



LIA TODAY

The Official Newsletter of the Laser Institute of America

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

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In The News...



Optical Scans Illuminate Breast Tumors

Britton Chance of the University of Pennsylvania and colleagues claim to have developed the first hand-held optical scanner that can be used for the early detection of breast cancer, reported the Aug. 9 issue of *Optics.org*. The device is intended to complement traditional breast-screening methods, such as mammography, and could be commercially available within the next three years (*Rev. Sci. Instrum.* 77 064301).

A portable device that both patients and doctors could use would overcome availability and comfort problems while also enabling women at high risk of contracting the disease to examine themselves regularly. The device consists of a plastic box with a circuit containing two light-emitting diodes (LEDs) and one diode, amplifiers and a microchip. The LEDs emit light in the near-infrared region of the spectrum between about 650

(Cont. on pg.15, see **In The News...**)

25 Years of Laser Processing Looking Back to See the Future

by Jack Dyer, Contributing Editor

Visitors to the Laser Institute of America (LIA) website, www.laserinstitute.org, find this invitation: We invite you to join our network of laser professionals TODAY!

The site explains how the LIA was started in 1968 with the sole intention of turning the potential of a powerful new technology into an actual, viable industry. The LIA was forged from the heart of the profession – a network of developers and engineers – people who were actually using lasers.

So, has this powerful new technology become an actual, viable industry? The success of the first International Congress on Applications of Lasers & Electro-Optics (ICALEO) has carried through to today.

International Growth – 1982 to 2006

In celebrating the silver anniversary of ICALEO, plenary speaker David R. Whitehouse of Weston, Mass., reviews the laser applications landscape of 25 years ago, the broadening success for laser materials processing, the activities and makeup of the LIA, and the building momentum for application conferences in the laser field.



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

Laser Welding: Quality, Efficiency, and Adaptability

by Stephen Lumbert

There were over 40,000 commercial lasers (non-diode) sold for materials processing in 2005* and today thousands are used for welding applications. Laser welding has come a long way since its infancy in the early 1970s when it was employed mainly for esoteric applications where other welding processes were not suitable. Now many manufacturers rely on laser welding for everything from plastics to titanium. The ability to vary the laser's output energy with pinpoint accuracy is finding more and more applications in industry today.

In order to address this topic LIA Today asked experts in the area of laser welding the

following three questions:

1. What has changed in industrial laser welding since its inception?
2. What are some new applications being used?
3. What do you foresee happening to the laser welding market in the next 5 years?

Changes Affecting Laser Welding

Over the last 30-odd years technology has improved across the board, but in the world of lasers and manufacturing, specifically laser welding, beam quality has never really been an issue. In fact, according to Stan Ream, laser

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



IN THIS ISSUE...

Features

25 Years of Laser Processing ..1
Laser Welding – Quality, Efficiency & Adaptability1
Automotive Laser Applications Workshop in 200710
ILSC Means Great Opportunities12

Departments

In The News1
Calendar of Events.....2
Executive Director's Msg.....5
Welcome New Members.....16
Chapter Corner.....17
Members in Motion18
ASC Z136 Update18
JLA Update18
LIA Announces19

Advertisers

BLS Certification12
Coherent, Inc.9
Directed Light7
FabTech13
ILSC20
Kentek.....4
LIA's Laser Safety Podcasts5
Lasag.....14
Laser Focus World.....16
Lasertel10
Lee Laser19
NoIR14
Photonics Spectra9
Precitec & American Laser Enterprises15
Trinity Technologies11
Wilson Industries3

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The Official Newsletter of the Laser Institute of America

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LIA TODAY is published bimonthly and strives to educate and inform laser professionals on 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 their 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.

If you are interested in affordable advertising space in this newsletter or a subscription, please contact Jim Naugle at 407.380.1553 or 1.800.34.LASER.

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

Dec. 4-6 • Orlando, FL
May 7-9, 2007 • Indianapolis, IN

Laser Safety Officer with Hazard Analysis

Oct. 30-Nov. 3 • Scottsdale, AZ
Feb. 5-9, 2007 • Orlando, FL
Mar. 26-30, 2007 • San Diego, CA

Medical Laser Safety Officer Training

Nov. 10-11 • Las Vegas, NV
Jan. 26-27, 2007 • San Diego, CA

Medical Aesthetic Lasers & Light Technologies

Oct. 14-15 • Chicago, IL
Nov. 18-19 • Houston, TX

ICALEO[®] 2006

Oct. 30-Nov. 2 • Scottsdale, AZ

ILSC[®] 2007

Mar. 19-22 • San Francisco, CA

ALAW

Apr. 17-19, 2007 • Plymouth, MI

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Executive Director's Message

LIA Is People

One of my bedrock beliefs about a successful organization is that it is all about people – attracting them, retaining them and giving them the freedom to succeed.

Clearly a major factor in LIA's current success is our people, particularly our leadership and our staff. We recently held an Executive Committee meeting in Florida and one of our leaders, Andreas Ostendorf, flew roundtrip from Germany to attend. That is dedication.

At the meeting we were discussing a possible revenue shortfall when President Elect Bill Shiner said, "Here is what we can do to make up the shortfall and here is what I will do to help." That is leader-



From left, Nat Quick, Bill Shiner and Andreas Ostendorf, members of LIA's executive committee.

ship. The following week LIA Secretary Nat Quick came by with his notes, thoughts and some content to help move the project along. That is leadership.

Leaders do not just say "you" should do this or that, they say "we" and then they do something about it. LIA is blessed with outstanding leaders for which I am very grateful.

The other key ingredient of our success is the LIA staff, and just yesterday there were three examples of the dedication and commitment that makes our people exceptional.

Storm/Hurricane Ernesto was threatening us and Rich Greene was scheduled to fly out to visit a customer. In spite of the situation, Rich insisted on going anyway even though he ran the risk of being stranded. That is commitment.

Barbara Sams was working on the Z136.1 standard and was frustrated because schools were closed and she had to stay home with her son Joey and might lose a day. She solved the problem by working through till 3 a.m. to get it out to the committee for vote. That is dedication.

Our newest employee, Noah



From left, Noah Schwarzfeld, Barbara Sams and Rich Greene, members of LIA's staff.

Schwarzfeld, is working here part-time while he completes his MBA. He is calling people whose membership has lapsed and was pretty nervous when he made his first calls. Unfortunately he had a very cold response to his first call but he pushed through and is now successfully helping people to avoid interruption in their membership. That is commitment.

So, with good leaders and dedicated staff members, all is well with our society.

Peter Baker

pbaker@laserinstitute.org



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ICALEO, cont. from pg. 1

Scottsdale, Oct. 30-Nov. 2, 2006

This 25th congress will feature major advances through two conferences – Laser Materials Processing and Laser Microprocessing. Some topics were undreamed of 25 years ago when Whitehouse was also general chair of a thriving baby ICALEO.

Materials Processing Conference Chair Paul Hilton of the Welding Institute, Cambridge, United Kingdom, in listing recent laser processing advances, says three sessions are devoted to the use of fiber laser sources in materials processing. In parallel to recent fiber laser developments, particularly advances in beam quality, progress has



LIA Professor Michael Bass was chair of the first material processing symposium.



Peter Baker, left, now LIA executive director, with James Luxon, chair of the Professional Advancement Courses in 1982.

also been made in the area of disk lasers, with new high power, high beam quality devices now commercially available.

Other sessions include: Laser Processing in the Automotive Sector; Processing in the Aerospace, Defense & Space Industries; Ultrafast Laser Processing, and Laser Micropackaging. A Laser Business Development Session (new in 2005) rounds out the highlights.

A Look Back – Boston, Sept. 20-23, 1982.

Looking back, on the other hand, reflects an LIA vision to build on the successful 1981 International Laser Processing Conference, and to create a broad-based, laser-applications conference that would attract and benefit researchers, manufacturers, system integrators and most importantly, end-users from many different fields. The initial five mini-symposia format was selected to achieve this goal, and in 1982, the first ICALEO was successfully launched with *Dave Whitehouse* of Raytheon Company, Burlington, Mass., as general chair.

Chair Whitehouse had these professionals at work on that first organizing committee: Program – *Sidney S. Charschan* of Western Electric, Princeton, New Jersey; Professional Advancement Courses – *James T. Luxon* of General Motors Institute, Flint, Mich; Treasurer – *James F. Smith*, IBM, Research Triangle Park, N.C.; Publicity – *Burton Bernard* of General Photonics, Santa Clara, Calif.; Intersociety

Liaison – *David Belforte* of AVCO-Everett Corp., Somerville, Mass., and Congress Manager – *Haynes Lee* of LIA's headquarters in Toledo.



David Whitehouse, in 1982 (left), was the first ICALEO general chair. In 2006, below, he will be a plenary speaker.

**An In-Depth Look at the First Applications-Oriented Congress**

This first technical program, designed to encourage “highly desirable” interdisciplinary exchanges, included five symposia: materials processing; medicine and biology; inspection, measurement and control; lasers and electro-optics, and optical.

Treating each subject in-depth and encouraging cross-fertilization by open attendance and one registration led to presentations of 132 U.S. and 15 foreign papers in this first congress.

Inclusion required the field of application to have made significant inroads into the general public use. Each had the ability to attract a broad range of persons working in the specialized field, and included researchers, developers, and end-users.

The successful format directed all events, activities and vender programs to be specifically oriented toward the overall applications theme. Fourteen cooperating professional and technical societies from all over the world were involved in some aspects of the laser and electro-optic technology. Thirteen basic and state-of-the-art professional advancement courses followed suit.

The network of laser professionals at the first ICALEO explored these in-depth topics:

- Laser Processing – Metals to

Biological Tissue (*James Johnson*)

- Lasers in Medicine – The interface between the Researcher and Clinician (*Myron Wolbarsh*)
- Processing of Semiconductors & Other Materials (*John Ready*)
- Laser Safety – Bio-effects, Hazards & Class (*James Rockwell*)
- Electro-Optic & Acousto-Optic Devices (*Robert Webb*)

Also moving deeper into 1982's focus came these advanced topics: Fiber Optics & Communications (*Elias Snitzer*); Spectroscopy (*Leon Radziemski*); Applied Laser Optics (*James Luxon*), and Beam Propagation (*Hugo Weichel*).

Highlight: The Medal – Sept. 22, 1982 – Citation to Arthur L. Schawlow

Professor Arthur L. Schawlow, 1981 Nobel Laureate in physics, became the first recipient of a new medal to be awarded annually in his honor by the LIA. Dr. Schawlow delivered the 1982 honored speaker address on the subject “Laser Applications.”

He chaired the department of physics at Stanford

Distinguished Past Recipients of the Arthur L. Schawlow Award

1982 Arthur Schawlow	1990 Herbert Dwight	1999 William Schwartz
1983 Arthur Guenther	1991 Anthony Siegman	2000 Theodor Hänsch
1984 Kumar Patel	1992 Yoshiaki Arata	2001 Walter Duley
1985 Leon Goldman	1993 James L. Hobart	2002 Akira Matsunawa
1986 William Bridges	1994 Rocco Lobraico	2003 Jyotirmoy Mazumder
1987 Sidney Charschan	1995 David Belforte	2004 Helmut Hügel
1988 Francis L'Esperance	1996 William Steen	2005 David Sliney
1989 Milton Chang	1997 Conrad Banas	
	1998 Robert L. Byer	

University from 1966 to 1970. Prior to joining the faculty in 1961 he was a member of the technical staff at Bell Telephone Laboratories, Murray Hill, N.J., the source over many years of several outstanding laser advances.

In 1958, with Charles H. Townes, he published the first scientific paper that specified the method of construction and predicted in detail the unique characteristics of lasers.

The award plaque read:

The first annual Arthur L. Schawlow Medal of the Laser Institute of America is presented in recognition of his distinguished contributions to the scientific applications of lasers, including his pioneering role in the invention of the laser; the development and use of ultra-sensitive, high-resolution spectroscopic techniques employing widely tunable, highly monochromatic lasers; his innovative work in highly selective laser excitation spectroscopy, revealing enhanced knowledge of atomic and molecular structure and energy levels; and his tireless contributions to education in laser science and

applications through numerous public lectures, tutorial papers, media appearances, and stimulating teaching and advising of his students.

Again, the Question

Has this powerful new technology become an actual, viable industry? The successes of the first ICALEO and the silver anniversary congress reflect the outstanding pursuits of the laser professionals of yesterday and today. ✱

Did You Know?

That in 1991, the Massachusetts Institute of Technology published *The Laser in America, 1950-1970* by Joan Bromberg. The book was an outgrowth of the *Laser History Project*, which was sponsored by the American Physical Society, the IEEE Lasers and Electro-Optics Society, the Laser Institute of America and the Optical Society of America. Haynes Lee, Jr., LIA manager, was the project's financial manager.

Looking Forward: ICALEO 2006

The 25th anniversary of the International Congress on Applications of Lasers & Electro-Optics (ICALEO®) will be held Oct. 30- Nov. 2 in Scottsdale, Arizona. It is 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.

Returning ICALEO features include the Laser Materials Processing Conference, the Laser Microprocessing Conference, the Poster Presentation Gallery and the Laser Solutions Short Courses. For more information or to receive a copy of the 2006 Advance Program, call LIA at 1-800-34-LASER/407-380-1553 or visit www.icaleo.org.



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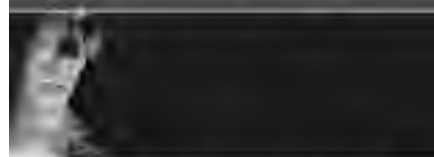
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Welding, cont. from pg. 1

technology and fuel cell team leader at EWI (Edison Welding Institute), Columbus, Ohio, much of the laser welding performance data generated back then is still credible today.



Micro-wire feeder adding filler material to laser weld.

“Early lasers had remarkably good beam quality, and much of the welding performance data generated with them are still valid today. The costs, reliability, and ease of operation of these early lasers are another matter all together. Thirty years ago a kilowatt CO₂ of laser power cost a few hundred thousand dollars (adjusted for inflation) and meantime-between-outages was measured in hours. Today a kilowatt of excellent CO₂ laser power costs about \$45,000, and these modern lasers can run for months without required maintenance or downtime,” said Ream.

“So, the most notable change that has occurred in industrial laser welding since its inception is its ‘value proposition,’ an overused but meaningful phrase in this context. The value of laser welding today is very much a product of the dramatic improvements in cost and reliability noted above. This value is further enhanced by continued reductions in operational and maintenance complexity. This holds true for all the currently popular, industrial laser types, but it is most dramatically evident in the emerging fiber lasers, which (at least for one manufacturer) may require virtually no user maintenance at

all. This is the proverbial ‘black box in the corner’ that may dramatically expand the applications for laser welding by offering even greater simplicity, efficiency, performance, affordability... just that ‘value proposition’ thing,” he continued.

Value proposition was not the only change that our respondents thought important. According to Bill Shiner, director of Industrial Market Development at IPG Photonics, Oxford, Mass., the marriage of laser technology and robotics virtually changed the landscape as far as laser welding is concerned.

“Before this merging of technology, laser welding was limited by the production fixture set-up, and multiple location welds required complex mechanisms for manipulating the work piece. The prohibitive cost involved setting up laser welding production made it difficult for the automotive industry to invest in this option. Now lasers can be mounted on robotic arms with an increased range of motion in three dimensions. This improvement resulted in worldwide acceptance of laser welding by a very demanding automotive industry,” said Shiner.

What’s New?

Some of the innovations in laser welding include remote welding and high power fiber lasers. Remote welding has the potential for shortening cycle times and reaching locations previously requiring multiple welding stations. The process of remote laser welding involves replacing the robot arm laser mount by using a combination of mirrors that can be rotated and tilted. This is used in combination with a variable laser output to eliminate large spatial movements while decreasing the footprint

of equipment. Remote laser welding holds great promise for the automotive and aerospace industries. Another potential application would be fuel cell construction where multiple precision welds within a small area are required and may eventually require millions of meters of laser weld per year.

A relatively new and very promising advance in laser welding is the introduction of high-power, portable, and efficient fiber lasers. Compact fiber lasers with high output operating with an overall efficiency reaching 15%-20% make laser pipeline welding a real possibility. Pipeline welding has been investigated many times in the past but has as yet not been used for production. There is also an opportunity for fiber lasers in the shipbuilding industry. The shipbuilding and pipeline sectors have great potential for the growth of laser welding.

On the horizon are other techniques related to laser welding. One of these is laser glazing. Laser glazing involves melting a thin surface layer followed by rapid solidification. When applied to railroad track rails, laser glazing effectively hardens the rail thus minimizing wear, reducing fuel, and decreasing the likelihood of derailments. Research by the Argonne National Laboratory, along with the American Association of Railroads, could result in millions of kilometers of laser glazing.

Looking Ahead 5 Years

Our respondents were divided on the third question. One segment predicts little to moderate change in the next five years based on the observation that a large number of laser welding applications are “just right” and remain unchanged for some time.

Examples include tailored blank, razor blade, and pace-maker welding. Unless these processes eliminate welding entirely, they are unlikely to change any time soon. It is interesting to note that while laser welding is usually the last process considered for manufacturing, it is also the hardest tool to replace.

A divergent view is that the next few years could lead to a paradigm shift where some industries may start adapting laser welding not because it is the only choice, but because it is the right choice. New demands on increased efficiency as energy costs continue to increase will raise the ‘value proposition’ question again. Advances in high strength, or ‘dent-free’ steel for automotive applications and the increased costs involved with traditional manufacturing may open the door for increased use of combination laser cutters/welders.



CO₂ laser welding of carbon steel to stainless.

Photos courtesy of Alabama Laser Technologies.

Every day brings new developments as the laser industry works to increase the accuracy, efficiency, and power of lasers. One thing that everyone seems to agree on is that laser welding is a valuable asset to the laser industry as a whole and our future holds the promise of exciting opportunities. ✦

*The *Laser Focus World Annual Review and Forecast of the Laser Marketplace* is based on a worldwide survey of laser producers and covers 27 types of lasers and 20 applications. Industrial-laser market information is provided by *Industrial Laser Solutions*. This review is the only major survey of its kind in this industry whose results are made public.

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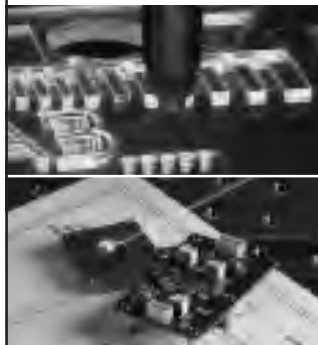
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Automotive Laser Application Workshop in 2007

Lasers—Ultimate Flexibility will be the focus of the 2007 ALAW conference April 17-19, 2007 at The Inn at St. John's in Plymouth, Mich. This three-day premier industry event introduces state-of-the-art processes in laser technology in manufacturing and automotive environments.

In March 2006 this well-established conference drew over 200 professionals, predominately decision-makers from suppliers to the automotive market. In April the Fabricators & Manufacturers Association, Intl. (FMA), and the Laser Institute of America (LIA) acquired the conference from founder Frank DiPietro. Frank will remain the conference chairman for 2007 and the quality of ALAW will

remain the same. The new partners are committed to building on the strong tradition of ALAW to provide the industry with access to cutting-edge laser technology. We have expanded and improved the program by

Conference Program & Audience

Day one of the conference is entitled "Fabricators Day – Making Money with Lasers" and will focus on giving managers and owners of manufac-

laser manufacturing. For more program details, please visit www.alawlaser.org.

ALAW Sponsorship Programs

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adding another day aimed at educating end-users on laser applications and the benefits of using laser technology.

turing facilities and job shops a fundamental understanding of laser technology, application realities, and solutions to practical problems.

Days two and three, the "Automotive Laser Applications Workshop," will feature senior level executives and engineers from the global automotive industry delivering presentations on laser processing for automotive components; diode, fiber, and disk laser applications for welding and cutting, and how lasers are being used worldwide in the automotive industry.

Day one of ALAW will be attended by owners, managers, supervisors of fabrication and job shops as well as new end-users who want to learn more about the benefits of using laser technology for new or different applications and the associated costs.

Days two and three should be attended by manufacturing, production, product design and research/development engineers and anybody interested in using and/or developing flexible applications for automotive laser material processing systems to reduce costs, improve quality and provide flexible

ALAW 2007 will provide you with three days of interaction with attendees. This premier industry gathering offers a rare opportunity to profile your company before key leaders involved in laser processing of materials. Space is limited so if you'd like to reserve your corporate sponsorship now, contact Rich Greene at 407-380-1553 or e-mail rgreene@alawlaser.org.

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ILSC Means Great Opportunities

The 2007 International Laser Safety Conference (ILSC®), to be held in San Francisco, Calif. Mar. 19-22, 2007, is a comprehensive four-day conference covering all aspects of laser safety practice and hazard control. Technical sessions and workshops will address developments in regulatory, mandatory and voluntary safety standards for laser products and for laser use. Presented by LIA, laser safety experts from all over the world will meet and discuss their research, programs and standards making ILSC 2007 a tremendous source for information and networking opportunities.

NEW for ILSC 2007!

The Laser Safety Practical

Applications Seminar will be held Mar. 19-20. This is a two-day seminar for the practical Laser Safety Officer (LSO). It will be particularly useful for LSOs who are not

full-time laser safety professionals. Participants will be involved in practical interactive workshops, panel discussions, and hot topics addressing the more common safety issues and concerns of the day-to-day operations in commercial, factory, research, and medical facility settings. PAS sessions will be held concurrent with ILSC sessions.

Registration fees include access to all PAS and ILSC sessions, workshops and receptions. Earn up to two BLS and ABIH CM points (.5 point per half day of atten-

opportunity to meet, and offers vendors the chance to experience ILSC firsthand. Vendor program participants have opportunities throughout the conference to interact



dance, 2.0 total Industrial Hygiene CM points).

Topics for Practical Applications Seminar:

- Optics 101
- Medical Laser Safety
- Lessons Learned / Laser Accidents
- Laser Facility Audits
- Industrial Laser Applications
- Laser Safety on a Budget
- High Intensity Light Sources
- CDRH/IEC
- Laser Safety Training

ILSC 2007 Programs

ILSC offers various level sponsorship opportunities to help create a lasting impression with attendees. Sponsors are acknowledged in a number of ways ranging from onsite signage to visibility on our ILSC website. Sponsors are also included in the Advance Program & Technical Digest, which is distributed to all attendees. From general refreshments to receptions, ILSC can highlight your company both online and onsite!

Another great opportunity is LIA's innovative Laser Safety Vendor Program! This program gives vendors and conference attendees the

with attendees from industry, medicine, government and academic worlds. The ILSC tabletop exhibit and reception is open to all companies and institutions within the laser industry and is the only scheduled event for Tuesday evening (5:30p.m.-8p.m.). Attendees from both ILSC and the Practical Applications Seminar will be participating in this exclusive showcase exhibit and reception. Sign up by Nov. 3 to take advantage of the early bird registration fee (www.laserinstitute.org/conferences/ILSC/programs/). For further information on sponsorships and the tabletop exhibit fee schedule, contact Beth Cohen at bcohen@laserinstitute.org or Barbara Sams at bsams@laserinstitute.org.

ILSC Registration Info

Full conference registration includes admission to the plenary session and all technical sessions, workshops, welcome reception and awards presentation, tabletop exhibits and a technical digest. Pre-register and save! Discounts are given to LIA corporate and individual members. Please visit www.laserinstitute.org/conferences for more details and to register. ✱

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In The News, cont. from pg. 1

and 900nm. Since water and fat do not absorb much light at these wavelengths, the light is able to penetrate as deep as 5cm into the tissue. The device can detect a growing tumor by changes to the absorbed signal: when the scanner passes over a tumor, more light is absorbed because there are more blood vessels in growing tumors than in healthy tissue. The device has already performed well in a small preclinical trial with 100 women, correctly detecting cancer in 92% of the patients. This is comparable to MRI and better than mammograms.

Fiber Takes on Medical Role

Conventional needle-syringes could be on the way out if a "smart" hypodermic needle made from biocompatible optical fiber takes off, reported the July 21 issue of *Optics.org*. Developed by a team from Polytechnique de Montreal, Canada, the porous double-core device can perform both sensing and drug delivery roles. What's more, the fiber is easy to recycle thanks to its biodegradable properties. Made from commercially available cellulose butyrate, the fiber consists of a 150 μ m diameter inner core surrounded by a 450 μ m outer core. The inner core allows laser pulses to be delivered to the target, while the outer core can be used to collect reflected light for analysis. Transmission is good in the visible to near-infrared with multiple absorption peaks in the mid-infrared, and preliminary data shows that side-scattering dominates transmission loss on the order of a fraction of a dB/cm. According to the researchers, the fiber can be impregnated with pharmaceutical compounds for release during treatment and gaps within the microstructured device provide a pathway for transferring fluids. The team uses hydroxypropyl cellulose powder to support the fiber's inner and outer cores.

Nano-Etched Cavity Makes LEDs 7 Times Brighter

Researchers at the National Institute of Standards and Technology (NIST) have made semiconductor light-emitting diodes (LEDs) more than seven times brighter by etching nanoscale grooves in a surrounding cavity to guide scattered light in one direction. The novel nanostructure may have applications in areas such as in biomedical imaging. Semiconductor LEDs typically emit only about two percent of the light in the desired direction of perpendicular to the diode surface. The NIST nanostructured cavity boosts useful LED emission to about 41%. The NIST team fabricated their own infrared LEDs consisting of gallium arsenide packed with "quantum dots" of assorted sizes made of indium gallium arsenide. Quantum dots are nanoscale semiconductor particles that efficiently emit light at a color determined by the exact size of the particle. The LEDs were backed with an alumina mirror to reflect the light emitted backwards. The periphery of each LED was turned into a cavity etched with circular grooves, in which the light reflects and interferes with itself in an optimal geometry.

Researchers experimented with different numbers and dimensions of grooves. The brightest output was attained with 10 grooves, each about 240nm wide and 150nm deep, and spaced 40nm apart. The principles of the method are transferable to other LED materials and emission wavelengths, as well as other processing techniques, such as commercial photolithography. ❁

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- Epolin, Inc., Newark, NJ
- PolarOnyx, Inc., Sunnyvale, CA
- Rhode Island Hospital, Providence, RI
- Southern Methodist University, Dallas, TX
- University of Arizona, Tucson, AZ

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

Individual Members

William Betts, Chandler, AZ
 Darren Cannone, Riverside, CA
 Beth Mohr, Menlo Park, CA
 Ellyn Martin, Fort Lauderdale, FL
 James Martin, Fort Lauderdale, FL
 Nancy Lewis, Augusta, GA
 Cindy Peters, Quincy, IL
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Chapter Corner

LIA encourages all LIA members in the supporting areas of these chapters to join the chapter and support its efforts to promote the laser industry on a regional level. For more information or to volunteer to help, visit www.laserinstitute.org/membership/chapters.

Northeast Chapter

The most recent meeting of the Northeast Chapter was held Tuesday, Sept. 26, 2006 at the Connecticut Center for Advanced Technology, Inc. (CCAT) in East Hartford, Conn. The meeting began with an optional lab tour of CCAT (www.ccat.us) before moving on to the Sheraton Hartford Hotel for a social hour, dinner and speakers.

The first speaker was Deborah Santy, CT SBIR, of CCAT who discussed "Tapping Federal SBIR Funds for Seed and Early-Stage Capital", followed by Robert Torrani, CMSCI, also of CCAT, discussing "Responding to Evolving Demands of Aerospace & Defense OEMs."

The keynote speaker was Dr. Susan Coleman of the University of Hartford, Barney School of Business, who gave the presentation "Economic Trends, Key Issues for the Manufacturing Sector, and A Role for Education." The keynote presentation discussed what's going on in the economy, how it affects the manufacturing industry in general and manufacturing using lasers in particular. It also addressed the link between education and needs of the industry.

For more information visit www.laserinstitute.org/membership/chapters/new_england/.



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. You must be a member of LIA in order to join one of its chapters.

Great Lakes Chapter

The Great Lakes Chapter includes not only the state of Michigan but also the supporting states of Illinois, Indiana, Ohio and the province Ontario, Canada. The goal of the chapter is to create a forum for networking with laser professionals in the Great Lakes area and abroad which include laser end-users, manufacturers of lasers and related products, safety officers, company presidents and researchers. The next meeting will be held Oct. 18 and will be student night as well as the election of officers for 2007.

The July meeting was held at the Fraunhofer Institute in Plymouth, Mich., and included a presentation on "Novel Lasers and Their Impact on Materials Processing." After the presentation the group toured the lab area of Fraunhofer, a rare opportunity to check out the latest real-world applications at work.

For more information please visit www.laserinstitute.org/membership/chapters/great_lakes/.

Northern CA Chapter

Established in May 2006, the Northern CA Chapter is the premier networking and educational gathering for the laser user community on the West Coast. The Northern CA Chapter of LIA includes the state of California, but is not limited to just that state.

The goal of the chapter is to create a forum for networking with laser professionals in Northern California that include laser end-users, manufacturers of lasers and related products, safety officers, company presidents and researchers. The mission 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 company tour as part of each one. For more chapter-specific information, visit <http://www.laserinstitute.org/membership/Chapters/West/>.

CLSO Volunteer Activity

Teams of CLSOs (certified laser safety officers) are being organized to work on a special project – a book tentatively titled "Best Practices in Laser Safety." Several CLSOs have already volunteered to work on this project that will help new LSOs accomplish their job. CLSOs get 1 CM point for their participation. Look for the book next year at the LIA Bookstore. If you are interested in helping out, please contact LIA's Rich Greene (rgreene@laserinstitute.org) or Jeannette Gabay (cfo@laserinstitute.org).

Sample of the table of contents:

- Laser Inspection
- Laser Safety Risk Assessment
- Representation & Administration Support
- How to Write Standard Operating Procedures
- Protective Equipment
- Eyewear, Including Guide for Selection and Proper Storage
- Laser Curtains, Windows and Guards
- Signs
- Laser Safety Training Programs
- Manual Hazard Calculations
- Non-beam Hazards
- Selection of Local Exhaust Systems for Laser Fume and Smoke
- Higher Powered Laser Safety Concerns
- Regulatory Bodies – Local and Federal
- National and International Standards
- Self-Audit
- Effectiveness of Laser Safety Program
- Accident Case Studies

Members In Motion

UVEX Acquires Majority Interest in Trinity

The UVEX Safety Group, Saint Paul, Minn., announced in August that it has acquired a majority interest in Trinity Technologies, also in Saint Paul, in an effort to complement the laser protection business of Laservision, a wholly owned subsidiary of the UVEX Safety Group that is based in Germany.

"This acquisition offers incredible potential for the development of our laser protection business worldwide," said Peter Bura, managing director of Laservision. "Laservision is the market leader for laser protection prod-

ucts in Europe and other countries where laser protective products fall under CE regulation. Trinity Technologies has laser safety expertise in the U.S. and other countries following ANSI laser safety guidelines. By working closely with Trinity we become the worldwide market leader in laser protection."

Joseph O'Brien, managing director of Trinity, said, "We look forward to working with Laservision to bring expanded product and service offerings to our customers in the U.S." "Additional frame styles and advanced new filter technologies will be a couple of the immediate benefits to our cus-

tomers. As we continue to work in close cooperation we expect to bring significant innovation to the laser protection marketplace worldwide."

In 1994 UVEX Winter Holding, parent of the UVEX Safety Group, sold its U.S. business including the rights to the uvex brand in American to the Bacou-Group. The acquisition of Trinity represents a re-entry of the U.S. market for laser protection products under the Trinity brand by the UVEX Safety Group.

2006 ANSI Leadership & Service Awards

The American National Standards Institute (ANSI) has announced the recipients of its 2006 Leadership and Service Awards. The 13 award recipients, one of which is a long-standing LIA member, will be honored during an Oct. 10 ceremony held in conjunction with the U.S. celebration of World Standards Week 2006 in Washington, D.C. The recipients are being recognized for their significant contributions to national and international standardization activities and an ongoing commitment to their industry, nation and enhancement of the global

voluntary consensus standards system.

LIA member Ronald Petersen, president of RC Petersen Associates, is the recipient of the Finegan Standards Medal, which honors an individual who has shown extraordinary leadership in the actual development and application of voluntary standards. Petersen's accomplishments and seminal contributions to the development of standards for lasers, radio frequency, and electromagnetic safety span more than 30 years. Congratulations Ron!

Coherent's Acquisition of Excel Under Investigation

Coherent, Inc., Santa Clara, Calif., announced in July that the German Federal Cartel Office (FCO) had notified the company that it has decided to extend its investigation into the acquisition of Excel Technology, Inc. as it relates to certain low-power range CO₂ laser products. Coherent is cooperating fully with the FCO and remains confident that the FCO will allow the transaction to close. All other regulatory conditions to close, including U.S. Department of Justice approval, have been satisfied. ✪

ASC Z136 Update ILSC 2007 Call for Papers

Plan ahead! The 2007 International Laser Safety Conference (ILSC® 2007) will be held in beautiful San Francisco, Calif., Mar. 19-22, 2007. ILSC is a comprehensive four-day conference covering all aspects of laser safety practice and hazard control, where laser safety experts from all over the world will meet and discuss their research, programs and standards. Abstracts for this conference are due Oct. 2, 2006 and should be submitted through the LIA conferences website.

Abstracts should be 100-200 words in length. Submitted abstracts should contain original, recent unpublished results of processes, application, development or implementation on topics relevant to laser safety. Authors are encouraged to indicate the current phase of their work, i.e., R&D, engineering or concept exploration. Commercial papers will not be accepted. Abstracts selected are allotted 20 minutes; this includes the presentation (15 minutes) and question-and-answer period (5 minutes). Authors are asked to secure company and/or governmental security clearance to present and publish as early as possible. This enables LIA to ensure the quality of the conference and to minimize last minute withdrawn papers.

Join us at the annual meeting, ILSC 2007! Abstracts and workshop submissions are now being accepted at www.laserinstitute.org/conferences/ilsc. Extended abstracts that will be printed in the conference proceedings will be due in January 2007. If you have any questions regarding ILSC, please contact Barbara Sams at the LIA, 407.380.1553 or bsams@laserinstitute.org for more information.

Journal of Laser Applications® Update

The *Journal of Laser Applications*® offers the latest refereed papers by leading researchers in the laser community. The November 2006 issue includes papers from materials processing, biomedical and safety. 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.

Sign up at <http://scitation.aip.org/jla/alert.jsp> to receive your JLA table of content e-mail alerts.

LIA Announces

LIA and ELI Extend Cooperation

The European Laser Institute (ELI) and the Laser Institute of America (LIA) have increased their cooperative activities. ELI will now become a cooperating society at LIA's conferences, the International Congress on Applications of Lasers & Electro-Optics (ICALEO®), the Automotive Laser Application Workshop (ALAW), and the Pacific International Conference on Applications of Lasers and Optics (PICALO). The European Laser Institute already currently cooperates in the publication of LIA's *Journal of Laser Applications*®. ELI's President Dr. Stefan Kaierle is a member of JLA's international review board.

Dr. Kaierle and LIA Executive Director Peter Baker agreed to the increased cooperation between the societies on July 18 at the Washington D.C. meeting of the Global Alliance for Research and Education in Laser Aided Manufacturing (GARELAM). The societies agreed to seek further opportunities for international cooperation in order to foster the application of laser technology worldwide.

Speaking of GARELAM, of which LIA is a cooperating society, the workshop brought together premier academic and

industry professionals from the international laser-processing field. The purpose of this workshop was for different research centers to brainstorm on lasers and plasmas across the globe, therefore establishing a global platform to create a culture and process for laser research and education in the 21st century.

Laser Safety Administration Package

Laser Safety Administration Package, an interactive CD, is intended for anybody responsible for setting up and maintaining a laser safety program in an industrial or research facility. It includes the tools necessary for setting up a laser safety program, especially the new LSO (laser safety officer). Whether you are starting from scratch or want to be sure you have all the components for a solid program, this product is for you.

Included in customizable electronic format to suit your specific needs are:

- Sample Institutional Laser Safety Policy
- Sample Institutional Laser Safety Procedure
- Information for an Operational Standard Operating Procedure (SOP)

- Facility Self-Auditing Questions
- Laser Safety Overview Training Module

Also included are some useful and practical informational sheets:

- Laser Safety Terms Glossary
- Laser Wavelength Table
- Laser Safety Equation Sheet
- Optical Density Basics Establishing a New Program: Things to do First

The cost for Laser Safety Administration Package is \$249 for non-members or \$229 for LIA members. Visit www.laserinstitute.org/store for this interactive CD, which is publication 210. ✱



Attendees at the first ever GARELAM, front row (left to right): Milan Brandt, Raj Patel, Amitabha Ghosh, Volodymyr Kovolenko, Mary Lynn Realff, Mool Gupta, Steven Jansen, Rado Kovacevic and Jianhua Yao. Middle row (l-r): Joonghan Shin, Todd Rockstroh, Mikhail Vasilyev, Peter Baker, Klaus Loeffler, Frank DiPietro, Jyoti Mazumder, William O'Neill and Donghyuck Kam. Upper row (l-r): Guru Dinda, Yasuhiro Yamamoto, Ashish Dasgupta, Susan Sprentall, Roberto Ortega-Martinez, Stefan Kairle, Magdi Azer, Yuzuru Uehara and Xiuli He. Not pictured: Lijun Song, Lawrence Yao and Susan Charnley.

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<h1>SAVE THE DATE!</h1>	<p>MARCH 19 - 22, 2007 • SAN FRANCISCO AIRPORT MARSHALL • SAN FRANCISCO, CA USA</p> <h1>ILSC 2007</h1> <p>INTERNATIONAL LASER SAFETY CONFERENCE • "THE WORLD'S LEADING CONFERENCE ON LASER SAFETY"</p> 
<p><i>New for 2007 -</i> Laser Safety Practical Applications Seminar March 19 - 20</p> <p>Chairs: Eddie Ciprazo, CLSO, UC Berkeley, Berkeley, CA USA Robert Sarason, CLSO, Univ. of California at Davis, Davis, CA USA</p> <p>A 2-day seminar for the Laser Safety Officer. Participate in practical interactive workshops, panel discussions, and hot topics addressing the more common safety issues and concerns of the Laser Safety Officer and Medical Laser Safety Officer. Learn and network with your peers! Go to www.laserinstitute.org/conferences/ilsc for more details!</p>	 <p>General Conference Chair: Benjamin Rockwell, AFRL / HEDO Brooks City-Base, Texas USA</p> <p><i>Featured in ILSC</i> Safety Standards - Worldwide Lasers - Operational Policies & Practices Bioeffects Laser Light Shows & Displays Non-Beam Hazards Hazard & Risk Analysis Measurements & Global Acceptance Protective Systems & Devices Training Programs Laser Safety in Health Care Facilities Lasers in Telecommunications Laser Safety in R & D Labs</p>



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