LIA TODAY

THE OFFICIAL NEWSLETTER OF THE LASER INSTITUTE OF AMERICA

The international society dedicated to fostering lasers, laser applications, and laser safety worldwide.

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Photo Courtesy of Lawrence Livermore National Laboratory, NIF

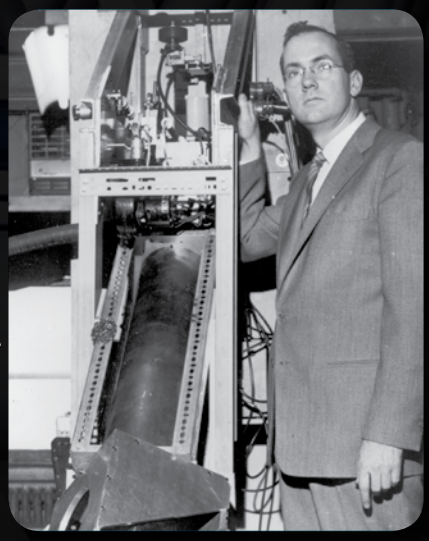

Photo Courtesy of Alcatel-Lucent Bell Labs

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Above: An early ruby laser.

Left: Dr C H Townes with a ruby maser.

Background Image: National Ignition Facility (NIF) "star on earth" program which focuses the energy of 192 giant laser beams on a BB-sized target.

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Laser Institute of America

Laser Applications and Safety

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LIA TODAY

THE OFFICIAL NEWSLETTER OF THE LASER INSTITUTE OF AMERICA

LIA TODAY is published bimonthly and strives to educate and inform laser professionals in laser safety and new trends related to laser technology. LIA members receive a free subscription to *LIA TODAY* and the *Journal of Laser Applications*® in addition to discounts on all LIA products and services.

The editors of *LIA TODAY* welcome input from readers. Please submit news-related releases, articles of general interest and letters to the editor. Mail us at *LIA TODAY*, 13501 Ingenuity Drive, Suite 128, Orlando, FL 32826, fax 407.380.5588, or send material by e-mail to lia@laserinstitute.org.

2010 LIA OFFICERS

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BUSINESS STAFF

CALENDAR OF EVENTS

Laser Safety Officer Training
July 13-15, 2010 | Chicago, IL
Dec. 7-9, 2010 | Clearwater, FL

Laser Safety Officer with Hazard Analysis*
Sept. 27 - Oct. 1, 2010 | Anaheim, CA
Nov. 1-5, 2010 | San Antonio, TX
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Sept. 18-19, 2010 | Boston, MA
Nov. 6-7, 2010 | San Diego, CA
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Sept. 9-12, 2010 | Atlanta, GA
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ICALEO® 2010
Sept 26-30, 2010 | Anaheim, CA

LIA SUPPORTED CONFERENCES
ANGEL 2010 EOS Conference on Laser Ablation and Nanoparticle Generation in Liquids
June 29 – July 1, 2010 | Engelberg, Switzerland

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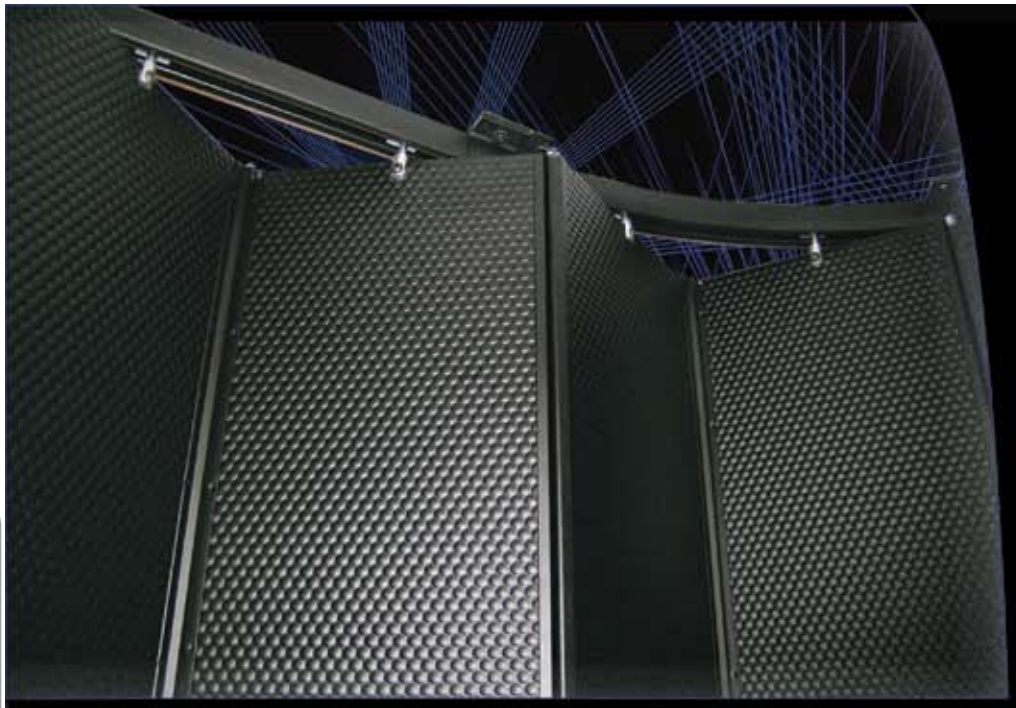
ABOUT LIA

Laser Institute of America (LIA) is the professional society for laser applications and safety. Our mission is to foster lasers, laser applications and laser safety worldwide.

We believe in the importance of sharing new ideas about lasers. In fact, laser pioneers such as Dr. Arthur Schawlow and Dr. Theodore H. Maiman were among LIA's original founders who set the stage for our enduring mission to promote laser applications and their safe use through education, training and symposia. LIA was formed in 1968 by people who represented the heart of the profession—a group of academic scientists, developers and engineers who were truly passionate about taking an emerging new laser technology and turning it into a viable industry.

Whether you are new to the world of lasers or an experienced laser professional, LIA is for you. We offer a wide array of products, services, education and events to enhance your laser knowledge and expertise. As an individual or corporate member, you will qualify for significant discounts on LIA materials, training courses and the industry's most popular LIA conferences and workshops. We invite you to become part of the LIA experience – cultivating innovation, ingenuity and inspiration.



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FIND A JOB
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Many job seekers and employers are discovering the advantages of searching online for industry jobs and for qualified candidates to fill them. But when it comes to making career connections in the field of laser technology, the mass market approach of the mega job boards may not be the best way to find exactly what you're looking for.

The **Laser Institute of America (LIA)** has created the **LIA Career Center** to give employers and job seeking professionals a better way to find one another and make that perfect career fit.

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Laser Institute of America
Laser Applications and Safety

PRESIDENT'S MESSAGE

Integrated laser manufacturing and fabrication systems and processes significantly impact the conversion to green manufacturing. As manufacturing philosophy evolves from cradle-to-grave responsibility to cradle-to-cradle responsibility, laser technology offers a roadmap for continuous improvement by reducing manufacturing and fabrication steps, reducing materials wastage, improving product yield, reducing electric power and water consumption, reducing maintenance and increasing manufacturing line versatility.

Laser technology, already demonstrated for rapid prototyping, has potential to collapse some manufacturing and fabrication layouts to near tabletop footprints. In particular, product material costs are reduced since expensive materials can be synthesized on a surface or in a parent material in the location that their properties are required. This capability reduces product material cost and imparts product properties such as weight reduction, longer life and recyclability that result in benefits for the consumer.

Cradle-to-grave manufacturing and fabrication refers to companies assuming responsibility only for the product it produces, but not necessarily reusing or recycling product components and materials back into service. In the electronics and computer industries, which are allied to our industry, environmentally toxic waste dumps have been created, particularly in third world nations. These sites are not only biohazards, but represent a waste of precious raw materials that are in short supply, thus impacting geopolitics.

Walter R. Stahel invented the phrase cradle-to-cradle in the 1970s to capture the vision of creating production techniques that are not only efficient, but waste free. The vision has been popularized in the book *Cradle-to-Cradle* authored by William McDonough and Michael Braungart in 2002.

The laser community is poised to take the lead in efficient, continuous manufacturing improvement and realizing the cradle-to-cradle vision. We can all share in contributing to this social responsibility.

Nathaniel Quick
President
Laser Institute of America

EXECUTIVE DIRECTOR'S MESSAGE

LAM – A Practical Program for End Users

Our second Laser Additive Manufacturing (LAM) Workshop, held in Houston May 11th and 12th, was a big success by any measure. Attendance was up 50% over last year and it had an effective and well-balanced program headlined by Schawlow Award winner Professor Bill Steen, a pioneer of the process. Attendees received a practical education and update on the various additive manufacturing processes together with the opportunity to interact with the suppliers of lasers, powders, feeders and related equipment.

All of the attendees, speakers and suppliers were pleased with the easy and friendly interaction at the event and are looking forward to LAM 2011.

The workshop is an excellent manifestation of LIA's commitment to practical programs for end users. When scientific processes, first presented at ICALEO®, are developed into practical cost-effective manufacturing processes, LIA is able to bring industry leaders and users together in a workshop setting that is conducive to networking and information sharing.

Peter Baker, Executive Director
Laser Institute of America
pbaker@laserinstitute.org

LASERS AND A LASER SOCIETY

In celebrating 50 years of the laser, we look at the laser society that's been there almost since the beginning.

By Peter Baker

On the 50th anniversary of the laser, it's amazing to look back at how far the technology has come — and how much more lasers can achieve in such a broad array of applications. Not long after I began using lasers in 1967, the Laser Institute of America (LIA) was founded to advocate for these endlessly fascinating tools.

As just about everyone knows, American physicist Theodore Maiman fired the first laser in May 1960 in Malibu, Calif. What is less well known is that in February 1968, also in California, Maiman and a collection of laser pioneers founded the Laser Industry Association —later to become the LIA.

What began as a modest venture started by publisher William Bushor, has grown into the industry's leading voice for furthering the reach of lasers and their safe use. Bushor and LIA's first president, Arthur Lubin, recruited our first board of directors, including Maiman, Stanford professor Arthur Schawlow and 10 other visionaries.

LIA's original directors were an august group, and their devotion to the power and potential of lasers set the tone that guides our organization to this day. Consider Schawlow, who went on to win the 1981 Nobel Prize for laser spectroscopy. His playful demonstrations —such as putting a blue balloon inside a clear one and firing a laser to pop the balloon inside, or his efforts to create a laser out of Jell-O — led to our understanding of laser absorption and innovations like the distributed feedback laser. Gordon Gould, our third president, coined the term *laser* and battled for decades to secure the patents for the inventions that eventually led to his induction in the National Inventors Hall of Fame. Springing from that lineage, LIA continues its mission "to foster lasers, laser applications and laser safety worldwide."

LIA'S PURPOSE

As executive director of LIA since 1988, I've marveled at our organization's growth and expanding reach. I truly believe in offering our best contributions as good citizens of the world to further sustainable energy and manufacturing efficiency together with user safety. LIA's purpose remains constant for all the courses, workshops and conferences we have created or co-sponsored, as well as the publications we offer. Our founders delineated our primary purposes as:

- To disseminate laser-related information and data in publications and symposia.
- To promote, conduct and sponsor or co-sponsor events related to laser subjects.
- To develop and present short courses, programs and curricula for training.
- To act as a focal point for collecting and disseminating data, inquiries and statistics regarding the laser community with regards to applications, safety, research and development.
- To act as liaison and with other organizations in the advancement of laser technology.
- To assist federal and state government agencies to enact legislation relating to the safety of laser products.

Meeting all those goals is a tall order. Sweating the details while focusing on big-picture ideals and broad strokes is never easy, especially when trying to maintain the level of excellence we expect while confronting enormous obstacles like the "great recession." But if LIA's pioneering founders taught us anything, it's that we continue our work because of our passion for progress in the face of the inevitable hurdles.

LIA prides itself on its reputation as a recognized and trusted global organization. It was past president David Belforte's initiative to establish a U.S.-Japan conference on industrial laser applications that led us to create our industry-leading show ICALEO® — the International Congress on Applications of Lasers and Electro-Optics. ICALEO is nearly 30 years old and continues to bring the best and brightest minds together to create the future of laser applications. We've since added the Pacific International Conference on Applications of Lasers and Optics, or PICALO, and the International Laser Safety Conference. Furthermore, we've just held our second-annual Laser Additive Manufacturing Workshop. We also collaborate with Laser Zentrum Hannover and the Laser Processing Committee of the Chinese Optical Society on a China-specific laser-processes conference.

Among the many and varied societies and organizations we cooperate with and lend our expertise to are the Association of Perioperative Registered Nurses, the American Welding Society and the Academy of Laser Dentistry.

One of LIA's proudest moments was signing up to work with the Occupational and Safety Administration as a partner in the OSHA Alliance to foster more healthful workplaces. That's a very big deal for us. We've trained many OSHA inspectors so

L to R: Bob Goldstein (1984), Warren Stevenson (1989), Milton Chang (1985), Fred Burns, Peter Baker (1987), Mike Bass (1988), Prem Batra, Sid Charschan (1980); all are LIA Fellows; all are LIA Past Presidents except Fred Burns and Prem Batra.

Arthur Schawlow was a founding director of LIA.

Milton Chang receiving the Schawlow award from Michael Bass in 1989.

they know how to be effective when they visit establishments that use lasers. On a smaller scale, we've shared information with the FDA regarding lasers and radiological health and written a brief to help Texas lawmakers revamp their safety regulations. We offer a veritable avalanche of safety programs ranging from a one-day safety overview to a three-day training course for safety officers in medicine, research and industry. Of course, LIA makes its expertise available in online safety courses, and recently we've produced laser-safety programs, *Mastering Light* and *FOCAL POINTS*, that help the safety officers we've trained teach their own people.

Meanwhile, our publications run the gamut from our *LIA TODAY* newsletter to our comprehensive series of American National Standards Institute (ANSI) Z136 laser-safety standards. We've been publishing the peer reviewed *Journal of Laser Applications®* for more than 20 years, and we also spread our message via *Laser Systems Europe* published in partnership with Europa Science.

LIA'S FUTURE

It's been my hard-won experience that advances in laser technology can take much longer than anticipated to achieve widespread acceptance. I've witnessed first-hand the lag time in adoption of innovations like laser marking and resistor trimming. Applications I thought would be adopted within five years often took 15 or 20 to become widespread.

Perseverance pays, however. Look where we are today. Lasers are everywhere, performing indispensable functions in shipbuilding, medical devices, photovoltaics and the automotive and aerospace industries. A new generation of researchers doggedly pursues further innovations as we seek alternative energy sources and more cost-effective and efficient manufacturing processes. Companies like Trumpf and IPG are pushing the boundaries of what lasers can do. The excellent beam quality, reliability, versatility, power and efficiency of today's lasers have opened up new areas of application.

Peter Baker and Rocco LoBraico. Dr. LoBraico was chairman of the first ANSI Z136.3 committee and was awarded the Wilkening award in 2003.

As we work to help our industry achieve its true potential in the 21st Century, I'm guided by a principle former President Clinton discussed in an interview with *Newsweek*. While maintaining the view that we are globally interdependent, he frames his decisions and approaches on whether the issues confronting him create positive — or decrease negative — interdependence. In 1960, the only laser was right here in Malibu. We had the whole market and all the knowledge. Now, lasers are made and applied all over the world. It is incumbent upon the LIA, our members and our partners to understand mutual needs and goals as we work to fulfill the promise laser technology offers. ■

(A version of this article will be published in the July 2010 issue of *Photonics Spectra*.)

Peter Baker, executive director of the LIA for 21 years, has been involved with lasers and applications since 1967 and designed his first laser in 1970.

PAST PRESIDENTS REMEMBER

Reminiscences from the leaders who shaped LIA in the 1970s and '80s.

• Jim Smith (1972, retired IBM 1991): LIA started as a laser industry association, then it was aimed more toward the manufacturers and some customers — people buying initial lasers. In the very beginning we had extreme financial problems. I remember struggling to keep our bank account over $100. One of the main reasons I was named president was that I had the backing of a corporation, IBM, who paid my expenses.

I started reaching out to more people in the safety and applications area. Dave Belforte was a user and an applications-oriented person, and people like that helped turn the tide a little bit from LIA being an industry organization to a total technology organization.

In the early years we affiliated ourselves with a laser electro-optics society meeting in New York. We'd have a small booth, and we couldn't afford to have the union guys put the stuff up. I set the show up several years in a row mainly because I was based in Poughkeepsie.

The big struggle was, 'What can we give our members for what they pay in their dues?' One of the things I was pushing for was to eventually get an actual journal, which we did, and a newsletter. We felt that in order to grow we had to get out there with publicity and be recognized.

I also pushed for getting more involved with the technicians; we did draw in a lot of them as members. We were growing on the need for laser safety. For a while our conferences were centered on laser safety. Then we got ICALEO® going, and that was a big turning point. Dave Belforte was a prime mover in it, and Dave Whitehouse.

• David Belforte (1978, now editor-in-chief of *Industrial Laser Solutions* magazine): Since many of the pioneers in the laser industry were still alive, I suggested we do an oral history using these people. That idea morphed into the development of a book that got published several years later on the first 20-30 years of lasers ("The Laser in America, 1950-1970" by Joan Lisa Bromberg, The MIT Press, Cambridge, Mass.)

LIA had a committee made up of many of the companies that supplied the goods and services in laser technology. The LIA charter prevented us from having any connection to a lobbying effort, so that was one of the inhibiting factors of this committee getting organized. They really wanted to have a voice, but couldn't within LIA. We started the beginnings of an effort that eventually morphed into the industrial laser community, which has been functioning for a number of years under the auspices of the AMT. There were several iterations, but basically that group of company suppliers of lasers and laser products and services spun off from that LIA committee and became a freestanding trade organization.

In the mid-'70s we were really just beginning to have some strength and organization and were setting and meeting goals and increasing our membership. The organization was feeling good about itself, and rightly so. We had struggled in the early years. At one board meeting, we were so poor that LIA couldn't even afford to buy the directors (con't page 18)

Industry Greats Honored

By Geoffrey Giordano

The Laser Institute of America (LIA) will present its first Lifetime Achievement Award to laser pioneer Dr. Charles Townes and the Schawlow Award to Dr. Steven Chu at the 29th International Congress on Applications of Lasers and Electro-Optics (ICALEO® 2010), which will be held in Anaheim, Calif. Sept. 26-30.

TOWNES LIFETIME AWARD

Townes, 94, won the Nobel Prize for physics in 1964 "for fundamental work in the field of quantum electronics, which has led to the construction of oscillators and amplifiers based on the maser-laser principle," according to the Nobel committee. The then-provost and professor of physics at the Massachusetts Institute of Technology shared the award with Nicolay Basov and Aleksandr Prokhorov of the USSR. Their work was among the critical early steps in the development of the laser, which is 50 years old this year.

"I am very privileged to receive the Lifetime Achievement Award," Townes said. "I feel my life has been very privileged by the opportunity to do research, discover new things and particularly by the discovery of how a laser could be made. I am also delighted by the many contributions that colleagues have made in development of the laser and further associated discoveries. Many thanks for this honor, and more importantly, many thanks for the many contributions other scientists and engineers have made towards the exciting growth of optics."

Born in Greenville, S.C., on July 28, 1915, Townes — professor emeritus of the University of California, Berkeley since 1986 — shares a patent for the laser with his late brother-in-law and fellow Nobel winner Arthur L. Schawlow. The pair collaborated on their research at Columbia University and Bell Labs in New York City and together wrote the seminal book *Microwave Spectroscopy* in 1955 and the 1958 paper *Infrared and Optical Masers*. During World War II, Townes designed radar-bombing systems at Bell and began applying those principles to spectroscopy. LIA honored Schawlow, who married Townes' sister, Aurelia, in 1951, with an award in 1982 that now bears his name.

"I invented (the maser) back in 1951, and I worked and worked thinking about how to get to shorter wavelengths," Townes recalled in a 2008 interview. "One morning, sitting on a park bench…I suddenly had the right idea, namely to use molecules and atoms and how to use them. One of my students, Jim Gordon, helped make the first one, which we called the maser because we wanted to make it work first in the microwave region, which seemed the easiest thing to do. I wrote a patent then that covered all wavelengths." Years later, in pursuing shorter wavelengths, Townes said he "sat down (and) wrote some equations" and realized he could get down to light wavelengths. Shortly thereafter he began collaborating with Schawlow.

Photo courtesy of Alcatel-Lucent Bell Labs.

Dr. Charles Townes

Townes' award will consist of a special citation and a cash prize and he will become a fellow and life member of LIA. He will make a special address during the awards luncheon on Sept. 29th at ICALEO. He attended the conference once before in 2000. These days, he is using lasers for astronomy.

"We now know that natural masers and natural lasers are occurring in extraterrestrial objects," he said in 2008. "They've been there for a long time. Had we just looked at them earlier… that would have been the invention of the laser and the maser perhaps."

Officers of the LIA "decided to present the special award to Professor Townes to recognize his contribution to the development of the first laser 50 years ago and in recognition to his lifetime body of work," said Executive Director Peter Baker.

CHU SCHAWLOW AWARD

LIA will also present U.S. Secretary of Energy Steven Chu with the 2010 Arthur L. Schawlow Award at ICALEO 2010. Chu, co-winner of the 1997 Nobel Prize in physics for development of methods to cool and trap atoms with laser light, will receive the honor during the awards luncheon on Sept. 29th and speak during the event. Laser pioneer Schawlow nominated Chu for the Nobel while the two were colleagues at Stanford University. Chu will receive a silver medal, a special citation and a cash prize and become a fellow and life member of LIA.

Chu, 62, was appointed as Secretary of Energy in December 2008 while director of the Department of Energy's Lawrence Berkeley National Lab and professor of physics and molecular and cell biology at the University of California, Berkeley. "Steven has blazed new trails as a scientist, teacher and administrator, and has recently led the Berkeley National Laboratory in pursuit of new alternative and renewable energies," said President Barack Obama.

Born in St. Louis, Miss. in 1948, he and his family settled in Garden City, N.Y. in 1950. Chu went on to receive his Ph.D. from Berkeley in 1976 and joined Bell Labs in 1978. It was at Bell that he and his coworkers perfected his Nobel-winning technique for cooling atoms with six lasers, creating "optical molasses" where the beams intersected. He went on to Stanford University in 1987, serving as a professor and chair of the physics department before returning to Berkeley to run the national lab in 2004.

The "green"-minded Chu — who reveled in shunning cars in favor of bicycles to get to work before his current role demanded full-time security — has touted a global "glucose economy" in which glucose from tropically grown plants would be distributed worldwide, gradually replacing oil. "From here on in, every day has to be Earth Day," he told *The New York Times* last year.

Dr. Steven Chu

LIA annually unveils the latest developments and trends in laser-related fields at ICALEO, the premier source of technical information about laser materials processing. ■

Oh, What A Night – LaserFest Celebration

By Fred P. Seeber

Another vicious snow storm had just hit Washington, D.C. on Feb. 10 as laser scientists from all over the country, if not the world, were trying to converge on our nation's capital to celebrate the 50th year celebration of the invention of the laser. LaserFest is a year-long celebration emphasizing the laser's impact in such industries as communications, medicine, energy and manufacturing. There will be celebrations of LaserFest throughout the year at different locations throughout the world.

I was fortunate enough to be invited with my wife, Pat, to LaserFest in D.C. From the hotel, where most of the 300 invitees stayed, we boarded a bus provided by the LaserFest committee to travel to the Museum of American History at the Smithsonian, where the celebration was held. This should have been a 15- or 20-minute drive under normal circumstances, however, due to the snow we arrived about two hours late, as did many of the other attendees and Nobel Laureates. The organizers realized what was happening and reversed the program with food and entertainment first and the opening ceremony second.

Dr. Steven Chu, U.S. Secretary of Energy, a Nobel Prize Laureate, who had done research in his academic years using lasers to cool and trap atoms was the keynote speaker. His address was most informative and entertaining describing the world use of energy in the past and where we are now with new innovations.

LASERFEST HONOREES

The honorees, including several Nobel Prize winners, were:

• ***James Gordon***, who, as a graduate student, worked with Charles Townes to construct the first ammonia maser and during a subsequent career at the Bell Telephone Laboratories made many fundamental contributions to optical communications.

• ***Nicolaas Bloembergen***, Nobel Laureate, who invented an important early microwave maser and made subsequent widely-hailed contributions to nonlinear optics and to the development of laser spectroscopy.

• ***Victor Evtuhov***, a member of Theodore Maiman's team at Hughes Research Labs, co-author of several of the early publications on the ruby laser, and who was subsequently responsible for many additional advances in laser technology.

Fred Seeber with wife Pat at the Laserfest Celebration in Washington D.C.

• ***Ali Javan***, who, working in the Bell Telephone Laboratories during the late 1950s, conceived and developed the basic concept of laser systems using gas discharges, and subsequently brought this concept to fruition by operating the first successful gas laser, the well-known and widely-used helium–neon laser.

• ***Kumar Patel***, who not long afterward, invented the carbon dioxide laser – the first gas laser to produce industrially useful high-power radiation continuously.

• ***Elsa Garmire***, who as a graduate student working with Townes at MIT, first demonstrated important nonlinear effects produced by powerful laser beams acting on atoms and molecules.

• ***Daniel Kleppner***, who as a graduate student at Harvard University, collaborated in the development of a hydrogen maser, which provides the foundation for extraordinary stable atomic clocks and atomic wavelength standards.

• ***Tingye Li***, who during a long career at Bell Laboratories, collaborated in developing crucial early understanding of laser cavities and subsequently made pioneering contributions to laser-based communication through optical fibers.

• ***Steven Chu***, Nobel Laureate and current U.S. Secretary of Energy, who developed laser-based methods to cool and trap atoms with laser light.

• ***Roy Glauber***, Nobel Laureate, who made fundamental and widely used contributions to the quantum theory of optical coherence and the understanding of laser physics.

• ***John Hall***, Nobel Laureate, who made many noteworthy contributions to the development of laser-based precision spectroscopy and precision measurement techniques including the optical frequency comb technique.

• ***William Phillips***, Nobel Laureate, who developed laser-based methods to cool and trap atoms with laser light.

• ***Charles Townes***, whose research led to the construction of the first microwave and then optical-frequency oscillators and amplifiers based on the maser-laser principle was scheduled to attend but due to the storm, his flight was cancelled.

The program also included a presentation featuring videos and slides of these researchers in the early days of the laser. Anthony Siegman and Thomas Baer, both of Stanford University, served as co-hosts. This presentation proved to be very entertaining and informative.

After the program was complete, most of us headed back to the buses with a special van for the Nobel Prize Laureates. The van never showed up, so I had the privilege of riding back to the hotel with many of these wonderful honorees. All in all, a wonderful evening and celebration of LaserFest. ■

References: 1) OSA News Item "*Advancing the Science and Techology of Light*," Feb. 2010; 2) Hecht, Jeff, *Laser Pioneers*, Academic Press, San Diego, 1992

Dr. Fred P. Seeber is a professor of physics/photonics and principal investigator for the National Science Foundation, OP-TEC. He is also a fellow of the LIA, past LIA board member and chair of the ANSI Z136.5 committee.

THE LOWDOWN ON LAM

By Geoffrey Giordano

The second time was a charm for the Laser Institute of America as its Laser Additive Manufacturing Workshop (LAM) drew 50 percent more attendees to Houston, Texas to learn about the latest cladding techniques and trends for the automotive, aerospace, oil and gas and other industries.

Held May 11-12, the second annual LAM featured 22 vendors and 13 sponsors and drew 137 attendees from 11 countries, an all-around improvement over the conference's successful 2009 debut amid the worst recession since the Great Depression.

"We were very pleased with the second LAM workshop," said LIA Executive Director Peter Baker. "The conference emphasizes LIA's commitment to providing end users and manufacturers with the practical knowledge and information they need to use lasers productively and profitably."

Keynote speaker Bill Steen of the University of Liverpool commented that it was well organized with an extraordinary level of friendliness on the part of the participants who were really interested in progressing their business.

Lasers provide a world of possibilities and efficiencies for additive manufacturing, and LIA assured attendees the show would "have a significant impact on the widespread industrial implementations." LAM is increasingly popular as a cost-effective way to repair expensive machinery and parts and reduce manufacturing downtime.

ON THE INDUSTRY'S PULSE

The carefully selected roster of presentations featured real-world case studies of successful, cutting-edge applications. Among the speakers were Dr. Ingomar Kelbassa of Germany's Fraunhofer Institute for Laser Technology, who addressed "Additive Manufacturing, Repair and Salvage of High-Value Aero-Engine Components by Laser Metal Deposition and Selective Laser Melting"; Dr. Jim Sears of the South Dakota School of Mines & Technology, who updated attendees on "Laser Additive Manufacturing for Bio-Medical Devices" and Wayne Penn, president of platinum sponsor Alabama Laser, who opened the workshop with a discussion of "Laser Hot Wire Metal Deposition with Solid and Cored Wire."

It was such up-to-date material that it kept "80 percent of attendees staying to the end," said Sponsor Committee Chair Bill Shiner, vice president of industrial markets at IPG Photonics in Oxford, Mass.

Over 80 percent of LAM attendees stayed until the very end of the conference for the cutting-edge sessions.

The success of the LAM workshop was also evident to Paul Denney, general chair of the conference and director of the laser applications lab at the Connecticut Center for Advanced Technology in East Hartford.

Jim Naugle with LAM10 Plenary Chair Jim Sears.

"Everything I heard from it was very positive," Denney says. "Everyone thought they came away with good information. I think that we're definitely addressing a need out there for a forum for people to get together that have an interest in this technology."

Plenty of heavy hitters were there to share expertise and learn, including representatives from Caterpillar's remanufacturing group, GE Global Research and GE Aviation, and Pratt and Whitney. "Those are the big guys who are interested in the technology," Denney notes, "and if they accept it they'll drive not only what they do at their own facilities but drive what goes on at their suppliers."

But it wasn't just big firms that came to Houston; smaller "job shop-type" companies like Hayden Corp. of West Springfield, Mass., Joining Technologies of East Granby, Conn. and Titanova Inc. of St. Louis, Mo. "You've got all these people that are now doing this as a service," Denney notes.

Although laser-additive manufacturing has been around since at least the early 1980s, newer and better lasers, optics, controls and monitoring, LAM can be done more consistently and reliably. "Design has driven people to come up with new and innovative ways to repair things," Denney says. "You're not just depositing a patch; you can actually build up structures." For example, Fraunhofer is using "zoom optics" to change the clad path width on the fly as they deposit material. "Now the question is 'How much can I build up and repair something in three dimensions and can I build up structures for manufacturing, not repair?'" Denney says. But some experts note a lack of standards for testing and certification to ensure the creation of acceptable and uniform parts.

Program Committee member Silke Pflueger, director of sales and marketing with Laserline, said she talked to several attendees who are looking into new areas in cladding and repair and are contemplating entering the market or using lasers for their current applications. "I spoke to a gentlemen from Delta Airlines who was very interested in pushing this into his repair shop," she noted. "It was interesting that so many of the talks touched on hybrid processes, where the laser is used in conjunction with other energy sources."

LAM LIGHTS UP WITH NETWORKING

A special vendor reception May 11 was one of several instances tailored to allowing attendees to explore current

offerings and network among their peers. The exhibit area "was a mix of laser manufacturers, powder providers, job shops, a few research organizations," Denney said. "If you're in a shop and all you've ever looked at is CO_2 lasers, it was good to go and talk to the people who are producing fiber lasers and direct-diode lasers and disc lasers" and other providers.

"We actually had customers show up," said Wayne Penn, president of Alabama Laser. "We work to try to encourage people to do that. It's one thing to have all the laser folks there, but it's a whole other deal to have actual customers and people who use the processes. I saw several of them there, and we made a couple of good contacts with companies that we already do business with; sometimes they're so large that just networking at workshops like this helps you to increase your awareness even with your existing customers because you never know when somebody new is going to show up in another location."

Denney and others are already thinking of ways to expand next year's workshop. "We'd really like to push to get more discussion and interaction with people who are doing (laser-additive manufacturing)," he said. "A lot of people want to hear stories from other people; they'd like the end users to talk about how they're using the technology. We've got to bridge over to other organizations and communities that don't use lasers that readily and get them to come to the workshop." Some other attendees and planners mentioned they'd like to see webcasts, more technology service providers and perhaps a third day added to the schedule.

Visit **www.laserinstitute.org/LAM** for more information on LAM. ■

Geoffrey Giordano is a freelance writer.

LAM 2011

LIA's 3rd Laser Additive Manufacturing Workshop (LAM 2011) will once again bring industry specialists, executives, users and researchers from around the world to show how cladding and rapid manufacturing can be applied effectively and affordably to today's manufacturing challenges. For more information on LAM 2011 or sponsorship opportunities, please contact LIA at lam@laserinstitute.org or call 1-800-34LASER.

The vendor reception proved an excellent time for networking.

Attendees enjoy the Houston skyline and IAH airport views while dining at CK's Revolving Rooftop Restaurant.

Bill Steen from Cambridge University in the UK delivers his keynote "Some Thoughts on Laser Additive Manufacturing."

LIA staff Gail LoIacono and Robin Devor.

MANY THANKS TO THE LAM 2010 SPONSORS

Platimum
- Alabama Laser

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- Durum USA
- Fraunhofer USA, Center for Coatings & Laser Applications
- Innovative Laser Technologies, Inc.
- Joining Technologies, Inc.
- POM Group, Inc.
- Trumpf, Inc.

THE PROGRESSIVE PICALO

The 4th Pacific International Conference on Applications of Lasers and Optics (PICALO) was held March 23-25, 2010 in Wuhan, China. Presented by LIA in cooperation with the Laser Processing Committee of the China Optical Society and Huazhong University of Science & Technology, PICALO focused on the growth and application of lasers and optics in the Pacific region.

LIA's Peter Baker presenting PICALO 2010 General Chair Xiaoyan Zeng with his plaque.

PICALO 2010 included two separate conferences – the Laser Materials Processing Conference and the Laser Micro, Nano and Ultrafast Fabrication Conference. In addition, the popular International Enterprise Summit, a business-focused forum highlighting laser industry development during the current global financial crisis, returned. With almost 200 attendees from 17 countries, 2010 was a good year for the conference as each session was packed with the latest developments and progress in lasers and applications.

CONFERENCE HIGHLIGHTS

The PICALO 2010 Plenary Session highlighted the theme of "Superfast Laser/Laser Applications." This session started with an impressive talk on multi-hundred-Watt femtosecond lasers and their applications in material processing. This type of laser may bring significant novel results that may have profound impact on the future material processing techniques. The evolution of femtosecond laser pulses after passing an AOD scanner and the experiments with models to validate its applications in neuroscience were presented in the second part of the Plenary Session, while the third presentation provided answers to the challenging question of if it's possible to manufacture large metallic components by laser direct manufacturing of metallic components based on powder deposition and push the technique into industrial applications. Lastly, the fourth presentation described the unique advantages of laser forward transfer and explored its role in the future of digital microfabrication.

Now that 2009 is behind us, people are looking ahead to 2010 searching for signs of economic recovery in the laser industry. The International Enterprise Summit invited executives and experts from the worldwide laser industry to discuss the current status and future trends of our industry. CEOs and CTOs presented their latest research and development activities, showcased their new products and predicted the markets in order to be ready for future growth.

The Laser Materials Processing Conference featured the latest developments from across the world in laser cutting, machining, surface modification, welding, additive manufacturing, laser modeling and simulation, drilling and forming and industrial applications. It was chaired by Lin Li, University of Manchester, Manchester, UK and Minlin Zhong, Tsinghua University, Beijing, People's Republic of China.

The Laser Micro, Nano and Ultrafast Fabrication Conference featured engineers and scientists from a variety of industry segments and institutes who discussed the use of laser micro, nano and ultrafast fabrication and diagnosis as a key technology for various applications. It was chaired by Yongfeng Lu of the University of Nebraska-Lincoln, Lincoln, Neb.

"The most cutting-edge topics in this conference were precise and high-throughput ultrafast laser surface micro-processing; 3D ultrafast laser micro/nano-machining; laser-induced synthesis and deposition of nanomaterials and lastly, laser-induced surface texturing and functionalization," Lu said.

NETWORKING OPPORTUNITIES

PICALO 2010 provided plenty of opportunities for attendees to make new acquaintances and reconnect with old ones. There was the Welcome Reception, Laser Industry Vendor Program Reception & Tabletop Display and the Closing Banquet as well as ample breaks.

"Overall the workshop was a great success both in terms of its aims and the high level of industry interest shown. The combination of industry, academic researchers and practitioners of laser fabrication technology in one forum is unique," said Lu.

For more information on PICALO, visit **www.laserinstitute.org/PICALO**. ■

PICALO's presentations featured the latest developments.

PROCEEDINGS ON CD ROM

Gain a global perspective with the PICALO 2010 Proceedings CD, which features papers from the Laser Materials Processing Conference and the Laser Micro, Nano and Ultrafast Machining Conference.

We're bringing you a whole world of laser and optics knowledge on one CD. Take your understanding of laser materials processing to a whole new level with the information in the PICALO 2010 Proceedings CD! Conference proceedings are now available at www.laserinstitute.org/store/PICALO.

MANY THANKS TO THE PICALO 2010 SPONSORS

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- Delphi Laser Co., Ltd.
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- National Natural Scientific Foundation of China
- TRUMPF Inc. Laser Technology Center
- Wuhan Huagong Laser Engineering Co., Ltd.

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- Wuhan Chutian Laser (Group) Co., Ltd.
- Wuhan East Lake High-Tech Development Zone

Nickel
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- AV Photonics Ltd.
- EKSPLA
- Laserage Technology Corporation
- Laserline Inc.
- Lasermech China (Shanghai Empower Technologies Co. Ltd.)
- Lingyun Photoelectronic System Co., Ltd.
- Molecular Technology (MolTech) GmbH
- Northrop Grumman Cutting Edge Optronics
- Precitec Group
- Wuhan Optics Valley Laser Technology Co., Ltd.
- Wuhan Zhongtai Laser Group

CORPORATE MEMBER PROFILE

ACCURATUS CORPORATION

As we celebrate the 50th anniversary of the laser, we've chosen to highlight the corporate member that has been with us the longest – Accuratus Ceramic Corporation. A member of LIA since 1985, which is when Milton Chang was LIA president, Accuratus is an industry-leading manufacturer of various vital components for the laser industry.

Located in Phillipsburg, New Jersey, company products include, but are not limited to, Accuflect™ diffused light reflectors for pumped solid-state lasers, gas laser waveguides/cavities and many others. To meet the different laser systems performance requirements, all these custom-engineered components are made with suitable technical ceramic materials, i.e. alumina, aluminum nitride, Accuflect™ , beryllia, boron nitride, macor, quarts, silicon nitride and other special composites.

ABOUT ACCURATUS

Dr. Jay Comeforo founded Accuratus in 1977. Today, shareholders own the corporation of 25 employees. The first products that began the company were lasers, microwave tubes and electronics.

Today's markets for Accuratus are within the medical industry, telecommunications, defense electronics and general industrial products, with the company's largest customers being lasers, microwaves and telecommunications. The company's mission is to provide customers with profound ceramic material science, sound engineering principles, pragmatic application knowledge and a commitment to bring a customer's innovation to its fruition. This is done with help from Accuratus' R&D department.

IN THE INDUSTRY

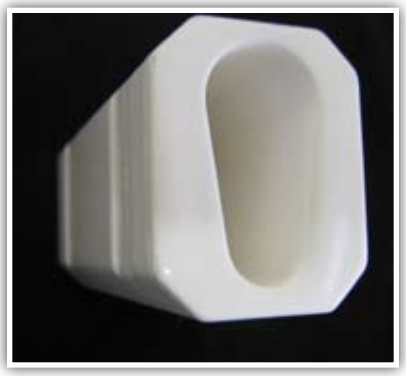
Accuratus CEO Raymond Tsao said he has seen the largest growth in the last five years in pumped-diode lasers and fiber lasers, but the company also has a rich history in the laser industry's development.

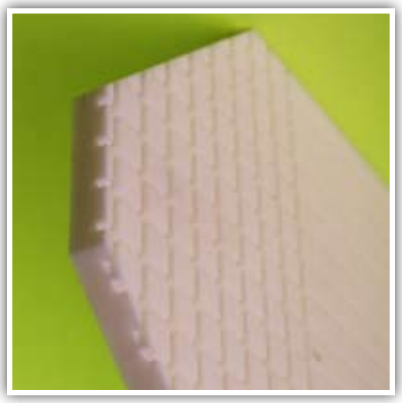
"Accuratus personnel have participated in the laser industry since the early days of gas laser development. In the '70s, they were instrumental in the designs and manufacturing of ceramic cavities for capillary and high-power ION lasers, sealed free-space CO_2 ceramic waveguide and later, the folded geometries. In the early '80s, we produced the first generation excimer laser ceramic insulator in collaboration with a leading laser scientist. We also produced various unique heat sinks/insulators that directly led the development of successful space-based DPSS lasers. In the late '80s, Accuratus successfully developed Accuflect™ diffused light reflectors that have been widely used for the flash lamp and diode-pumped solid-state lasers," he said

"Overall, in the past 30 plus years, Accuratus has witnessed and participated in the vigorous progress of laser technology. At the 50-year milestone of this ever-expanding industry, we are more enthused and committed than ever to assist laser optical professionals in the continuous evolution and development of new technologies and innovative solutions to the world of ever growing laser applications," Tsao said.

Tsao plans to maintain his membership with LIA as it provides Accuratus with "a timely connection to the current events in a broader laser and related technologies world. Best wishes to the continuous success of LIA!"

For more information, visit **www.accuratus.com** or **www.laser-reflectors.com.** ■





Top and left, an Accuratus reflector and right, a CO_2 waveguide.

BLS UPDATE

After successfully achieving certification, professional certification programs generally require continuing education activities to maintain the certification, recognizing the need to stay aware of new technology and other advances in the field. As a Certified Laser Safety Officer (CLSO) or Certified Medical Laser Safety Officer (CMLSO), it is necessary to demonstrate having completed sufficient professional development activities to ensure continued competency. To maintain an "active status," the CLSO or CMLSO is required to accumulate a minimum of 10 certification maintenance (CM) points over a three-year cycle.

It is important to understand that these points must be accrued during the three-year cycle. Easily obtainable points, such as membership in a laser safety-related organization or active participation in laser safety standards or regulations committees, are irrelevant after the fact.

For CLSOs and CMLSOs with maintenance cycles ending in December 2011 or later, attendance at the upcoming ILSC® 2011 (International Laser Safety Conference) will earn one CM point per each full day present. Additionally, presentations given at the conference will earn .5 point each. The ILSC 2011 Call for Papers is now available and paper submission is open. Visit the LIA – ILSC conference page for more details at **www.laserinstitute.org/conferences/ilsc/conference**.

For CLSOs and CMLSOs with maintenance cycles ending in December 2010 or later, CM points will be awarded for attendance at the 6th Annual Laser Safety Officers Workshop, July 27-29, 2010 hosted by Lawrence Berkeley National Laboratory in Berkeley, Calif. A new addition to the program will be mini-workshops (breakout sessions) held during the lunch breaks to demonstrate the pros and cons of the major commercial laser safety calculation software systems available on the market. In addition, the BLS will host a mini-workshop "Q&A" session to answer questions on certification and allow the opportunity to network with the CLSOs and CMLSOs in attendance. Please join us at this one-of-a-kind workshop.

For more information on either of these activities or questions regarding accumulation of CM points, please contact Hydee Cash at hcash@lasersafety.org or Barbara Sams at bsams@lasersafety.org, or call 407-380-1553. ■

BLS®
Board of Laser Safety

ASC Z136 UPDATE

Congratulations to Standards Subcommittee 4 (SSC-4) for its completion of ANSI Z136.4-2010 *American National Standard Recommended Practice for Laser Safety Measurements for Hazard Evaluation*. The document received ANSI approval on April 22, 2010.

From the 2010 ANSI Essential Requirements:

A standard developed by an ANSI-Accredited Standards Developer may be approved as an American National Standard by the ANSI Board of Standards Review (BSR) or by an ANSI Audited Designator. In either case, the essential due process and consensus criteria defined herein shall apply. In addition, approval assures the user that each American National Standard is generally acceptable to the directly and materially affected interest categories that participated in the development of consensus for the standard.

The most significant changes to the document were made to harmonize with the ANSI Z136.1-2007. A number of definitions were added, while others were clarified. Another notable change is the addition of section 5.10 on M-squared. M^2, also called beam quality, beam propagation ratio or times diffraction limit number, is an indication of how close the energy distribution in a laser beam is to that of a perfect Gaussian beam.

The ANSI Z136.4-2010 is available for purchase from the LIA bookstore in print or electronic (single-user) versions (**www.laserinstitute.org/store**). ■

JLA UPDATE

The *Journal of Laser Applications*® offers the latest refereed papers by leading researchers in the laser community. Visit **www.laserinstitute.org/subscriptions/jla** for the online version. To view the journal online, please make sure your membership is current. In addition, articles are now posted online as the production cycle is completed ensuring timely publication.

The JLA is published four times a year by the LIA in February, May, August and November. It is sent to all LIA members as a member benefit. For nonmembers of LIA, call the American Institute of Physics at 1-800-344-6902 for subscription information. To receive your JLA table of content e-mail alerts, sign up at **http://scitation.aip.org/jla/alert.jsp**.

LASER SAFETY CORNER

FINDING THE LASER BEAM

When working with visible lasers it is very simple to find the beam path. Simply blow smoke in the path of the beam and suddenly you can see it. However, working with lasers in the ultraviolet or infrared portions of the electromagnetic spectrum becomes a bit of a challenge. No problem – tools exist that can help you find the beam without much effort.

The first tool is the **infrared viewing card or disc**. These cards, or ceramic discs, will glow when infrared laser light strikes the card or disc, thus changing the infrared radiation to visible radiation. The second tool is the **infrared viewer**. IR viewers allow you to view the IR beam as it propagates through the air and is very useful in identifying stray beams from the controlled area. Some viewers can be connected to cameras or video monitors. When working in the ultraviolet spectrum, there are **ultraviolet viewing cards and discs** that operate similar to the IR cards and discs. Identifying stray beams in the UV can be done with the **ultraviolet viewer**. The last tool for finding the laser beam is **burn paper**. Burn paper is sensitive to laser radiation and is used to visually display a laser beam's shape or mode structure. Burn paper is typically used for laser beam alignment. When the beam strikes the paper an image of the beam is etched or burned onto the surface of the paper.

Remember, when using all of the tools above, it is important that you **always wear laser protective eyewear**. ■

PAST PRESIDENTS REMEMBER

CON'T FROM PAGE 7

sandwiches. We all had to chip in and pay for them. I always use that as a message to people: We started from very, very small beginnings and grew, and I think we grew quite well.

• David Whitehouse (1981, formerly of Raytheon): In 1979 the LIA matured to a full-time paid general manager and staff, and we established an LIA newsletter. We hired Haynes Lee and set up the office in Cincinnati. During the '79-80 period, we made plans for a major international conference, and it was held in 1981 in Anaheim. It was called the ILPC — International Laser Processing Conference. (It) received such great response. That's when the concept of ICALEO was generated. I wanted an international congress — not a conference — where the concept would be to have other organizations (participate). Part of the reason we pushed ICALEO was as an additional value we could give to the membership, particularly the laser processing membership.

After our terms as president, Dave Belforte and I were brothers in terms of trying to promote a more robust LIA. There was one point where one of the board members wanted to somehow sell or incorporate the LIA into the IEEE lasers group, and came with a proposal from IEEE. At that meeting both Dave and I gave a very emotional pitch to the board not to accept this proposal, that the LIA still had a tremendous opportunity to become a significant organization for the laser applications group as opposed to the IEEE group, which tended to be engaged in more theoretical work. We ruled the day and kept the LIA as a separate organization.

Reminiscences collected by Geoffrey Giordano, a freelance writer.

CHAPTER CORNER

LIA Northern California Chapter News

On April 21, the Northern California LIA Chapter hosted 50 industry professionals at San Jose's very quaint and hospitable Bella Mia Restaurant for a great evening of networking, good food and to hear Dr. Ken Caldeira talk on climate change and its unfolding impact on the globe.

Caldeira, an atmospheric scientist at the Carnegie Institution for Sciences, Department of Global Ecology, researches ocean acidification, climate effects of trees, intentional climate modification and interactions in the global carbon/climate system. Caldeira's LIA presentation reviewed natural and man-made contributions to global warming, including scientific and socioeconomic perspectives of various options for dealing with these issues.

Ken shared some of his personal experiences and insight to the exciting and direct role he plays in educating government and non-government sectors. For example, he gave us some insight as to an expanded, futuristic role high-powered lasers might play in space for energy generation to Earth or to orbiting spacecraft. Other laser applications might involve nuclear-powered vessels, like navy ships, as potential sources of laser directed energy to land-based PV receptors for power generation needs in remote locations or for emergency situations.

The evening's presentation was introduced by LIA Chapter Chairs Neil Ball and Tony Hoult who set the evening's theme by presenting an overview of the role lasers play in PV/green-energy applications.

Great LIA meetings do not solely result from great speaker topics, but from great audience participation too. Our guests included technologists and business management members and nonmembers from San Francisco-based solar, semiconductor, medical device, laser, safety and computer-based organizations. We were especially delighted that our student guests, middle school through college, gained a lot from the presentations as well.

LIA Norcal wishes to sincerely thank Caldeira for his contribution to our 2010 meeting and to the guests who brought their interest, appetites and good will to this wonderful event!

We look forward to seeing everyone at the next event. Please send us your ideas on speaker topics directly to LIA, Kathleen Pollack (kpollack@laserinstitute.org).

LASER INSIGHTS

Laser Insights is a new feature to give insight into the very latest developments of laser materials processing and the possible applications. These overviews are designed to provide perspective on the content and applications of the papers presented at our conferences and workshops.
Visit ***www.laserinstitute.org/laserinsights*** *to begin your search.*

TEMPERATURE DISTRIBUTIONS AND THERMAL STRESSES INDUCED IN LASER SOLID FREEFORM..., *by Masoud Alimardani*

The use of multi-material structures has shown a rapid increase in the past decade due to new fabrication technologies. Laser solid freeform fabrication (LSFF) technique has great potential for the creation of multi-material structures in which material composition varies from one layer to another or from one point to another point in the same layer.

MARKING AND MICRO-MACHINING WITH NANOSECOND PULSED FIBER LASERS, *by Jack Gabzdyl*

The new generation of ns fiber lasers offer a range of highly flexible compact beam sources with tailored beam quality options to give a further dimension for process enhancement. Combined with increases in peak powers and pulse energies new applications beyond the standard marking and micro-machining have opened. MOPA designs with directly modulated seeds also allow control of the pulse shape and duration using a range of preset pulse waveforms adding further flexibility.

LASERS AND LONG-TERM IMPLANTS, *by Negar Rasti*

Due to the increasing demand for implanted orthopedic and dental devices and a growth in the percentage of elderly people, the designing of reliable long-term implants is vital. Therefore, a new method has been developed to improve such devices that uses laser processing, a very controlled way to modify the topographical and chemical properties of titanium and thus increase biocompatibility. This is a pioneer study focusing on the effects of the laser processing of titanium in HP.

FIBRE LASER WELDING FOR LIGHTWEIGHT DESIGN, *by Jan Karlsson, Alexander Kaplan*

This project aims at weight reduction by laser welding of high strength steel for certain applications, and at the same time, aims at initiating a knowledge platform for lightweight structures including, besides other issues, the optimization of welding technology. To enable welding information to be transferred and used in a larger perspective, creating a broad knowledge platform may be a solution. ■

WELCOME NEW MEMBERS

CORPORATE MEMBERS

• Shanghai Jue Hua Laser Technology Development Co., Ltd., Shanghai, Peoples Republic of China

• Tribocor Technologies, Inc., Stafford, TX

For a complete list of corporate members, visit our corporate directory at **www.laserinstitute.org/membership**.

INDIVIDUAL

Alison Moffo, Phoenix, AZ
Mark Meyers, Scottsdale, AZ
Craig Marley, Lake Elsinore, CA
Michelle Jaskunas, Denver, CO
Suhash Ghosh, East Hartford, CT
Tim Blauvelt, Eastford, CT
Julian Leland, Oviedo, FL
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Scott Reitsma, Marlborough, MA
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Patricia Burrows, Frederucton, NB, Canada
Brad Morrison, Cambridge, ON, Canada
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Alexander Laskin, Berlin, Germany
Swaminathan Jayaraman, Chennai, India
Mauricio Rosales Tlalpan, Mexico D.F., Mexico
Anders Martenson, Stockholm, Sweden
Marcel Schaller, Zurich, Switzerland

COHERENT RELEASES INDYSTAR, SETS POWER BENCHMARK

Coherent Inc., Santa Clara, Calif., has added a new model to its IndyStar family of compact excimer lasers that offers higher repetition rate (2 kHz) for increased throughput. In addition, the fully Semi S2-certified IndyStar 2 kHz laser incorporates several new output stabilization features for improved processing, making them ideal for use in semiconductor fabrication, testing, inspection and micromaterials processing facilities. The IndyStar 2 kHz is offered with a choice of 193 nm (ArF) output where it delivers 8 Watts of stabilized power, or 248 nm (KrF) output with 12 Watts of stabilized power. It delivers faster and better results for semiconductor applications such as photomask inspection and testing photolithography optics and enables other high-speed processes including precision material ablation tasks and high-value marking applications.

Also from Coherent is the new Genesis™ CX355 -250 laser that sets a new high-power benchmark for true-CW, ultraviolet, solid-state performance, delivering over 250 mW of TEM00 output. All Genesis CX355 lasers utilize Coherent's unique optically-pumped semiconductor laser (OPSL) technology and are the only class of commercial solid-state laser that provides true-CW UV, rather than pulsed or quasi-CW (mode-locked) output. The major applications that will benefit from the high power of the Genesis CX355 -250 are in flow cytometry of live-cells, such as egg and fertilized-egg sorting. It is also an excellent source for other fluorescence-based applications, including confocal microscopy, where its short wavelength and low M^2 beam provide optimum excitation of Hoechst and Indo dyes. For more information, visit **www.Coherent.com**.

NEWPORT INTRODUCES INTEGRATED STAGES AND CONTROL DEVICES

Newport Corporation, Irvine, Calif., announces the UMR-TRA XY Stages. The new line of integrated XY stages are built from reliable, industry-standard UMR linear stages and TRA actuators. Affordable and compact, the small footprint measures only 90 mm wide and 38 mm high, including the base plate. The UMR-TRA-XY stages are specially designed for applications in confined spaces, making them an excellent choice for a wide range of motion control tasks in research and industry. For more information, visit www.newport.com/UMR-TRA.

Also from Newport Corporation is the CONEX™ family of compact, photonics control instruments. The product family features three new devices that connect easily via USB plug-and-play technology and allow simple, but highly functional PC-computer control solutions. Multiple units can be connected to a single USB port and for CONEX-PSD9 and CONEX-IOD models, the USB port also powers the modules, eliminating the need for additional power supplies and/or cables.

Three models are initially introduced – the CONEX-CC motor controller/driver is a very compact, low-cost motor controller/driver for Newport's low-power DC servo motor stages or actuators, the CONEX-PSD9, a position-sensing detector, provides accurate XY position information of laser beams and is ideally suited for laser beam stabilization, laser tracking and general beam diagnostics and the third, the CONEX-IOD, is a highly versatile, general purpose I/O module that works with many third party devices and features both digital input/outputs and 12-bit analog input/output interfaces. For more information, **visit www.newport.com/CONEX**.

OPHIR-SPIRICON'S NEW SENSORS AND INTERFACE

Ophir-Spiricon, Logan, Utah, has introduced a new line of thermal laser power sensors with powers up to 400 W. These high performance, heat dissipation sensors feature an array of pins for cooling, unlike other devices which rely on flat cooling fins that consume significantly more space. As a result, they are the most compact laser power sensors on the market at half the size of most devices. The modular design can be tailored for a variety of custom OEM applications. The devices have very high uniformity of reading over the surface, better than ±1%, in most cases. The low-medium power thermal sensors are designed for concentrated beams and pulses with power levels from 50 mW to 150 W and apertures to 35 mm. The medium-high power sensors are designed for higher power applications up to 400 W, apertures to 50 mm.

Also from Ophir-Spiricon is the smart USB sensor to PC interface that converts a laptop or desktop PC into a laser power/energy meter. A compact USB module, the Juno connects any of Ophir-Spiricon's 100+ smart laser sensors – thermal, pyroelectic and photodiode – to a PC USB port. The Juno operates with Ophir-Spiricon's StarLab software which logs power and energy; calculates and displays averages, statistics, histograms and more. Juno is a plug-and-play module that can be used with a wide variety of laser measurement sensors. For more information, visit **www.ophir-spiricon.com**.

SPORTY SAFETY GLASSES

Laser Safety Industries (LSI), Minneapolis, Minn., has introduced new lightweight black sport-wrap frame style number 38 laser safety glasses. They are available in polycarbonate, glass and high visibility dielectric coated laser protective filters. This new laser blocking frame style offers excellent side shield protection without impeding field of view along with contoured arms for comfortable wear. They are ideal for active users or individuals that want more stylish laser protection with lighter weight and more personalized fit and can be worn by women, men and young adults. The face hugging contours make for a great fit.

This attractive sport-wrap frame accommodates most laser applications including medical, industrial and research. Frame 38 is advanced visual performance and protection combined with today's latest eyewear fashion. For more information, visit **www.lasersafetyindustries.com**. ■

COHERENT OPENS LAB, ACQUIRES COMPANY, MAKES AGREEMENT

Coherent, Inc., Santa Clara, Calif., has opened a new CO_2 laser applications laboratory in Beijing, China. This facility will give customers in the rapidly growing Chinese materials processing and microelectronics markets the ability to get quick feedback on the suitability of their specific application for CO_2 laser processing. The Coherent Beijing applications laboratory is currently able to process a wide variety of laser/material interactions with up to 400 watts of laser power. As we add higher power levels such as 1 kW from our new DIAMOND E-1000, we'll be able to address an even broader selection of applications.

"The introduction of more compact CO_2 lasers with greater reliability and lower cost of ownership, such as our DIAMOND E Series, have helped fuel a substantial expansion in applications for these sources," notes Sri Venkat, VP/GM CO_2 Business Unit, at Coherent. "Beyond traditional materials processing applications, we're now seeing increased demand for sealed CO_2 lasers for a variety of new applications and materials. Having the ability to perform testing locally will speed development and adoption of these new processes in China."

In a separate move, Coherent, Inc. has acquired the business of Beam Dynamics, a manufacturer of laser machining centers. Beam Dynamics has established a strong market position through the development of industrial-grade laser machine tools that have compelling price/performance characteristics. Their laser machining tools are used in a variety of cutting applications including plastics, fabric, leather, rubber, metal, ceramics and wood, for customers ranging from regional machine shops to Fortune 500 brands.

This acquisition allows Coherent to further expand its presence in the materials processing market, achieve closer alignment with customer processes and applications and more effectively drive development of new sources and tools to meet the needs of the laser machining market. For more information, visit **www.Coherent.com**.

IPG ACQUIRES COSYTRONIC

IPG Photonics Corporation, Oxford, Mass., has acquired privately-held, Germany-based Cosytronic KG (COSY), a specialist in the joining technology with an emphasis on engineering know-how in automated welding turnkey solutions. The acquisition allows IPG to extend its product offerings to include a welding tool that integrates seamlessly with IPG's fiber laser. COSY's core capabilities include the development, engineering and application of new, modern joining techniques and innovative welding tools for many material processing end-markets.

"With the acquisition of Cosytronic, we plan to enhance IPG's product portfolio of laser welding tools with fiber lasers – a promising complementary market for us," said Valentin Gapontsev, IPG Photonics chairman and CEO. "Combining our state-of-the-art fiber laser technology with COSY's proven and innovative laser welding technology opens exciting opportunities to build robust integrated robotic solutions for various automotive, sheet metal production and other material applications."

For more information, visit **www.ipgphotonics.com**.

OPHIR ACQUIRES PHOTON

Ophir Optronics, Jerusalem, Israel, a global leader in precision laser measurement, has acquired Photon Inc., San Jose, Calif., a developer of precision laser beam profiling optical test equipment. The acquisition adds Photon's experience and products to the Ophir-Spiricon group and creates a powerful, new supplier of laser measurement equipment for industrial, medical and scientific research applications. Ophir-Spiricon now provides a complete line of beam profiling equipment and software. Photon Inc.'s extensive experience with laser and fiber beam characterization in the photonics industry supports solving complex optical problems and provides semi-customized measurement system designs. Of special interest in the acquisition was Photon's scanning-slit technology. Their scanning-slit profilers provide high accuracy and precision for the measurement of CW and sub-KHz pulsed laser beams across the spectrum range from UV to far infrared. For more information, visit **www.ophiropt.com**.

Ophir-Spiricon has also released its *2010 Laser Measurement Catalog* covering a wide range of laser power/energy sensors and meters and laser beam profiling systems for industrial, defense, medical and research applications. The free catalog has been designed as a "green" PDF-formatted reference book. For more information, visit **www.ophir-spiricon.com**. ■

ILSC CALL FOR PAPERS

The 2011 International Laser Safety Conference (ILSC®) will be held Mar. 14-17 in San Jose, Calif. ILSC is a four-day comprehensive conference covering all aspects of laser safety practice and hazard control. Scientific sessions will address developments in regulatory, mandatory and voluntary safety standards for laser products and for laser use. The Practical Applications Seminars (PAS) complement the scientific sessions by exploring everyday scenarios that the LSO and MLSO may encounter. For ILSC 2011, PAS is being expanded to include the medical community.

LIA is seeking abstracts for the conference in the areas of safety standards, bioeffects, practical laser safety, laser safety training, control measures, outdoor laser use and safety, eye protection and measurements to name just a few. All abstracts must be submitted by Aug. 15, 2010. To submit an abstract online, visit **www.laserinstitute.org/ilsc**.

ICALEO SPONSOR AND VENDOR OPPORTUNITIES

The 29th International Congress on Applications of Lasers & Electro–Optics (ICALEO®) will be held Sept. 26-30, 2010 in Anaheim, Calif. ICALEO has a 28-year history as the conference where researchers and end-users meet to review the state-of-the art in laser materials processing and predict where the future will lead. From its inception, ICALEO has been devoted to the field of laser materials processing and is viewed as the premier source of technical information in the field. ICALEO 2010 will include three conferences, the Laser Materials Processing Conference, the Laser Microprocessing Conference and the Nanomanufacturing Conference as well as a Poster Presentation Gallery, the Laser Solutions Short Courses, a business forum and plenty of networking opportunities.

ICALEO attracts over 200 companies and organizations from more than 30 countries. We invite companies to take part in the Laser Industry Vendor Program, which gives vendors and conference attendees the opportunity to discuss equipment and applications in a relaxed setting. Space is still available to experience this unique networking opportunity!

ICALEO also offers various level sponsorship opportunities. Sponsors are included in the *Advance Program* and *Technical Digest*, which is distributed to all attendees. To find a sponsorship that fits your company's needs or to register as a vendor, visit **www.laserinstitute.org/conferences/icaleo/sponsors_and_vendors**, e-mail icaleo@laserinstitute.org or call 1-800-34-LASER. Also be sure and check out the video testimonials from the ICALEO 2009 sponsors and vendors on the site.

ANSI Z136.4 REVISION RELEASED

LIA is pleased to announce the release of the newly revised ANSI standard, *Z136.4 – 2010 American National Standard Recommended Practice for Laser Safety Measurements for Hazard Evaluation*. This recommended practice provides guidance for optical measurements assoicated with laser safety requirements. The information contained in this document is intended to assist users who are entrusted with the responsibility of conducting laser hazard evalutions to ensure that appropriate control measures are implemented. It contains clearly written definitions, examples, and other practical information for manufacturers, laser safety officers, technicians and other trained laser users.

This revision from the original 2005 standard harmonizes with the revised *ANSI Z136.1 – 2007 Safe Use of Lasers* standard, parent document and cornerstone of the ANSI Z136 series for safe use of lasers and the foundation of laser safety programs nationwide. Other changes include the addition of many new important terms and definitions as well as revised definitions from the 2005 standard. Significant revisions can also be seen in updated figures, tables and charts as well as completely revised or new sections throughout the standard.

The revised ANSI Z136.4 can be be purchased online at **www.laserinstitute.org/store** or by calling 1-800-34-LASER. This document is also available in electronic format.

MEDICAL LASER SAFETY CD-ROM NOW AVAILABLE

LIA's new medical laser safety CD-ROM titled *FOCAL POINTS: Interactive Training for Medical Laser Safety®*, is now available. This interactive training course is dedicated to the safe use of lasers in health care facilities. Based on the *ANSI Z136.3 Safe Use of Lasers in Health Care Facilities* laser safety standard, *FOCAL POINTS* is an excellent training tool for laser safety officers and other health care professionals who have the responsibility of training new employees and keeping existing personnel updated on current safety issues and practices.

Considering the wide variety of laser applications and their increasing role in health care, it is vital that health care professionals understand fundamental information regarding lasers and their safe use. This cost-efficient and effective training tool will cover the following objectives relating to medical laser safety:

- Take the first step toward achieving fundamental competency with the use of lasers in medicine
- Understand the basics of laser physics
- Learn about different types of health care laser systems and how they are categorized
- Become familiar with the nature of the interaction of laser radiation and biological tissue
- Understand the potential hazards posed by medical lasers and the control measures used to ensure safety.

Make FOCAL POINTS a key component of your facility's laser safety program and help to ensure your compliance with the regulations set forth by the Joint Commission and OSHA while satisfying the ANSI Z136.3 *Safe Use of Lasers in Health Care Facilities* training requirements.

Written and produced by LIA, *FOCAL POINTS* offers a user-friendly training program that fulfills the ANSI Z136.3 as well as the Joint Commission and OSHA's training requirements. The *FOCAL POINTS: Interactive Training for Medical Laser Safety* CD-ROM is available for $495 ($450 for LIA members) at **www.laserinstitute.org/store** or by calling LIA at 1-800-34-LASER. ■

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