber optics (fiber pigtail), borescopes (IR, visible, UV rigid/flexible borescope, high temperature borescope, endoscope, etc.), lasers (CTH:YAG laser, Nd:YAG laser, CO_2 laser), hologram (label).

COFFEE BREAK SPONSOR

Wordingham Technologies #504

SPIE Corporate Member

Victor, NY

Wrisley Abrasives #301

Simsbury, CT

New Product: Advanced Diamond Tooling for IR Materials.

Wrisley Abrasives has engineered diamond tools for precision optics for over 20 years! We have a tremendous amount of experience grinding an array of materials including IR, visible, hard crystals, and ceramics. We offer a wide range of diamond tool geometries such as generators, end mills, core drills, band saw blades, and numerous wheel types. Bond types include metal bond, resin bond, copper-filled resin, electroplated, and brazed. US made for quick delivery and competitive price.

Precision Diamond Tools for Precision Optics

ZEMAX Development Corp. #1100

Bellevue, WA

ZEMAX Development Corporation publishes the ZEMAX® Optical Design Program which can be used for both sequential and non-sequential ray tracing. Our software can be used to conceptualize, design, optimize, analyze, tolerance and document virtually any optical system. ZEMAX® also goes beyond the traditional limits of ray tracing software by allowing users to use diffraction calculations to propagate any arbitrary beam through an optical system.

Zygo Corporation #815

SPIE Corporate Member APOMA

Middlefield, CT

Zygo Corporation is a worldwide supplier of optical metrology instruments, precision optics, and electro-optical design and manufacturing services, providing productivity and yield improvement solutions for manufacturers of precision components for a variety of industries. Zygo Corporation provides a wide range of inspection, surface analysis, precision displacement measurement, and automated solutions.

Visit the SPIE Optifab website to make your meeting a success!

General Information

Rochester Riverside Convention Center

SPIE Optifab 2009 will be held at the Rochester Riverside Convention Ctr. 123 East Main St, Rochester, NY 14604-1619

Rochester is the third largest urban area in New York State. Rochester is a terrific place to visit, offering plenty of experiences to relish and remember. Whether you're in the mood for museum hopping or antique shopping, cultural adventures or sporting pleasures, scenic cruising or bargain choosing, history, mystery, artistry... when you visit Rochester you'll discover an exceptional place to indulge all your senses!

Registration Hours

Rochester Riverside Convention Center Registration

Convention Center Galleria

Monday–Wednesday. . . . . .7:30 am to 5:00 pm
Thursday . . . . . .7:30 am to 4:00 pm

Exhibition Hours

Rochester Riverside Convention Center • Empire Hall

Tuesday 12 May . . . . . .10:00 am to 5:00 pm
Wednesday 13 May. . . . . .10:00 am to 5:30 pm
Networking Reception and Poster Viewing . . . . . .4:30 to 5:30 pm
Thursday 14 May. . . . . .10:00 am to 3:00 pm

Save money -

Book in the SPIE Room Block

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spie.org/ofbpreview

Book your room by 16 April 2009 - rates go up after this date.

The Hyatt Regency Rochester and The Rochester Plaza Hotel & Convention Center (formerly Crowne Plaza Rochester) have each reserved a block of rooms at special reduced rates for symposia attendees. The conference rates cannot be guaranteed after the room block has been filled. Reservations received by either hotel after their specified cut-off dates will be accepted on a space and rate availability basis and regular rates may apply. It is imperative that individuals identify themselves as SPIE Optifab attendees to obtain the reduced rates.

Hotel Reservations

To secure a room reservation, requests must be received with a credit card guarantee. Problems or delays with your payment may affect your hotel request.

Early Conference Registration cutoff is 24 April 2009

Register on the Web

spie.org/ofbpreview

Make your selections from the categories described below and on the registration form on page 23. For those registering by fax or mail after 24 April 2009, please add the appropriate additional fee to your total. The online form will automatically display the increased pricing.

Mailed forms should be sent to: SPIE, PO Box 10, Bellingham WA 98227-0010 USA (fax: +1 360 647 1445) by 24 April 2009. FORMS NOT ACCOMPANIED BY PAYMENT WILL BE RETURNED.

Conference Registration

Full conference registration includes admittance to the conference, exhibition, coffee breaks, poster viewing/reception, and a technical digest. Prices increase by $100 after 24 April 2009!

Course Registration

Choose the number associated with the course of choice. Note that course prices go up $50 USD after 24 April 2009!

Student Members save 50% on course registration with the appropriate documentation: Student ID number or proof of student status accompanies your registration. Offer applies to undergraduate/graduate students who are enrolled full time, have not yet received their PhD, and are not also full-time employees in industry, government, or academia.

Exhibition Only Registration

Entrance into the SPIE Optifab Exhibition is $35. Exhibition Hall Only Registration includes admittance to the SPIE Optifab 2009 Exhibition, as well as the Exhibitor Product Demos presented by Exhibitors. The fee goes up $10 after 24 April.

Only children over the age of 12, accompanied by an adult, will be allowed in the Exhibition Hall. No photography is allowed inside the Exhibition Hall without the consent of the exhibitor. No soliciting in the Exhibition Hall.

Media Registration

Media/Press representatives, please email contact information, title of position, and organization to media@spie.org.

About SPIE

SPIE is a not-for-profit international society dedicated to furthering technological innovations. Established in 1955, SPIE has a long history of producing international meetings that push the forefront of photonics technologies and their applications.

SPIE.org

About APOMA

The American Precision Optics Manufacturers Association represents a broad base of precision optics manufacturers and supporting industries whose mutual interest is to expand and advance optics manufacturing technology. The 150-member organization promotes regional educational centers for the optics industry, provides student grant funding, participates in the formation of optical standards for the industry, and actively sponsors technical workshops aimed at improving technical dialogue and exchange within the membership.

www.apoma.org

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Conference Registration

☑ Check box to indicate appropriate registration fee.

	SPIE Member	Nonmember
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☐ **Author (AU)** ☐ **Chair/Committee (CH)** Includes Technical Digest	☐ $295	☐ $355
☐ **Full-time student (ST)** Includes Technical Digest	☐ $130	☐ $150
☐ **Additional Technical Digests**	☐ $55	☐ $75

Exhibition ONLY Registration

☐ **Exhibition ONLY Attendee Pass $35**

☐ **Full-time student Exhibition ONLY Pass $15**

Courses

Write the number(s) and price(s) of the courses you will attend. (see p. 5–7 for a complete list of courses)

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After 24 April 2009
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Preregistration for
Optifab 2009
11–14 May 2009
Rochester Riverside Convention Center
Rochester, New York USA

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Conference fees increase $100 USD after 24 April 2009
REGISTRATION TOTAL
$_____

Exhibition fees increase $10 USD after 24 April 2009
EXHIBITION ONLY TOTAL
$_____

Course fees increase $50 USD after 24 April 2009
COURSE TOTAL
$_____

DIGITAL LIBRARY SUBSCRIPTION TOTAL
$_____

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$_____

Payment must accompany registration.

TOTAL
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Refund Policy for Preregistration: There is a $40 service charge for processing refunds. A letter requesting the refund should state the preregistrant's name and to whom the check should be made payable. Requests for preregistration refunds must be received no later than 30 April 2009. Membership dues are not refundable. SPIE Digital Library subscriptions are not refundable.

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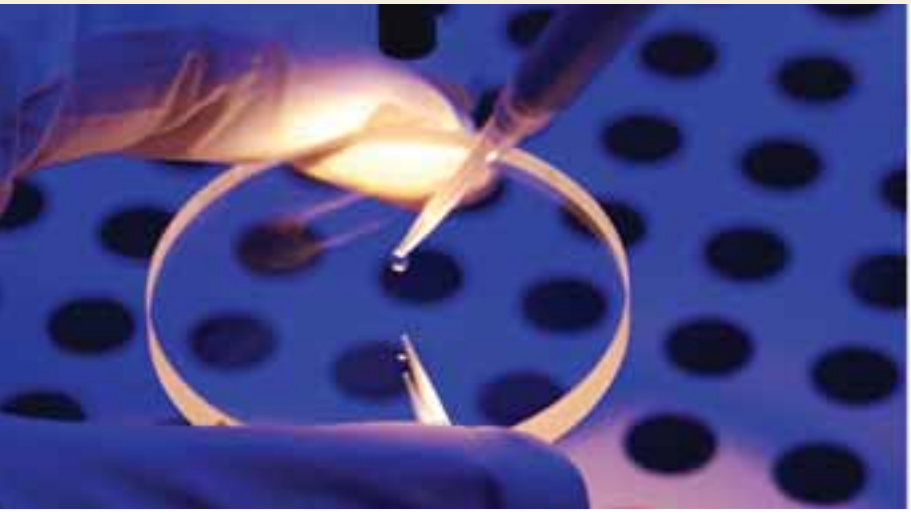
2009
Event Preview

SPIE Optifab

Exhibition Dates: 12-14 May 2009
Conference Dates: 11-14 May 2009
Rochester Riverside Convention Center
Rochester, New York, USA

CONFERENCES COURSES EXHIBITIONS SPECIAL EVENTS



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