LIA TODAY

The Official Newsletter of the Laser Institute of America
The professional society dedicated to fostering lasers, laser applications, and laser safety worldwide.

Volume 13, Number 5 **September/October 2005**

In The News . . .

New NIST Director

The U.S. Senate has confirmed William Alan Jeffrey, a veteran manager of federal science and technology development, as the 13th director of the U.S. Commerce Department's National Institute of Standards and Technology (NIST). Jeffrey, 45, was nominated by President Bush on May 25, 2005, to succeed Arden Bement, who was appointed director of the National Science Foundation in November of last year.

Jeffrey has been involved in federal science and technology programs and policy since 1988. Previous to his appointment as director of NIST he served as senior director for homeland and national security and the assistant director for space and aeronautics at the Office of Science and Technology Policy within the Executive Office of the President.

Honeybees Sniff Out Landmines

Jerry Bromenshenk and colleagues from the

(Cont. on pg. 14, see **In The News…**)

Laser Nanomachining & Nanoprocessing

by Y.F. Lu

Laser material processing demonstrated its significance in many areas such as microelectronics, data storage, photonics and nanotechnology, since versatile laser sources provide flexible and unique energy sources for precise control of material processing. With current laser technology, short wavelengths down to X-ray range and short pulses duration down to femtosecond range can be achieved. The extreme conditions created by laser irradiation have provided strong impact on material research.

To achieve nanoscale laser machining and processing of materials and structures, we need to overcome the diffraction limit of the laser wavelengths. Recently, different approaches have been explored to overcome the diffraction limit and to achieve feature sizes down to 10-100nm order, way beyond the diffraction limits. These approaches include laser-assisted scanning probe microscope (SPM), superfocusing by optical resonance in spherical particles, laser nanoimprinting, laser annealing of ultrashallow pn junctions, and laser cleaning of nanoparticles.

Laser-Assisted SPM

Laser-assisted SPM involves various ways in which the laser beam is integrated with an SPM. Here laser-assisted SPM refers to the case when the SPM tip is irradiated with a laser beam. In the past several years, extensive research has been conducted to explore the mechanisms of laser-assisted SPM nanostructuring. Possible mechanisms include nanoindentation due to the mechanical contact between the SPM tip and the sample surface, nanoscale surface heating by the enhanced optical field resulting from the cou-

(Cont. on pg. 6, see **Nanomachining**)

OSHA Aligns With LIA

The Occupational Safety and Health Administration (OSHA) and the Laser Institute of America (LIA) recognize the value of establishing a collaborative relationship to foster safer and more healthful American workplaces. Therefore, OSHA and LIA have formed an alliance that focuses on providing access to training resources to help protect worker safety and health, particularly by reducing and preventing exposure to laser beam and non-beam hazards in industrial and medical workplaces. In addition, the organizations will focus on sharing information on laser regulations and standards, bioeffects lasers have on the eyes and skin, laser control measures and laser safety program administration.

alliance
An OSHA Cooperative Program

"This alliance is a perfect opportunity to expand our efforts to provide access to safety and health training to those in industrial and medical workplaces," said Jonathan L. Snare, OSHA acting assistant secretary. "We are pleased to join with the Laser Institute of America, who share our goal of reducing injuries and illnesses among the industry's workers."

"Our members and staff are very pleased to

(Cont. on pg. 8 see **Alliance**)

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LIA TODAY

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Laser Institute of America (LIA) is the professional society dedicated to fostering lasers, laser applications and laser safety worldwide. LIA is the secretariat and publisher of the ANSI Z136 series of laser safety standards, and is a leading provider of laser safety education.

LIA offers educational programs, conferences and symposia on the applications of lasers and electro-optics. LIA's annual International Congress on Applications of Lasers & Electro-Optics (ICALEO®) features the world's foremost meeting on laser materials processing. The biennial International Laser Safety Conference (ILSC®) covers all aspects of laser safety practice and hazard control.

If you would like more information about the LIA, call 407.380.1553, 1.800.34.LASER or visit our home on the Web: **www.laserinstitute.org**.

LIA's Calendar of Events

For more information contact LIA at 1.800.34.LASER or visit www.laserinstitute.org

Laser Safety Officer Training
Oct. 31-Nov. 4, 2005 • Phoenix, AZ
Dec. 5-9, 2005 • Orlando, FL
Feb. 6-10, 2006 • Orlando, FL
Mar. 27-31, 2006 • St. Louis, MO
June 5-9, 2006 • Boston, MA

Advanced Concepts in Laser Safety
Mar. 13-15, 2006 • Orlando, FL

Fundamentals of Laser Safety
Nov. 15-16, 2005 • San Francisco, CA

Medical Laser Safety Officer Training
Nov. 11-12, 2005 • Phoenix, AZ
Jan. 27-28, 2006 • Tampa, FL
Feb. 10-11, 2006 • Portland, OR
May 12-13, 2006 • Chicago, IL

ICALEO® 2005
Oct. 31-Nov. 3 • Miami, FL

PICALO 2006
April 3-5 • Melbourne, Australia

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Executive Director's Message

Team LIA

LIA Executive Director Peter Baker

LIA is all about teamwork and two recent events illustrate this in quite different ways.

First, the OSHA alliance, described in more detail on page 1 shows how we can combine our strengths with those of another organization to more effectively carry out a common mission, in this case our mission "*to foster..... laser safety.....*" and OSHA's mission to keep the workplace safe. We are pleased and proud to work together with OSHA to provide increased resources and training to improve laser safety in the workplace.

In the second example, we held a Northeast Regional Meeting, soon to be an LIA Chapter. Here executive committee member Bill Shiner worked with LIA staff members Jim Naugle and Rich Greene to organize the regional meeting. The response was so positive that several volunteers came forward to lead the effort to form a Northeast Chapter of LIA (see page 9). We intend to build on this momentum and hold regional meetings in the Midwest and in northern California in coming months.

We are also continuing negotiations with a number of different groups to find cooperative ways to carry out our overall mission *to foster lasers, laser applications and laser safety worldwide* more widely and effectively.

Go team!

Peter Baker

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Nanomachining, cont. from pg. 1

pling between the laser beam and the SPM tip, chemical desorption of atoms from the sample surface by the increased tunnelling current, enhanced chemical interaction between the SPM tip and the sample surface, and dissociation of gas species between the SPM tip and the sample surface and the subsequent atomic deposition. In practical laser-assisted SPM nanostructuring, several of these mechanisms can co-exist to affect the final surface nanomodification.

The SPM probe head has an open architecture to allow an external laser beam to be directly introduced to the tip-sample gap from 0 to 45˚ (θ) (Fig. 1). The power of the laser beam is detected using a power meter by measuring 5% of the total laser energy with a beam sampler. A λ/2 wave-

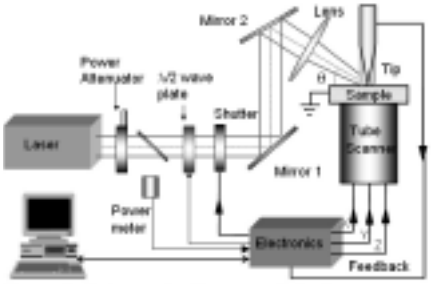

Fig 1: Schematic diagram of the laser-assisted SPM.

plate was introduced to rotate the polarization of the laser beam before it reached the SPM tip. Figure 2 shows ultrafine lines created on a Cu surface using the laser-assisted SPM by nanoscale local heating and vaporization. The small width of the lines demonstrates the nanoscale focusing of the laser beam (~10nm).

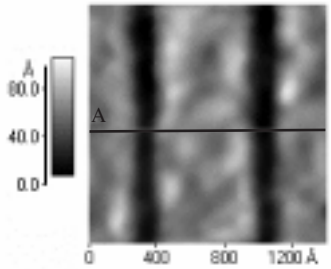

Fig 2: 10nm lines on Cu surface due to nanoscale local heating.

Superfocusing by Optical Resonance in Spherical Particles

A low-cost and simple optical lithography technique was developed based on particle-enhanced laser irradiation. The optical resonance in the particles is the excitation of partial waves (multipole modes of spherical cavity). The resonances are very sharp. It means that optical resonances produce high intensities in the near-field region and, naturally, it can lead to the formation of "hot spots" if this high intensity will be on the substrate surface. Clearly, these "hot spots" can be used to fabricate nano-features in near-field regions. Figure 3 shows the FDTD (finite-difference time domain) simulation results of a KrF excimer laser beam (wavelength: 248nm) passing though a silica particle with a diameter of 1 micrometer. The silica particle "focuses" the laser beam to a tiny spot much smaller than the particle size. The electrical field is enhanced by a factor of 6. Therefore, the optical intensity at the "focal point" is 36 times higher than that of the incident laser beam.

Figure 4 shows an example of creating hole-array using a femtosecond laser (wavelength 800nm, pulse duration 100fs) on an Al surface covered with 1.0mm silica particles. Due to the strong local intensity underneath the particles and short pulse duration of the incident laser beam, the holes are deep and have sharp edges. It can be seen that non-thermal ablation has occurred during laser irradiation.

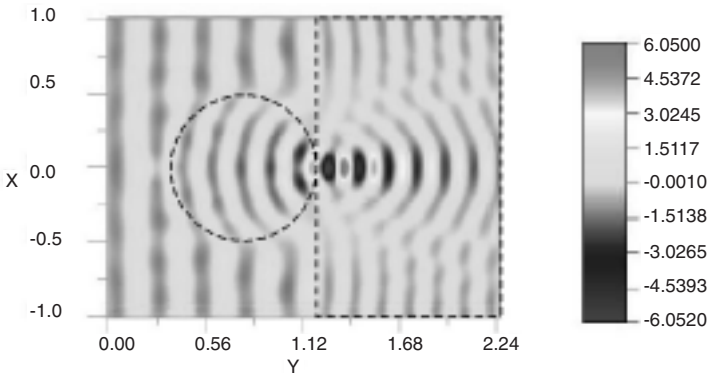

Fig 3: Electrical field distribution of a laser light (λ = 248nm) passing through a SiO_2 particle of 1.0mm.

Laser Nanoimprinting

In view of the fast development of photonic bandgap structures, new process to form large-scale periodic structures on a solid substrate with a low cost and a high throughput is required. To meet this requirement, a new approach has been developed to fabricate nanoscale periodical structures using laser-assisted nanoimprinting of self-assembled particles. This technique is a parallel process feasible for large-area fabrication of photonic structures.

Figures 5 and 6 show 2-D and 3-D periodical structures fabricated on Si surface using laser-assisted nanoimprinting of single- or multiple-layer self-assembled silica particles. The silica particles were removed after imprinting using HF chemical solution.

Laser Annealing of Ultrashallow pn Junctions

As MOSFET (Metal-Oxide-Semiconductor Field Effect Transistor) scaling down continues, ultrashallow and highly-activated junctions are essential for device performance and control of short channel effects. For example, the 100nm technology node requires source/drain extension junctions to be 20-33nm, with sheet resistance in the range of 200-625 Ω/ . Ultrashallow p^+/n junctions using boron-ion implantation are difficult to fabricate due to channelling of boron ions and transient-enhanced diffusion (TED) of boron during subsequent annealing. Several annealing processes are being developed that limit diffusion of dopant while achieving good activation. Ultra-low energy ion implantation and rapid thermal annealing (including spike annealing) are typically used to form ultrashallow junctions. However diffusion of the dopant during annealing places a limit on the minimum junction depth.

Laser annealing, in which a laser melts a preamorphized surface layer and causes the dopant to be distributed throughout the region of melted Si, is another promising candidate for formation of ultrashallow junctions. Recent

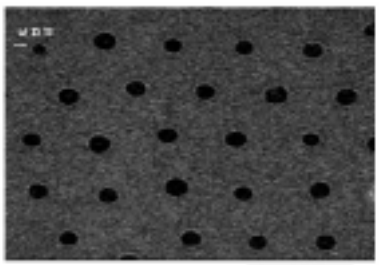

Fig 4: SEM image of periodic pit arrays formed after laser illumination of SiO_2 particles on an A1 surface.

works have shown that the degree of activation increases as higher laser fluence is applied. The tradeoff however, is that deeper junction results. A new approach of multiple-pulse laser annealing was recently developed to achieve highly-activated p^+/n junctions without compromising on the junction depth.

Laser Cleaning of Nanoparticles

Laser cleaning has emerged in order to effectively remove contaminants from solid surfaces. Laser cleaning was demonstrated both theoretically and experimentally to be an effective cleaning technique for removing nanoparticles from solid surfaces without damage. The surface cleanliness can be monitored in real time by acoustic, electric and optical means. Applications of laser cleaning include cleaning magnetic slider surfaces, magnetic media surfaces, silicon wafers and IC mold surfaces, although further engineering efforts are still required.

Conclusions

Laser nanomachining and nanoprocessing are new frontiers beyond the optical diffraction limit. It has shown that lasers can be used to produce materials and structures with dimensions of 10 to 100nm that are much smaller than the diffraction limit of laser wavelengths. The feasibility of laser nanomachining and nanoprocessing has been proven by a few examples, including laser-assisted scanning probe microscope, superfocusing by optical resonance in spherical particles, laser nanoimprinting, laser annealing of ultrashallow pn junctions, and laser cleaning of nanoparticles. With further efforts in basic science and engineering, lasers will play more important roles in a new arena – nanoscale science and engineering.

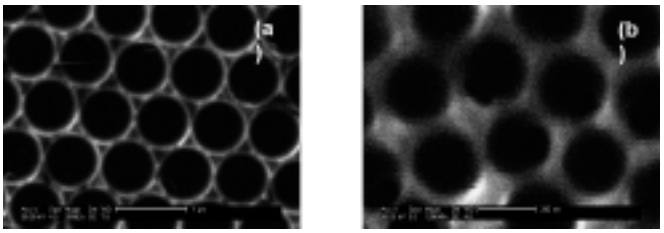

Fig. 5: Hemispherical cavity arrays on Si surface after laser-assisted imprinting using (a) 0.97μm and (b) 0.33μm silica particles.

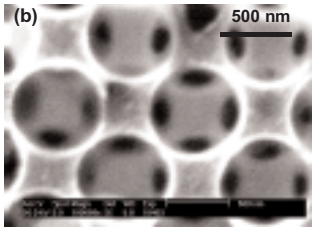

Fig. 6: SEM micrographs of 3-D (multi-layer) cavity structures formed after imprinting 0.97μm silica particles in silicon. Cavities oriented both in (a) [111] and (b) [100] directions.

Dr. Y. F. Lu (ylu2@unl.edu, 402-472-8323) is an associate professor with the Dept. of Electrical Engineering, Univ. of Nebraska-Lincoln, Lincoln,

Alliance , cont. from pg. 1

become an OSHA alliance partner as we share a common commitment to occupational safety," added Peter Baker, LIA's executive director. "We look forward to working together to educate OSHA employees and laser users on the safe use of lasers."

The Program Basics

The alliance calls for OSHA and the institute to work together to develop training and education programs for OSHA staff, laser manufacturers and laser users of Class 3a, 3b and 4 lasers regarding laser program administration information to employers and employees.

Alliance members will produce materials on the recognition and prevention of laser hazards in the workplace and develop electronic assistance tools and other ways to communicate the information to employees and employers in medical, industrial, military, research and development, and optical fiber communications industries. The two organizations will work together to deliver or arrange for the delivery of laser-related safety courses; and will speak, exhibit or appear at OSHA or LIA conferences, local meetings, or other laser safety training events and participate in forums, roundtable discussions or meetings on laser safety issues to help forge innovative solutions in the workplace or to provide input on safety and health issues.

A joint team of representatives from the LIA and OSHA will meet regularly to develop an action plan, identify goals and objectives, and track and share information on activities and results of the alliance.

Everyone Has A Role

OSHA's alliances provide parties an opportunity to participate in a voluntary cooperative relationship with OSHA for purposes such as training and education, outreach and communication and promoting a national dialogue on workplace safety and health.

From left: LIA Education Director Rich Greene, OSHA Acting Assistant Secretary Jonathan Snare, and LIA Executive Director Peter Baker sign the OSHA/LIA alliance agreement.

Employers are responsible for providing a safe and healthful workplace for their employees. OSHA's role is to assure the safety and health of America's workers by setting and enforcing standards; providing training, outreach, and education; establishing partnerships; and encouraging continual process improvement in workplace safety and health. For more information, visit www.osha.gov.

LIA, the secretariat and publisher of the ANSI Z136 series of laser safety standards, already offers a wide range of laser safety training courses for personnel in research, industrial and medical laser facilities. These courses are instructed by the leading experts in laser technologies and laser safety today. In addition to training courses, LIA also offers a broad range of additional laser safety materials such as safety videos, in-house and online training. Stay tuned to the **LIA TODAY** to see what this new alliance will bring about for the future as the first planning meeting will be held Sept. 19, 2005. For more information on any of these safety tools or LIA's conferences, contact LIA at 1.800.34. LASER, or visit us at www.laserinstitute.org.

LIA has been involved with laser safety training for over 37 years and is dedicated to fostering lasers, laser applications, and laser safety worldwide. The society's efforts will continue under the OSHA alliance.

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LIA Forming Northeast Chapter

The Laser Institute of America (LIA) held its first regional meeting in Sturbridge, Mass. on Aug. 18, 2005. The meeting exceeded all of LIA's expectations. Fulfilling its mission to foster lasers, laser applications, and laser safety worldwide,

Dave Belforte gave a presentation on the global market threat of China to the laser industry.

LIA is pleased to report that those in attendance voted unanimously to form a Northeast Chapter of the society in this laser industry rich area.

Meeting First

The meeting, which was attended by over 50 LIA members and prospective new members, included an optional facility tour of LIA Corporate Member IPG Photonics. IPG is the world's leading designer and manufacturer of high power fiber lasers, diode lasers and amplifiers for materials processing, communications, medical, scientific, aerospace, test and measurement and other commercial applications. The tour was well organized and very informative. The feedback from all those who attended the tour was positive.

Following the tour was a presentation by David Belforte, chief editor of *Industrial Laser Solutions*, titled "Industrial Lasers in China: A Global Threat?" Belforte's presentation was well received and gave an up-to-date snapshot of the laser industry in China.

NE Chapter Develops

Following this, the discussion with LIA staff members regarding formation of a Northeast Chapter ensued. Once agreed upon, further plans were developed and pertained to the chapter's development and mission as allowed by LIA's bylaws. The goal of the group is to provide laser community networking avenues and education for LIA members and to serve as a recruitment tool for potential new members. Bimonthly meetings will be held throughout the area with a guest speaker or factory tour as part of each one.

Five voluntary chairmen have been named from five different Northeast regions. These chairman are: Bo GU of GSI Lumonics, Boston, Mass., Bill Shiner of IPG Photonics, Worcester, Mass., Ron Schaeffer of Photo Machining, Nashua, N.H., Robert Brown of CCAT, Hartford, Conn., and George Andrews of Yale University, New Haven, Conn.

The next stage of the chapter's development is to conduct a new member drive by contacting prospective members from the laser, industrial, medical, and scientific communities to insure that the chapter has good balance and to provide the maximum networking and benchmarking opportunities to the members. Membership in the LIA is required to join the local chapter.

"The formation of an LIA chapter in this area will provide outstanding local leadership and present increasing opportunities to meet needs in the region," said LIA Executive Director Peter Baker.

Future Plans

The goal of the LIA is to form many of these regional chapters throughout the country and then grow internationally. According to LIA's bylaws, each chapter must consist of a minimum of 20 LIA members and form an organizational committee with one designated chair. There will not be any chapter dues and the group must meet a minimum of four times a year.

The next LIA Regional Meeting will be held Dec. 15, 2005 in the Detroit area, to determine whether or not a local chapter will be formed. For more information, call 800-34-LASER or visit www.laserinstitute.org.

Over 50 attendeed LIA's first regional meeting. The LIA Northeast Chapter was formed as a result.

LIA TODAY

Laser Product Showcase

FireWire Laser Beam Profiler

Spiricon announces Laser Beam Profilers using FireWire® equipped cameras, which connect directly to a laptop computer, providing a portable beam analyzer. Multiple FireWire cameras operate simultaneously and capture CW and pulsed laser beams. The LBA-FW uses standard magapixel CCDs, and with fluorescent plates, lasers in the UV can be analyzed. Spiricon's Pyrocam III covers IR from 1µm to over 1000µm. The included Ultracal™ baseline offset compensation remains the industry standard.

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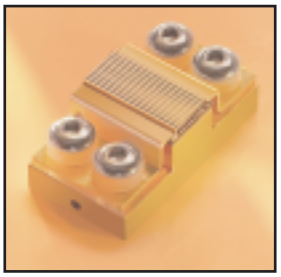

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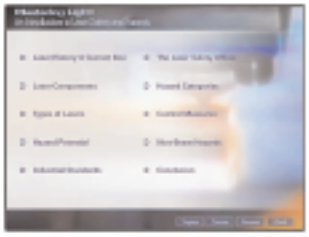

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- **Provides guidance for optical measurements associated with laser safety requirements**
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The ANSI Z136.4 has been published as part of the ANSI Z136 series. The basic document is the American National Standard for Safe Use of Lasers, Z136.1. In general, this recommended practice may be used as a supplement to ANSI Z136.1 when additional details on laser safety measurements are desired.

This standard contains clearly written definitions, examples, and other practical information for laser safety officers, technicians, medical practitioners, educators, and other professionals. The comprehensive guide represents years of effort by laser safety experts representing the Department of Defense, Department of Energy, the Food and Drug Administration, National Institute of Standards and Technology, industrial laser manufacturers, laser operators, academic contributors and others. *(soft bound, 82 pgs.)*

The standard is designed to be used in conjunction with the ANSI Z136.1. Also available in electronic format.

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Revised! ANSI Z136.3 for Safe Use of Lasers in Health Care Facilities

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The revised ANSI Z136.3 is recognized as the definitive document on laser safety in all health care environments. **The ANSI Z136.3 is a must for hospitals, medical centers and clinics using medical laser systems.**

The most important change in the latest iteration of ANSI Z136.3 is the broadening of the scope of the document. The original 1988 document was created to provide guidelines for the safe use of high-powered, high-energy lasers in operating rooms. This revision has extended the scope of medical lasers into all clinical settings.

Other changes include:

- Recognizes the broad clinical areas of the application of lasers in a variety of non-traditional settings as used and operated by a diversity of personnel. These applications include any system that is applied to a human subject for diagnostic, therapeutic, cosmetic or prophylactic purposes.
- Recognizes the increasing role of lasers in the practice of dentistry, and covers the possible use of the document by practitioners of veterinary medicine.
- Emphasizes the U.S. Food and Drug Administration requirement that any laser sold for use on human subjects be regulated. It is required that any laser entered into commercial distribution have not only instructions regarding its use, but additional instructions and guidelines that carefully outline the parameters of its safe use.
- Appendixes have been refined and expanded to offer guidelines and suggestions for safe operation of a greater range of individual medical specialties.

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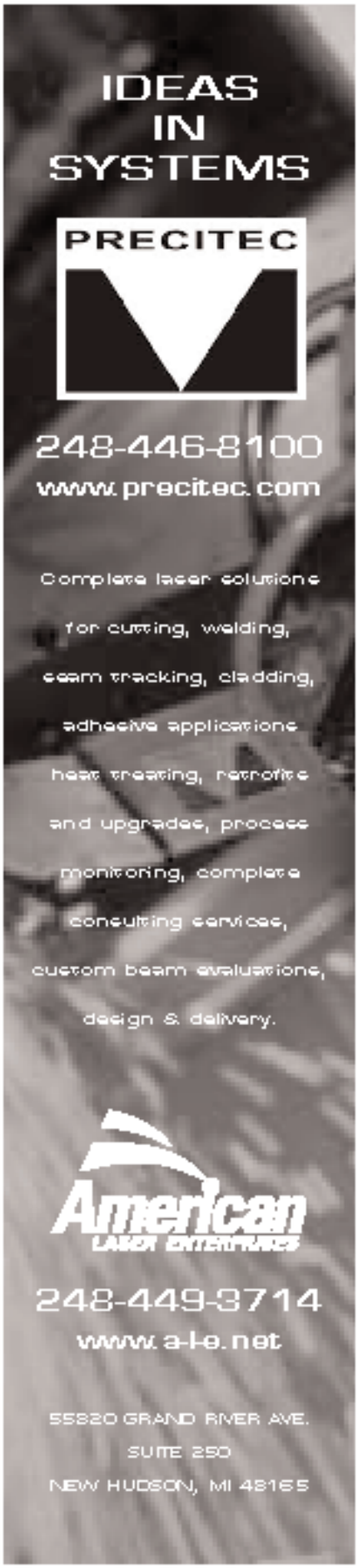

In The News, cont. from pg. 1

University of Montana at Missoula are training honeybees to sniff out the explosives found in landmines and uses LIDAR to track their progress in-flight (*Optics Express 13 5853*), reported the Aug. 11 issue of *Optics.org*. Bees can be trained in a couple of days to pick up the scent of the explosive in the landmine by injecting trace amounts of target chemical into feeders. This causes the foraging bees to seek sources of food with the same smell. When the bees locate vapors from a landmine, they fly along the plume to its source where they pause before continuing.

The next part of the puzzle was how to track the bees. Joe Shaw and colleagues from Montana State University came up with a horizontal scanning LIDAR system. The co-polarized LIDAR system uses a frequency-doubled 532nm Nd:YAG emitting 100mJ pulses at a repetition rate of 30Hz. The backscattered light is passed through a receiver with a linear polarization parallel to that of the emitted light. In an experiment, the researchers concluded that the scanning LIDAR consistently detected a higher bee density near most of the significant chemical plumes. There is still a lot of work to do as a bee hovers over a potential mine site for only a few seconds. This is a sufficiently long time for LIDAR detection if the laser beam is pointed in that direction at that time.

"The primary limitation was identifying bee-specific signatures from grass and other interfering objects," said Shaw. "We have already developed some new sensors and are in the process of characterizing them in the field."

Built-in "Fingerprints" on Surfaces

The surfaces of most paper documents, plastic cards and cardboard packages contain unique "fingerprints" that could be used to combat fraud, according to Russell Cowburn and co-workers at Imperial College London, Durham University and the University of Sheffield in the U.K. The fingerprint is contained in microscopic imperfections on the surface and can be read by a portable laser scanner, reported the Aug. 2 issue of *Optics.org*. The results could eventually eliminate the need for expensive security measures on passports, identity cards and pharmaceutical packaging. The physicists used a phenomenon called "laser speckle" to examine the structure of different surfaces. They scanned a focused laser beam over a sheet of white paper and used photodetectors to record the intensity of the light reflected from four different angles.

The physicists then quantified how much random fluctuations on the paper differed from the mean value (called the zero positional shift) and converted these values into 1s and 0s to obtain the fingerprint code. They obtained different codes for different sheets from the same pack, and achieved similar results for plastic credit and identity cards and cardboard packaging. Moreover, a sheet of paper could be identified even after it had been screwed up into a ball, submerged in water, baked at 180°C, scribbled on with ballpoint and black marker pens, and scrubbed with abrasives. The probability of two pieces of paper sharing the same fingerprint is less than 1 in 1,027.

"Our findings open the way to a new and much simpler approach to authentication and tracking," said Cowburn. "This is a system so secure that not even the inventors would be able to crack it since there is no known manufacturing process for copying surface imperfections at the necessary level of precision."

Journal of Laser Applications® Update

The *Journal of Laser Applications®* offers the latest refereed papers by leading researchers in the laser community. The upcoming November 2005 issue includes papers from materials processing. Look for the online version at www.laserinstitute. org/publications/jla/. To view the journal online, please make sure your membership is current.

The *JLA®* is published four times a year by the Laser Institute of America 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.

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

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Members In Motion

Florida Location for Crafford-LaserStar

Crafford-LaserStar Technologies Corporation, Riverside, R.I., has opened a LaserStar Center in Winter Park, Fla. The office, which opened officially in August 2005, will be a sales, service, education and training facility.

"The decision to establish our presence in the Florida area is consistent with our plans for growth and the desire to establish a presence closer to the markets that we serve" said James Gervais, executive vice president.

Crafford-LaserStar Technologies is a premier supplier of laser welding and laser marking machines to the jewelry, dental and industrial marketplaces. Additional offices are located in Texas and California. For more information visit www.laserstar.net.

Consulting Partnership Formed

Dick Pellegrini, president of Pilgrim Associates, Lakeland, Fla. and former VP/GM of GPT Glendale, Inc., has formed a new strategic consulting partnership with Executive Solutions, LLC of West Palm Beach, Fla. providing senior level consulting services for troubled companies experiencing serious restructurings due to M&A, divestitures and succession changes; operations and new product developments as well as financial turnarounds. Their resource supports include a wide range of seasoned senior executives located throughout the U.S., U.K. and China. For more information visit www.excsolutions.com.

ASC Z136 Update

The meeting of ANSI Z136 Ad-Hoc Committee on Additional Standards held in August was deemed highly successful and productive by all in attendance. A vote was taken to determine whether to recommend to the committee the development of three new vertical Z136 standards – *Safe Use of Lasers in the Manufacturing Environment; Safe Use of Lasers in Research, Development and Testing;* and *Safe Use of Lasers in Entertainment, Display and Exhibitions*, which passed unanimously.

This recommendation will be presented to the committee at the annual meeting and, if approved, PINS (Project Initiation Notification System) forms will be submitted to ANSI for listing in the *Standards Action* to allow for participation by interested parties. For more information on how to participate on ASC Z136 or any of its subcommittees, please contact Barbara Sams at the Laser Institute of America, 407-380-1553 or email bsams@laserinstitute.org.

Mark your calendars today! The ASC Z136 Annual Meeting is scheduled for Thursday, March 16, 2006 at FDA/CDRH in Rockville, Maryland. Details to follow.

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LIA Announces

BLS Exam Dates

The Board of Laser Safety™ (BLS) will be offering Certified Laser Safety Officer (CLSO) exams Oct. 21 in Sedona, Ariz., Nov. 4 in Phoenix, Ariz., Nov. 12 in Las Vegas, Nev., and Dec. 9 in Orlando, Fla. BLS will also be offering Certified Medical Laser Safety Officer (CMLSO) exams Oct. 14 in Philadelphia, Pa. and Nov. 13 in Phoenix, Ariz. Cost is $300 for the CLSO exam and $150 for the CMLSO exam, both prices include the application. For more information contact Rich Greene at bls@lasersafety.org, 800-345-2737, or visit www.lasersafety.org.

LIA Regional Meeting

LIA invites those in the laser industry in the Detroit area to come network with other laser professionals facing the same challenges at its first regional meeting for this region. The meeting will be held on Dec. 15, 2005 at a location still being determined. It will be free for all LIA members, but you must register. The nonmember price is $10. Visit www.laserinstitute.org for more information. This meeting will also determine whether a local chapter will be formed (see article on page 9).

LIA at Fabtech

FABTECH® 2005, co-sponsored by the Society of Manufacturing Engineers and the Fabricators & Manufacturers Association International, will be held Nov. 13-16 in Chicago, Ill. Fabtech is North America's largest annual metal and fabricating event with 700 exhibitors with over 2,000 products on display and a wide range of technologies and equipment in action. We invite attendees to stop by the LIA booth (#13014) and learn about the laser safety training available from LIA, which includes the ANSI standards for safe use of lasers series, the *LIA Handbook for Laser Materials Processing*, and laser safety training. For more information visit www.fmafabtech.com.

ICALEO® Approaching

The 24th International Congress on Applications of Lasers & Electro-Optics (ICALEO®) will be held Oct. 31-Nov. 3, 2005 at the Hyatt Regency in Miami, Fla. Pre-conference registration is $695 for LIA members and $795 for nonmembers. Onsite costs and registration after Oct. 11 are $745 for members and $845 for nonmembers. For more information, visit www.icaleo.org or contact Conference Director Beth Cohen at bcohen@laserinstitute.org.

PICALO in 2006

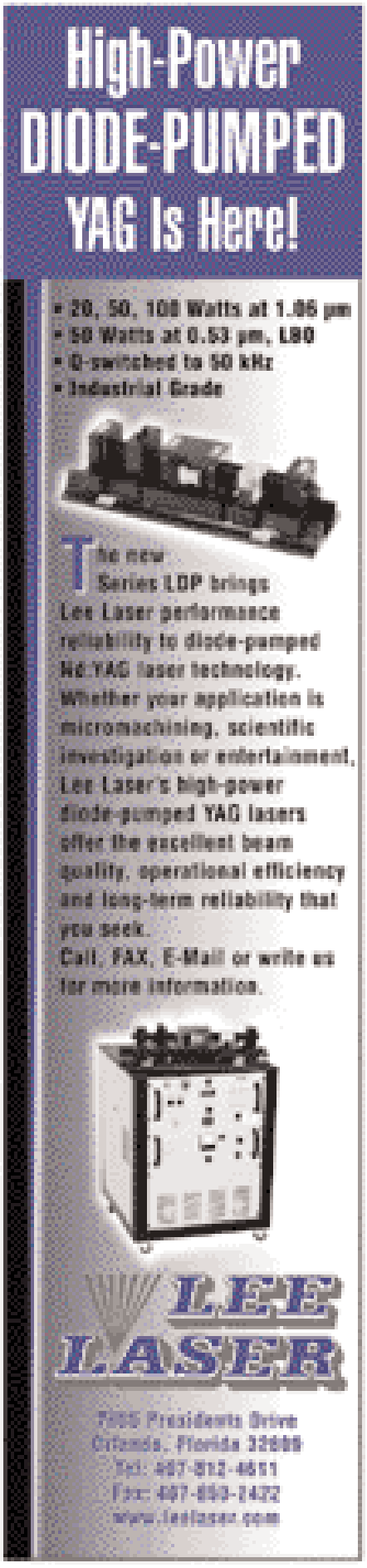
LIA's newest conference, the Pacific International Conference on Applications of Lasers and Optics (PICALO), is back for a second time. First held in 2004, the 2006 conference will be held Apr. 3-5 in Melbourne, Australia. PICALO will focus on the growth and application of lasers and optics in the Pacific region. For more information, visit www.laserinstitute.org/conferences or contact Beth Cohen at 800-34-LASER or bcohen@laserinstitute.org.

ILSC® 2007 Announced

With the ink barely dry on the contracts, LIA would like to announce the location and date of its next International Laser Safety Conference (ILSC®). ILSC® 2007 will be held Mar. 19-22, 2007 at the San Francisco Airport Marriott in San Francisco, Calif. More details will follow, but please mark your calendars now to attend this comprehensive four-day international conference covering all aspects of laser safety practice and hazard control.

Mastering Light Interactive CD

LIA has a new training CD now available – *Laser Safety: Mastering Light* (pub. #203). Developed from LIA's popular *Mastering Light Video – An Introduction to Laser Safety* (pub. #303), this new interactive CD version reviews the lasers' history and current uses, components, and various hazard issues. Control measures, including the duties of the laser safety officer, are discussed in detail. It fulfills the ANSI Z136.1 and OSHA training requirements for employees working with or around Class 3b or Class 4 lasers. It is an excellent training tool for laser safety officers in industrial or research environments who have the responsibility to train new employees and keep existing ones updated on current safety issues and practices. *Laser Safety: Mastering Light* is $695 for LIA members and $795 for nonmembers. For more information visit www.laserinstitute.org/bookstore or call 800-34-LASER.



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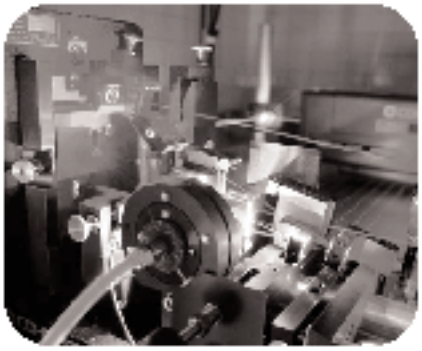

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