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...

Yale Launches Center

Yale University has established the Yale Institute for Nanoscience and Quantum Engineering, which it says will unite its six existing research efforts in molecular electronics, quantum information processing, chemistry of soft materials, nanoparticles, photonics, and nanoscale biomedical engineering, reported the Nov. 16, 2006 issue of *Optics.org*. The initiative is a part of Yale's commitment of over $1 billion to research infrastructure and science and engineering programs.

New research programs that link current programs will focus on biomaterials and bioengineering, nanoparticles and quantum dots, nanoelectronics and photonics, and quantum information processing. The institute will provide a new mechanism for interdisciplinary faculty hiring and interaction while building on collaborations in engineering, physics, and chemistry. Sixty faculty members from 10 departments will form the ini-

(Cont. on pg.17, see **In The News…**)

Everyday Laser Safety in Dentistry

by Gail S. Siminovsky and Joel M. White

Laser dentistry is primarily performed in private practice settings. Dentists and dental hygienists use lasers for up to 24 specific problems, such as ablation of enamel, dentin, and bone and gum surgery. Most dental lasers are operated in dental operatories in private practices and are used one to five times a day.

The educational standards within the dental profession have been developed and endorsed worldwide. These standards include the implementation of ANSI Z136.3 Safe Use of Lasers in Health Care Facilities in the dental treatment environment. Dentists and hygienists are encouraged to follow the recommendations of organized laser dentistry that advises specific training and certification before using lasers on patients. This educational standard is defined in the Curriculum Guidelines and Standards for Dental Laser Education which is implemented by the Academy of Laser Dentistry (ALD).

To assure safe and efficacious use of lasers for the health and welfare of the patients treated, the ALD manages a certification program to assure competency in safe laser use. Introductory courses offer general information but do not assess the proficiency of the attendee. Standard proficiency courses offer a level of education including instruction with hands-on exercises and clinical simulation proficiency examination. This is the course that must be satisfactorily completed before inde-

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

Meet LIA's 2007 President & Board

Installed as the 2007 president of LIA during ICALEO in October, William Shiner is the vice president of industrial products for IPG Photonics in Oxford, Mass. IPG is a manufacturer of fiber lasers and fiber amplifiers sold to the telecomm, industrial, medical, scientific and government market sectors. Shiner, with an area of expertise in sales, marketing and applications, has an extensive background in laser technology and industrial applications of lasers and has written and presented numerous papers at a wide range of technical conferences.

Shiner received his EE and MBA from Northeastern University and began his laser career at American Optical in 1962, eventually purchasing the AO laser group and co-founding Laser, Inc. in 1973. Laser, Inc. was sold to Coherent in 1979 and Mr. Shiner became the vice president of sales and marketing for the Coherent Industrial Group. He remained in that position when Coherent sold the industrial division to Transtec with the name being changed to Convergent Energy. Convergent Energy was sold to Prima Industries and Shiner became COO until his departure in 2001.

Shiner has been involved with LIA almost since its inception. "The LIA has provided excellent networking benefiting me both on a business and personal level," he said.

The Year Ahead

During his year in office, Shiner hopes to assist the LIA staff in making the ALAW show a success and to increase LIA's corporate and

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

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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 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
May 7-9, 2007 • Indianapolis, IN
July 16-18, 2007 • Raleigh, NC
Aug. 6-8, 2007 • Albuquerque, NM
Oct. 29-31, 2007 • Orlando, FL
Dec. 3-5, 2007 • Miami, FL

Laser Safety Officer with Hazard Analysis
Mar. 26-30, 2007 • San Diego, CA
June 4-8, 2007 • Baltimore, MD
Sept. 17-21, 2007 • San Francisco, CA

ILSC® 2007
Mar. 19-22 • San Francisco, CA

Medical Laser Safety Officer Training
Feb. 23-24, 2007 • Orlando, FL
May 18-19, 2007 • Atlanta, GA
Sept. 21-22, 2007 • San Francisco, CA
Nov. 9-10, 2007 • Raleigh, NC

Advanced Concepts in Laser Safety
Sept. 24-26 • Silver Springs, MD

ALAW
Apr. 17-19, 2007 • Plymouth, MI

ICALEO® 2007
Oct. 29-Nov. 1 • Orlando, FL

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

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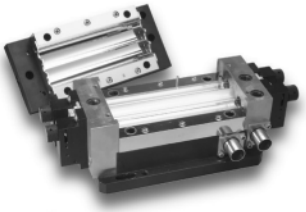

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President's Message

LIA President Bill Shiner

One of my prime objectives during my term of office is to work with Peter Baker and the LIA staff to increase the corporate and individual membership of LIA. When one questions the benefits of membership in the LIA, I pose the question, "What if there were no LIA?" The LIA is and always has been the cement that bonds the worldwide laser community together. The various events provide attendees an opportunity to learn, to educate, and to network with the worldwide laser community. Last year, for example, there were over 200 papers presented at ICALEO by students and researchers. These papers were all submitted in response to the call for papers and for many are the only outlet for publication.

With corporate travel restrictions commonplace, in many cases only senior managers are allowed to attend the various events. In response, the LIA has instituted a program of regional chapters to bring many of the benefits of membership, and in particular the networking opportunities, to the local level.

As co-chairman of the Northeast Chapter, I have seen the results firsthand. We have held five meetings with an average attendance of 60 members, we have attracted new members, and most important we are attracting younger members so important to the future of the LIA and the laser industry. At our December meeting, it was enjoyable to watch three LIA past presidents, students studying lasers from three different colleges, educators, laser users, and LIA corporate members interacting during the social hour and dinner.

I encourage each of you to help us in our efforts to attract new members and to expand our regional chapters. The strength of any organization is its ability to continually attract new members.

Executive Director's Message

LIA Executive Director
Peter Baker

The beginning of the New Year, 2007, brings LIA some newly elected officers and board members who are profiled starting on the front page.

For me, it is a chance to thank outgoing President (now Past President) Joe O'Brien for his fine leadership during 2006. Joe's thoughtful, laidback style helped keep things on an even keel in 2006 and his legal background and deal-making skills were a big factor in our successful purchase of a 50% stake (with our partners FMA) in ALAW. Thanks Joe.

Our new President Bill Shiner is a longtime member and faithful friend of LIA. He has served on the board since the early 1970's and has been an enthusiastic supporter of our society and sponsor of our conferences and regional meetings.

Bill has a particular interest in membership and was the leader in creating our regional meetings and chapters, particularly the very successful Northeast Chapter. In addition, his knowledge and connections in the automotive industry will be a big help in guiding the growth of ALAW.

So, on behalf of the members and staff, I welcome Bill – er, Mr. President. We look forward to working with you this year.

pbaker@laserinstitute.org

Dentistry , cont. from pg. 1

pendently using lasers. This is the level of education that has been defined as the standard of care.

Advanced proficiency represents advanced knowledge and clinical experience with the dental laser and is administered only by the ALD at its annual meeting. The educator course is the fourth level of education on lasers in dentistry. This course provides specific instruction in planning and presenting the standard proficiency course.

Standard Proficiency in Dentistry

What do you need to know and demonstrate to be a safe beginner?

The standard proficiency course includes lecture and hands on instruction of at least 12 hours, a 75-question exam, and most importantly a clinical simulation proficiency examination. Clinicians and auxiliaries must demonstrate proper safe use by clinical simulation with appropriate oral tissues (e.g. cow or pig jaws).

Dentists looking for training can find courses and study materials that are readily available. A list of helpful links follows at the end of this article. Through ALD, continuing education courses at the standard proficiency level are evaluated and must meet specific criteria to be a recognized through the Standard Proficiency Course Provider Recognition program. At the conclusion of the standard proficiency course, participants take the clinical simulation proficiency examination. They can then obtain certification by taking the online standard proficiency written examination and joining the ALD.

Clinical Proficiency for Dental Lasers

The clinical simulation proficiency examination tests three areas: 1) Knowledge of the device and overall safety, 2) Infection control, general set up and tear down, and laser operating parameters, and 3) Patient management. Each area has specific criteria for assessment.

1. Knowledge of the device and overall safety.

Each dental office or facility must have a designated laser safety officer (LSO).

Dr. Deruyter demonstrates safe laser use with examiners Dr. Schilman and Dr. van As.

Standard Proficiency
Dental Laser Certification

March 28-29, 2007
Source 2007: Lasers in Dentistry, March 28-31, 2007
ALD's 14th Annual Conference and Exhibition
Gaylord Opryland Resort, Nashville, TN
For information visit www.source2007.org or
call ALD 1-844-527-3776.

This LSO's only training may be the successful completion of a dental standard proficiency course. The LSO officer is typically the user, the dentist, and dental hygienist, but may also be the dental auxiliary. The laser officer is the person responsible for overall laser safety within the dental practice. In dentistry, we call the LSO the "keeper of the key". The LSO supervises proper safe use of lasers and coordinates staff education and training, and the LSO also oversees personal protective wear (like appropriate eyewear) and knows the country regulations, including any specific state regulations.

During the exam, the participant needs to identify on a specific laser up to eight laser safety mechanisms like the on/off switch, guarded footswitch, emergency stop diagnostic software, system time-out, and fiber detectors. The examinee also needs to identify the necessary safety aspects of the environment, like identification of the controlled area, proper posting of signs outside the nominal hazard zone, limited access and minimization of reflective surfaces. The exam includes discussion of minimizing access and traffic through the nominal hazard zone. General anesthesia and intubation are not common in laser dentistry, but nitrous oxide and oxygen use with lasers are common provided there is proper evacuation. Examinees then must identify proper protective eyewear specific for the wavelength laser being used with proper side shields that are worn by the dentist, patient, and staff within the nominal hazard zone. The last item assessed in this portion of the exam is the description of the Food and Drug Administration adverse effects reporting mechanism.

2. Infection control, general set up procedures, operating parameters.

The laser device set up and operation are tested in this portion of the examination. The clinician actually sets up the laser, assembles the delivery system, typically a fiber and hand piece and tips. The examinee test fires the laser and then chooses low and high settings for two separate dental procedures. For instance, a clinician using an Nd:YAG fiber optic laser would choose 1.5W and 15Hz for the start of a soft tissue excision and a high would be 3.5W 20Hz. The examinee then describes proper infection control with high volume evacuation, the description of contaminated and uncontaminated zones. The examinee also needs to describe proper cleaning and sterilization procedures.

3. Patient management.

In this section of the examination, the clinician discusses the specific indication for use of the device by providing a treatment proposal. The dental laser is then used to demonstrate specific treatment objec-

tives. For instance, if the clinician is using an ErCr:YSGG or Er:YAG laser for hard tissue, the clinician would do a simple cavity preparation. The surgical technique is achieved on the teeth in a hog jaw with the clinician ablating the enamel and dentin. In order for the clinician to be successful, they need to assure proper operating parameters of power, repetition rate, energy density, and air/water spray to remove enamel and dentin. The clinician simulates the procedure on the hog jaw and describes the needed proper patient management and management of complications. Lastly, a description of the surgical and healing assessment methods and interval for the demonstrated procedure, on a scale of excellent, good, fair, and poor must be described.

The Standard Proficiency Certification course provides the standard for what is expected for laser safety in dentistry for everyday laser use. The hands on clinical simulation proficiency examination is the way in which safe laser use is assessed. Dentists and dental hygienists who use lasers are expected to complete the standard proficiency certification as the standard of care in dentistry. ✱

Gail S. Siminovsky, CAE, is the executive director of the Academy of Laser Dentistry, and Joel M. White, DDS, MS, is a professor at the University of California, San Francisco.

Helpful Links

Register for an Online Course or Examination
http://www.laserdentistry.org/prof/edu_dentallasercourses.cfm#online

Certification in Laser Dentistry
http://www.laserdentistry.org/prof/edu_certprog_geninfo.cfm

Standard Proficiency Recognized Course Providers
http://www.laserdentistry.org/prof/edu_cert_courseprov.cfm

Dental Laser Courses
http://www.laserdentistry.org/prof/edu_dentallasercourses.cfm#resource.

Suggested Resources
http://www.laserdentistry.org/prof/edu_publications_resources.cfm#readingsvideo

Curriculum Guidelines and Standards for Dental Laser Education
http://www.laserdentistry.org/prof/edu_curriculumguidelines.cfm

Laser Institute of America
ANSI Z136.3 – Safe Use of Lasers in Health Care Facilities
http://www.laserinstitute.org/store/ANSI/113

BOARD , cont. from pg. 1

individual memberships.

One of the ways to accomplish his membership goals is

Bill Shiner

to support the already existing LIA regional chapters as well as establish more. "We have already seen the impact of the chapters in both member retention as well as attracting new members."

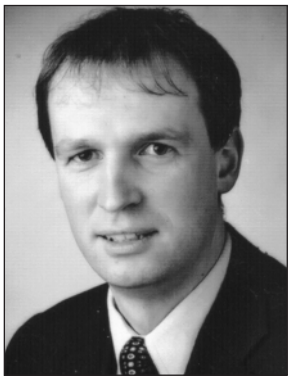
Additionally, Shiner gets to experience something new this year, as it will be the first year LIA hosts ALAW (Automotive Laser Applications Workshop). "This conference will enhance our image as the leading organization associated with material processing. It should also increase our membership and attract the automotive customers to ICALEO later in the year."

Lastly, two new ANSI standards are to be released this year, which are published by LIA, so a marketing flurry will take place. "We have all been awaiting these releases with anticipated improvements."

We wish him a great year!

Meet the Officers 2007

• President Elect – Andreas Ostendorf studied electrical engineering at the University of Hannover, Germany. In 1995, he joined the Laser Zentrum Hannover (LZH) as a scientist dealing with micro-machining using UV and ultrafast lasers. In 2000, he finished his Ph.D. After holding different offices at LZH, in 2001 he became its CEO and a member of the board of directors, which is his current position. As a scientist, he has been involved in many national and international research programs and German Collaborative Research Centers. His scientific work is focused on laser micro- and nano-structuring. In his current position, he has intensified international cooperation between the LZH and especially American, Chinese and Russian scientific institutes. Ostendorf was the micro-fabrication conference chair of ICALEO® 2002, 2003, and 2004, and in 2005 and 2006 he was ICALEO general chair. He



Andreas Ostendorf

is also a member of the WLT German Scientific Laser Society, which cooperates internationally with LIA. He joined LIA's board in 2004, and since 2005 he has also been a member of LIA's executive committee, responsible for coordination of conferences.

• Past President – Joseph O'Brien is an entrepreneur and attorney in Minneapolis, Minn. He is the founder, president and CEO of Trinity Technologies, a developer and manufacturer of laser protective technologies, which is now LASERVISION USA. He has experience working closely with laser professionals in research, industry,

Joe O'Brien

medicine, aerospace, telecommunications, and the military. Prior to founding Trinity Technologies, he helped establish several early stage medical technology companies. He served as LIA's treasurer in 2004 and is a founding member of the Board of Laser Safety.

• Treasurer – Stephen Capp has been CEO of Laserage Technology Corporation since 1994. He previously held positions as plant manager and vice president of operations. Laserage is an international supplier of laser-processed materials. He graduated from Milwaukee School of Engineering in 1978 with degrees in electrical power engineering technology and industrial management and has worked in the laser industry for more than 25 years. He has been a member of the LIA since 1992.

Stephen Capp

• Secretary – Nathaniel R. Quick is the president and chief technical officer of AppliCote Associates, LLC in Sanford, Fla., a technology development company. He holds a Ph.D. from Cornell University in materials science and engineering. He established AppliCote Associates to develop laser-based technologies that enable the next generation of semiconductor chips

Nat Quick

for communications and power control. AppliCote Associates collaborates with academic institutes, including the University of Central Florida/CREOL. He currently holds 36 U.S. patents and has over 55 publications. He has served as LIA's secretary for five years and is an LIA fellow.

Meet the New Directors – 2007-2009

• Magdi Azer is currently the lab manager for the Laser Processing Lab at GE Global Research in Niskayuna, NY. He received his bachelor's degree in mechanical engineering from Kansas State University in 1982. He completed his master's and Ph.D. from the University of Illinois in Urbana Champaign in 1989 and 1996, respectively. In 1995, he joined GE Aircraft Engines, where he held several positions of increasing responsibility within the Laser Applications Group. In 2003, Azer moved to GE Global Research, serving as project

Magdi Azer

leader for laser applications. In this role, he has worked with GE's research laboratory in Shanghai, China to deliver solutions to customers in GE Aviation, Lockheed-Martin, and NIST. He assumed his current role in 2005. Azer has authored or co-authored 23 publications and holds seven patents related to laser-materials processing. He has served as an author, a session chairman, and a planning committee member for several ICALEO conferences.

• **Neil Ball** is the president of Directed Light Inc, of San Jose, California. Directed Light is a laser technology company serving the industrial, medical, and scientific laser communities worldwide. He began his career as an application technician in the jobshop manufacturing sector at LaserFab, Inc. He joined Directed Light in 1993 to assist in applications development, system design, and component/service support. In 1998, he became general manager of the components and jobshop divisions. Ball has led the marketing and developing sales plans for both national and international arenas and is the resident methodologist, working on projection of future industry trends.

Neil Ball

• **Eckhard Beyer** took over a professorship for surface engineering and thin film technology, which was renamed professorship for laser and surface engineering, at the University of Technology Dresden and became executive director of the Fraunhofer Institute for Material and Beam Technology in Dresden in 1997. Fraunhofer IWS offers application-oriented research and development in the area of laser and surface technology. Eckhard has been engaged in the coordination and organization of several international conferences, such as ICALEO, LAMP, and LIM, chairing sessions at these conferences. He has acted as the vice-president of WLT – the German Scientific Laser Society. He is author of approximately 300 publications and owner of about 50 patents.

Eckhard Beyer

• **Paul Denney** has been involved in the development and implementation of laser materials processing for over 25 years. Presently he is a senior research engineer at the Connecticut Center for Advanced Technology, Inc. in East Hartford, Conn., where he has the responsibility to manage and develop activities in laser materials processing. Denney was previously head of the High Energy Processing Department at ARL Penn State, a research engineer at the Westinghouse Electric Research & Development Center, a metallurgist at the Naval Research Laboratory, and a product metallurgist at C.F. & I Steel Corp. He has his BS and MS from MIT. He has been an LIA member since 1984, is a fellow and member of the board of directors, and has been general and co-chair of ICALEO.

Paul Denney

• **Klaus Löffler** graduated from the University of Stuttgart with a master's in mechanical engineering. His expertise in lasers extends from resonator design, excitation methods, beam delivery, sensor systems to laser material processing. Beginning in 1991, he worked at Trumpf Laser Technik in Ditzingen/ Germany moving to Trumpf

Klaus Löffler

(Cont. on pg. 11)

The following are currently serving terms on the LIA Board of Directors:

2005-2007

- Heinrich Endert, Newport Corporation/Spectra-Physics
- John Hoopman, Univ. of Texas Southwestern Medical Center at Dallas
- Anthony Hoult, SPI Lasers
- Robert Hull, General Dynamics Information Technology
- Klaus Kleine, LaserLine Inc.
- William Lawson, New Tech Development
- John Marshall, The Rayne Institute, St. Thomas Hospital
- Etsuji Ohmura, Department of Manufacturing Science at Osaka University
- Dean Wilson, Wilson Industries, Inc.
- Minlin Zhong, Tsinghua University (2007)

2006-2008

- Anthony Arquisch, LASAG Industrial Lasers
- Milan Brandt, Swinburne University of Technology – IRIS
- Ben Edwards, Duke University Medical Center
- Michael Green, Association of Industrial Laser Users
- Bo Gu, GSI Group, Inc.
- Aravinda Kar, College of Optics and Photonics/University of Central Florida
- William O'Neill, University of Cambridge
- Wayne Penn, Alabama Laser Systems
- Ronald Schaeffer, PhotoMachining, Inc.
- Sheldon Zimmerman, Naval Surface Warfare Center

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Inc. in Farmington, Conn. in 1995. From 1996 to 2002, he started the Trumpf Laser Technology Center in Plymouth, Mich. In his position as director, he was responsible for the organization of all products. Starting in 2006, he took over the responsibility for international sales at Trumpf Lasers and Systems where he is also responsible for product management and marketing. In 2004, he founded the Automotive Laser Conference in Wolfsburg/ Germany, which together with ALAW and JALAW builds a global conference partnership.

• **Hau Chung Man** received his Ph.D. in laser materials processing from Imperial College of Science

H.C. Man

and Technology, University of London, in 1984. He has worked for Control Laser, Ltd. (U.K.), Integrated Laser Systems, Ltd. (U.K.) and The Laser Centre of TWI (U.K.). He returned to the academic sector in 1990 and is now a professor of the Hong Kong Polytechnic University. He founded the only Laser Materials Processing Centre in Hong Kong in 1994 and has been the leader of the laser processing group since. He has published more than 200 journal and conference papers. He is a senior member of the LIA and has been a member of the board of directors since 2003.

• **Rajesh (Raj) S. Patel** has accumulated 20 years of experience in the laser material processing field. He is currently a manager at Spectra Physics and is responsible for managing the laser processing applications lab and new laser

Raj Patel

product development projects. Prior to working at Spectra Physics, he had his own consulting company and has also worked at IBM, Aradigm, and IMRA America. He received his Ph.D. in mechanical engineering from the University of Illinois at Urbana-Champaign in 1989. He is the author of 22 U.S. patents related to laser processing, optics, and the mask technology field, and has published and presented more than 40 technical papers. He is a member of LIA and SPIE, has served on LIA's executive committee for the last three years, co-chaired LIA's ICALEO 1997, 1998, 1999, and 2002 conferences, and was conference chair of ICALEO 2004.

• **Silke Pflüger** has 20 years of experience in industrial lasers and their applications and is currently the director of sales North America for SPI Lasers. Before joining SPI Lasers in 2004, she held engineering and marketing positions in SDL/JDSU working with high power laser diodes and fiber

Silke Pflüger

lasers. She started her career in lasers at the Fraunhofer Institute for Laser Technology in Aachen, Germany. This also brought her to the U.S. and the Fraunhofer Resource Center in Michigan as a project manager, where she was involved in establishing the newly founded group as a center of excellence for laser technologies. Pflüger received a Ph.D. in mechanical engineering from the Technical University in Aachen.

• **Reinhart Poprawe,** Prof. Dr., holds an M.A. in physics from California State University in Fresno, which he received in 1977. In 1985, he joined the Fraunhofer Institute for Laser Technology

Reinhart Poprawe

in Aachen as head of the department for laser-oriented process development. From 1989 to 1996, he was managing director of Thyssen Laser Technik GmbH in Aachen. In February 1996, he became managing director of the Fraunhofer Institute for Laser Technology and holds the university chair for laser technology at RWTH Aachen. Poprawe is a founding member of the company ACLAS GmbH in Aachen. Since 2001, he has been a member of the LIA board and executive board member of the Wissenschaftliche Gesellschaft Lasertechnik (WLT). He has served as president of WLT since 2003. In 2005, Poprawe became vice-rector for structure, research, and junior academic staff of the RWTH Aachen.

• **Y. Lawrence Yao** is a professor and chair of the department of mechanical engineering at Columbia University. He has been conducting research and development in the area of laser materials processing over 12 years and his current interests include laser micromachining, laser forming, laser cleaning, and laser shock peening. He has published over 90 technical papers and holds three U.S. patents. He has co-chaired the LMP conference at ICALEO® 2001 and chaired the LMP conference at ICALEO® 2002. He has been a member of LIA since 1991, a senior member since 1999, and a fellow since 2004. He received a Ph.D. from the University of Wisconsin-Madison in 1988. ✱

Y. Lawrence Yao

Laser Safety in the Dermatology Sector

by Stephen Lumbert

Almost 11.5 million surgical and non-surgical cosmetic procedures were performed in 2005, many of them involving the use of lasers. For example, there were 1,566,909 laser hair removals and 432,606 laser skin resurfacing procedures performed in 2005, according to the American Society for Aesthetic Plastic Surgery's (ASAPS) 2005 Statistics on Cosmetic Surgery.

Laser hair removal involves using laser energy to quickly heat and damage or destroy the hair follicle. This is accomplished with lasers used to generate photothermal, photomechanical, or photochemical destruction. Similarly, laser skin resurfacing is performed using laser energy to vaporize the targeted layers of skin to specific and controlled levels of penetration. These increasingly popular treatments create an increased potential for health risk to those professionals conducting laser assisted dermatologic procedures from laser generated airborne contaminants (LGACs).

Over 11 million procedures were performed in 2005 that involved a laser.

Laser Generated Airborne Contaminants

Since laser assisted dermatological procedures require the use of laser devices, this is where the potential for health risks begin. While eye injuries are the most common type of incident, they are by no means the only cause for concern; burns and other heat-related accidents bear equal attention. When a beam of laser energy interacts with an organic object, such as skin or a hair follicle, some of the organic material vaporizes. This particulate matter, sometimes in the form of an invisible haze, then becomes airborne. These LGACs are often ignored as a minor irritant or inconvenience, but in reality they pose a potentially serious health risk for the practitioner. According to Kay Ball, RN, MSA, CNOR, FAAN, a perioperative consultant, past president of AORN, and instructor for the LIA, there are three main concerns regarding LGACs: the odor, the size of the particulate matter, and the viability of particulates. The smell alone from the toxic gases should give one cause for caution. Additionally, there are over 600 potentially toxic gases and particulate matter released by the interaction of laser energy and organic substances. Some of these include benzene, formaldehyde, hydrogen cyanide, bioaerosols, dead and live cellular material and even viruses[1]. Furthermore, 77% of these particles are less than 1.1 microns in diameter, much smaller than the pores in standard surgical masks. (Mihashi, S. et al: Some problems about condensates induced by CO_2 laser irradiation, Karume, Japan, Department of Otolaryngology and Public Health, 1975v, Karume University.)

The potential for practitioners to inhale surgical smoke from laser procedures is great.

To date there have been no detailed studies on the cumulative affects of exposure to the small amounts of LGACs created during laser-assisted dermatological procedures. However, there are many anecdotal reports from practitioners who get respiratory infections after repeated exposure to unfiltered organic and inorganic LGACs. For example, Ball relates the story of how a doctor who inhaled surgical smoke for many years developed respiratory problems. When he was out of that surgical environment for an extended period of time, the symptoms of this condition decreased in severity. When he returned to the surgical environment where the surgical smoke was not being evacuated, his symptoms returned.

Simple Solutions

We can mitigate the possible risks by taking some very simple actions. For one thing, a filtered smoke evacuation system should be in place. General room ventilation will not capture any contaminants generated at the source and room suction, since it was designed primarily for liquids, tends to pull at a much lower rate than a smoke evacuator system. (Note: Room suction with an in-line filter is adequate to evacuate small amounts of surgical smoke.) Smoke evacuators have a vacuum pump, hose(s), filter(s), and the inlet nozzle. Hence the more robust method of a smoke evacuator is recommended for larger amounts of

[1] *DHHS (NIOSH) Publication No. 96-128*

[2] *G. Champault, N. Taffinder, M. Ziol, H. Riskalla, J. M. C. Catheline, "Cells are present in the smoke created during laparoscopic surgery." British Journal of Surgery Volume 84, no. Issue 7 (2005 (online)): 993 - 995. Image © Cockeyed.com 2004.*

surgical smoke. Should room suction systems be used, it is essential that they employ the appropriate in-line filters. Also, the sterile tubing itself should be replaced with each procedure. An in-line filter is a must because you do not want to have a build-up of contaminants in your wall suction or tubing. Cleaning will not necessarily remove all of the organic material[2].

Inhalation of smoke is a documented health risk in the industrial sector, however the potential risks are not quite as obvious in the realm of dermatology. Every day brings the potential for practitioners to inhale surgical smoke or LGACs resulting from laser dermatological procedures. Because of this, we need to amend our belief systems. We are generally so concerned with the well being of our patients and clients that we tend to forget about our own, or our fellow practitioner's safety.

Appropriate protection methods and practices should be employed at each and every turn. This should obviously include proper maintenance and record keeping. Additionally, proper training in medical laser safety is imperative for us to continue to apply and maintain the high standards of competency our industry and reputation requires. The practice of using lasers for hair removal, tattoo eradication, and other cosmetic procedures will continue to evolve and grow, and as we grow with it, let's take a deep breath and do it right. ✱

Stephen Lumbert is a technical writer for the LIA TODAY.

Journal of Laser Applications® Update

The *Journal of Laser Applications*® offers the latest refereed papers by leading researchers in the laser community. The February 2007 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. Starting with the February 2007 issue, online figures will be in color. In addition, articles will now be posted online as the production cycle is completed ensuring timely publication. These articles will be fully citable.

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 Launches New Online Job Service

On Jan. 4, 2007, LIA launched its online job board, the LIA Career Center. With its focus on companies and professionals in industrial, medical, and research applications of lasers and laser safety, the LIA Career Center offers its members – and the industry at large – an easy-to-use and highly targeted resource for online employment connections.

"We're very excited about LIA Career Center because we know how critical it is for employers in the laser technology industry to attract first-rate talent with a minimum expenditure of time and resources," said Jim Naugle, marketing director for LIA. "And it's important for us help enable smooth career transitions for those seeking industry jobs."

Both members and non-members can use LIA Career Center to reach qualified candidates. Employers can post jobs online, search for qualified candidates based on specific job criteria, and create an online resume agent to email qualified candidates daily. They also benefit from online reporting that provides job activity statistics.

For job seekers, LIA Career Center is a free service that provides access to employers and jobs in laser technology. In addition to posting their resumes, job seekers can browse and view available jobs based on their criteria and save those jobs for later review if they choose. Job seekers can also create a search agent to provide email notifications of jobs that match their criteria. Visit www.laserinstitute.org for more information.

Novel Ideas from ICALEO

"It's like people who used to listen to AM radio and think its good and state-of-the-art, and now we've got multi-point surround sound audio and that is the difference; when you're used to listening to audio and getting every sensation, it seems somewhat strange to watch these people still listening to their AM radio."

As in "A Novel Approach to the Consolidation of Plastic Powders Using Computer Generated Holographic Optical Elements" by Adrian Haddock, John Tyrer, James Kell, all of Loughborough University, U.K. at ICALEO 2006.

LIA Today Contributing Editor Jack Dyer interviewed Professor John Tyrer during ICALEO® 2006 in November 2006 in Scottsdale, Ariz.

LIA Today: What's novel here? Producing holograms goes back to 1947.

John Tyrer: What we are trying to do is really look at the temperature distribution we want in the material, this defines the metallurgy. So if we reverse things and start from the basis of the material, we can devise the requisite metallurgy, both in terms of the physical and chemical properties, I am assuming a metal in the first instance.

Today with computer predictive modeling, we can take a process, be it welding, a deposition, or a cutting process, and we can have the metallurgy defined by the computer model. From that, we can determine a series of time temperature plots that define how we want the material grain structure to develop, i.e. what we want the material to see in terms of temperature distributions, over some periods of time to generate the phase states, to evolve grain size, etc. With that, we can then use conduction physics to basically propagate that temperature distribution back to the surface to define what laser flux distribution we want on the surface to generate that time/temperature distribution.

LIAT: With what result?

JT: This gives us the energy distribution that we now use as the output requirement from a computer-generated hologram. So, if we now take the inputting laser beam characteristics, which we determine from measurements or go by the manufacturer's specification, we can calculate a computer-generated hologram that converts that laser beam into that output distribution in the same way as the hologram in the credit card does with a white light.

Now, because we understand the physics of the diffraction process, we don't use a simple hologram because they tend to be at best about 30% efficient. We actually use what is known as a 'kinoform,' and that is a diffractive structure that converts virtually all of the incident laser light really where we want it to go, so we can convert typically 90-95% of the incident laser beam into what we want – which is a very efficient use of our laser beam.

So, that's the calculation of the hologram, now all we have to do is manufacture that hologram. For me to say all we have to do is a slight simplification (because this work has been occupying the team and me for probably about 20 years) and the maximum power we have used on such optics with CO_2 lasers is up to 10 kilowatts CW.

John Tyrer

LIAT: So far, so good! This depends upon the laser type?

JT: Yes. We now have a situation where we have to then fabricate the diffractive and this depends upon the type of laser we're using. If we're using a CO_2 laser we typically use a mirror element, we machine it to the substrate and then coat with a multilayer gold overlay and that gives us the element that can be water cooled and put into the optics train.

With the hologram fabricated, we then discovered that we needed to put together a proper optic system specifically designed around the needs of the laser, initially we thought it was all just about the diffractive mirror. It turns out what we really need is a beam delivery system to go onto the laser that protects all

Holography Meets Laser

In 1947, the Hungarian-British physicist Dennis Gabor was working at Imperial College, London, on ways of improving the performance of the electron microscope when he unexpectedly discovered the technique of producing holograms. Gabor received the l971 Nobel Prize in Physics for his discovery.

Holography did not progress significantly until the laser was invented in 1960. In 1963, Emmett Leith, working with Juris Upatnieks in Michigan, became familiar with Gabor's work and applied his theory with laser light sources. The first holograms that recorded three-dimensional objects were born; practical holography became possible. Called transmission holograms, they are viewed by shining laser light through them.

To record a transmission hologram, light from a laser is divided into two beams – one goes directly to a photographic plate, the other is reflected off the object before reaching the plate. If the developed plate is illuminated by laser light, a three-dimensional image of the object can be seen. Rainbow transmission holograms produce images when ordinary light is reflected from them.

Holography is applied in many fields. Most people are familiar with the holograms on their credit cards to improve security. *Source: www.timesonline.co.UK*

the optics.

That brought a few features into the delivery system so that the interchangeability of the optics is very quick, the system is sealed up from the environment; it has all sort of kinematics built-in so we can take out a lot of the alignment issues, and that's all been dealt within the opto-mechanics. It's a sealed box so we can keep all the crud from getting into and onto the optics, and then at the bottom of the delivery head is a place where we put an environmental chamber so we can pump shield gases onto the substrate during processing as you would do with any other laser technique. That is basically the nub of the thing.

LIAT: And what is the downside?

JT: In terms of the downside, well, as far as I'm concerned, there is no real downside insofar as you are taking a laser that probably cost you $100,000, you have a work handling system that delivers components to the head of the laser. Now what you are actually able to do conceptually is convert this laser and treat it like a traditional machine tool such as a lathe. Now the prime mover is the laser and the optics simply slot in and they convert that laser to do lots of different jobs.

If you want a laser driller and you want to drill say 100 or 1,000 holes, that would be a 10 by 10 or a 20 by 50 matrix, at whatever the required geometry is, and all of those holes could be diffraction limited, or they could be cylinders or tapers. They could be core drillers, so instead of trying to blast the middle out, you can make the beams into rings replacing trepanning, you have the trepanning head built into the optic. All these integrated things with one drilling optic, then you just take the optic out and you insert another one and suddenly you get a state-of-the-art laser welder.

Traditionally, you would go and buy a laser and the laser makers would say: "Oh, you must have this laser because this is a welding laser," and then you need a different laser, "for this is a cutting laser." Now the sales pitch is: "Here is the laser, what holographic optics do you want to match it to the specific job?" So, the optics are the missing link.

We have always treated the optics badly in high power lasers. We've always worried about this bloody big light bulb and about the material handling, the environmental, and everything else. The bit at the end – well, we just had a focusing lens and a bit of nozzle. Now what we are doing is adding the real and unique value because we are capturing the process in the optic.

It's really not fair to say there is a downside; the downside is you do it the traditional way. It is that the current approach is the simple and limiting way.

So, it is like people who used to listen to AM radio and think it is good and state-of-the-art. Now we have multi-point surround-sound audio and that's the difference.

The more and more we get into it, the less and less we understand why everyone else is doing it badly, you know. (laugh) So, there you go! ✱

Time for ILSC

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 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. Earn up to two BLS and ABIH CM points (.5 point per half day of attendance, 2.0 total Industrial Hygiene CM points).

Registration Information

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. Registration can be completed in two ways – online or by downloading a PDF registration form from www.laserinstitute.org/conferences/ilsc. Discounts are given to those who register early. Conference payment in full by Feb. 5, 2007 for LIA members and cooperating societies is $625, or $675 for nonmembers. From Feb. 6 to Feb. 23, the price increases to $670 for LIA members and cooperating societies, or $755 for nonmembers. Onsite conference registration is $720 and $805 respectively. One- and two-day registrations are also available. For more information visit www.laserinstitite.org/conferences/ilsc. ✱

ILSC at a Glance

- Safety Standards Legislation Worldwide
- High Intensity Light Sources
- Bioeffects
- Medical Laser Safety
- Laser Hazard Evaluation in Industrial Applications
- Protective Systems & Devices
- Audits
- Industrial Laser Applications
- Laser Safety Training
- Non-Beam Hazards & Fume Extraction
- Outdoor Laser Use & Safety
- Measurements

MEMBER PROFILE

Wilson Industries

LIA Corporate Member Wilson Sales Company was founded in 1957 by David and Elizabeth Wilson in San Gabriel, Calif. to sell soft wall safety partitions, machine guards, and laser safety accessories. Since its inception, the company has been serving industry by researching today's industry developments for tomorrow's safety needs.

In 1968, Wilson originated the revolutionary concept of transparent welding curtains. After years of extensive marketing, the company introduced spectra curtain, which creates an ideal welding environment by manipulating light rays. Even today, the spectra curtain is one of Wilson's biggest sellers.

The company changed its name to Wilson Industries in 1986. "Originally, the company was founded as a sales agency and distributor. However, the company evolved into a manufacturing entity and we felt that Wilson Industries was more representative of this," explained Dean Wilson, president and owner.

Continually Evolving

From humble beginnings in 1957 when a single machine produced a steel mesh barrier, to the 30,000 square foot facility that now houses Wilson Industries, the company continues to manufacture the highest quality flexible partitions and industrial curtains in the world. Today, Wilson's R&D department consists of three employees, and the company extensively uses local universities and consultants in its research and product development. Wilson is working on new fabrics for high temperature applications for the future, and they are also developing a new system for fabric support and assembly.

To stay a viable and vital part of the industry, over the years Wilson has made the necessary changes in its products and product line.

"Wilson was one of the first companies to offer an asbestos replacement fabric in the 1970s. We pioneered the first transparent welding curtain and the first laser safety partition. The advent of automation has caused us to make perimeter barriers for robots and other automated equipment. Sound absorption and internal air pollution concerns have caused us to change our barriers to react to this stimulus. Reacting to the rising cost of energy, we have designed strip curtain barriers to insulate from the cold and heat," explained Wilson.

"Currently, our production floor is segmented into two distinct manufacturing divisions. One is dedicated to the manufacture of vinyl curtain products consisting of transparent and opaque reinforced materials, and the other houses our sewing operation for the production of our heat management fabrics, such as welding blankets, stress relief pads, and other work area accessories," he said.

During the last five years, expansion into new products, such as automotive repair facility curtains and laser beam safety barriers, has occurred. Providing solutions in the form of flexible curtains and partitions for applications in welding, safety, automotive, laser safety, environmental management, and noise attentuation applications is the basis of Wilson's business.

Involved In Industry

Wilson Industries became a corporate member of LIA in 2000. "The LIA is the premier organization designed to further the advancement of lasers. Being a member of the LIA enables us to be informed of industry changes and advancements," said Wilson.

Dean Wilson is on the LIA Board of Directors, the American Welding Society Board of Directors, and serves on the Industry Partnering Committee for the Gases and Welding Distributors Association.

For more information about Wilson Industries, visit www.wilsonindustries.com. ✱

Safety Rules!

Since 1957, Wilson Industries continues to research new technical developments for tomorrow's safety needs. Wilson's Laser Safety Products Group is a culmination of this research and provides a collection of products for industrial and medical environments, such as its line of Laz-R-Barrier Curtains, Optical Table Laz-R-Barriers, and free-standing Laz-R-Barrier Screens. Other work area products include a complete line of laser safety eyewear, illuminated signs, and printed warning signs. All Wilson products meet or exceed the specifications of ANSI.

In The News, cont. from pg. 1

tial intellectual base and will provide expertise as more faculty are progressively drawn into this new area.

NIST Laser-Based Method Cleans Up Nanotubes

Before carbon nanotubes can fulfill their promise as ultra-strong fibers, electrical wires in molecular devices, or hydrogen storage components for fuel cells, better methods are needed for purifying raw nanotube materials. Researchers at the National Institute of Standards and Technology (NIST) and the National Renewable Energy Laboratory (NREL, Golden, Colo.), have taken a step toward this goal by demonstrating a simple method of cleaning nanotubes by zapping them with carefully calibrated laser pulses.

When carbon nanotubes – the cylindrical form of the fullerene family – are synthesized by any of several processes, a significant amount of contaminants such as soot, graphite, and other impurities also is formed. Purifying the product is an important issue for commercial application of nanotubes. The NIST/NREL team described how pulses from an excimer laser greatly reduce the amount of carbon impurities in a sample of bulk carbon single-walled nanotubes, without destroying tubes. The general approach is simpler and less costly than conventional "wet chemistry" processes, which can damage the tubes and also require removal of solvents afterwards.

The new method is believed to work because, if properly tuned, the laser light transfers energy to the vibrations and rotations in carbon molecules in both the nanotubes and contaminants. The nanotubes, however, are more stable, so most of the energy is transferred to the impurities, which then react readily with oxygen or ozone in the surrounding air and are eliminated. Success was measured by examining the energy profiles of the light scattered by the bulk nanotube sample after exposure to different excimer laser conditions. Each form of carbon produces a different signature. Changes in the light energy as the sample was exposed to higher laser power indicated a reduction in impurities.

Laser Technique Reveals Earthquake Trouble Spots

Scientists at the University of Leicester, U.K., have shown that airborne LiDAR (light detection and ranging – in this case, a powerful laser mounted on an aircraft) can be used in mountainous terrain to "virtually deforest" the landscape and so reveal details of the forest floor topography, including traces of active faults, reported the Nov. 8, 2006 issue of *Optics.org*.

Topographic images derived from LiDAR data of two major plate boundary faults, the Idrija and Ravne strike-slip faults in Slovenia, reveal geomorphological and structural features that shed light on the overall architecture and movement history of both fault systems.

"For the first time, we are able to see how the faults connect at the surface and cut the landscape," said Dickson Cunningham. "This allows us to assess whether the faults are likely to produce large earthquakes or small events in the future."

The images also enable earth scientists to identify suitable sites for detailed fault analysis. Such studies can help to determine how often major earthquakes are likely to happen, and also provide a probabilistic estimate of the timing and magnitude of the next major earthquake. ✱

Get It All At ALAW

ALAW will be held April 17-19, 2007 in Plymouth, Mich. Registration is now open at www.alawlaser.org, and a promotional brochure is available. Lasers — Ultimate Flexibility will be the focus of the 2007 ALAW conference. This three-day premier industry event introduces state-of-the-art processes in laser technology in manufacturing and automotive environments. The 2007 conference has been expanded and improved by adding another day aimed at educating end-users on laser applications and the benefits of using laser technology.

The conference chair is Frank DiPietro and co-chairs are Eckhard Beyer of Fraunhofer WLT, Mariana Forrest of DaimlerChrysler, and Stanley Ream of Edison Welding Institute.

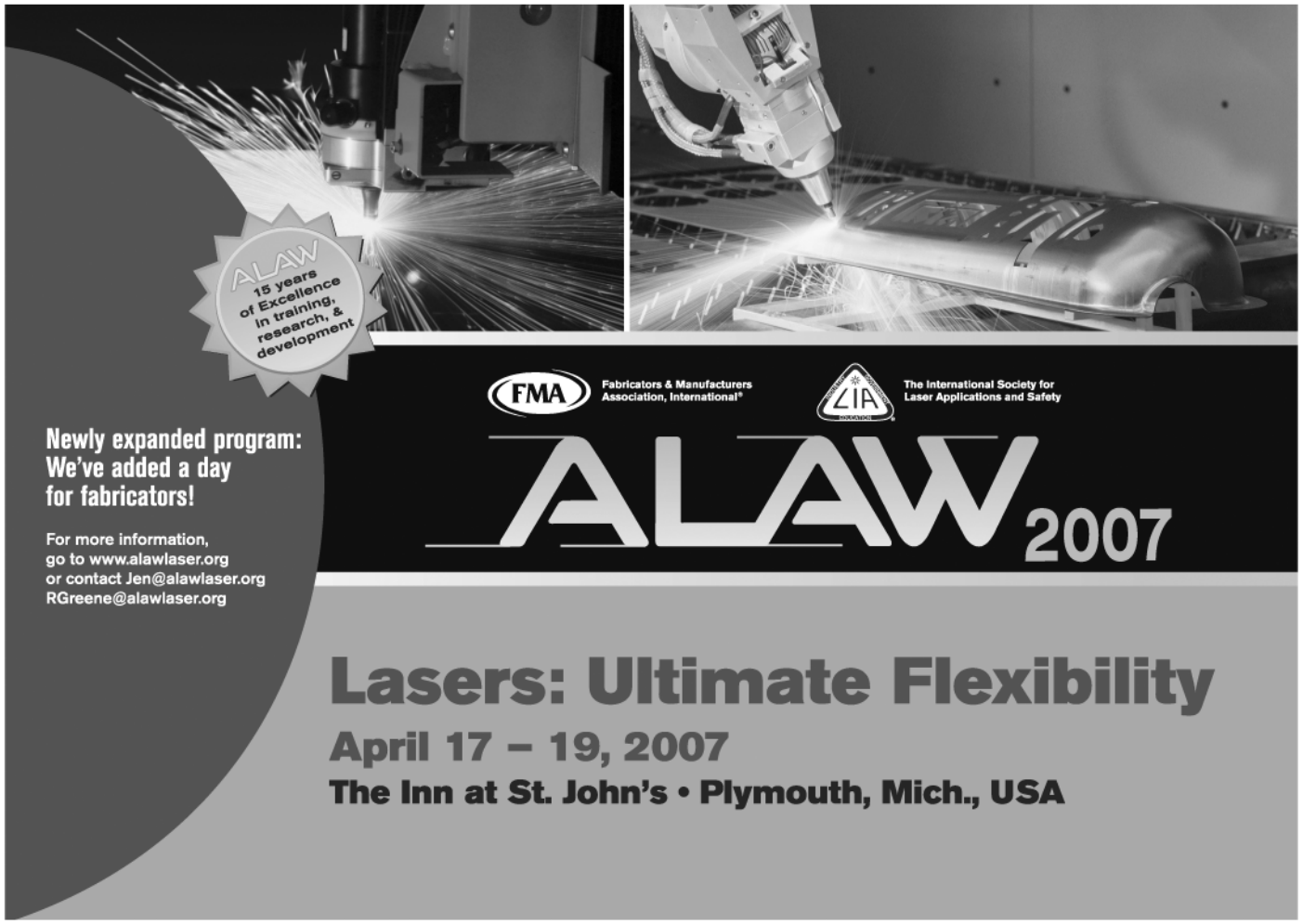
Day one of the conference, "Fabricators Day – Making Money with Lasers," will focus on giving managers and owners of manufacturing facilities and job shops a fundamental understanding of laser technology, application realities, and solutions to practical problems. Days two and three will be the "Automotive Laser Applications Workshop" and will feature senior level executives and engineers from the global automotive industry. The presentations will include 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.

Registration Information

Full conference registration is $895 for nonmembers and $845 for LIA, FMA and cooperating institutions members. Day one only registration is $345 for nonmembers and $295 for members. Registration for days two and three only is $795 for nonmembers and $745 for members. For more information, contact Rich Greene at 407-380-1553, rgreene@alawlaser.org, or visit www.alawlaser.org. ✱

ALAW at a Glance

- Keynote – Future of Lasers in Metal Fabrication
- A New Tool for Metal Fabricators
- Companies Using Laser Welding
- Importance of Laser Safety
- Laser Tube Cutting
- Plate Cutting Advancements
- Benefits of Custom Laser Systems
- Understanding the True Cost of Owning a Laser
- High Speed Lasers
- Automating Lasers
- Global Laser Brazing Applications
- North American Automotive Applications
- Automotive Powertrain and Components Applications
- Remote Laser Applications
- Future of Automotive Laser Manufacturing
- Advanced Laser Applications
- European Automotive Applications
- Asian Automotive Applications



Letter to the Editor

Editor's Note: *In the September/October 2006 issue of* ***LIA TODAY****, we ran an article titled "Laser Welding: Quality, Efficiency & Adaptability" that discussed changes in laser welding and forecasted the future. One of our readers, Conrad Banas, who retired after 50 years in the laser industry and is the 1997 Schawlow Award recipient, had the following response:*

Stan Ream's comment about the enduring applicability of early laser welding information is on the mark. Beam quality was definitely adequate, and no one has repealed the first and second laws of thermodynamics during the past 35 years. Relative to the early work, it is noted that extensive laser welding process development took place during the '70s and '80s. Significant events in the '70s included the first laser keyhole welds (1970); the first remote welding system; the first multikilowatt production systems; LaserglazeTM; welding at 100kW; fusion zone purification; welding with a high frequency interrupted beam; out-of-position welding; welding in soft vacuum; welding with cold wire, hot wire, powder, and preplaced filler addition; and near-net-shape formation of components with controlled metallurgical structures by sintering of powder (now called rapid prototyping). In the '80s, developments included hybrid welding, welding with a high frequency scanning spot, welding with a 25kW chemical (DF) laser, welding in hard vacuum, twin spot welding, and installations of increasing numbers of multikilowatt lasers in high volume production.

While the reliability of initial developmental lasers left something to be desired, properly maintained lasers placed in production in the '70s, '80s, and '90s delivered reliable production service for up to 100,000 hours. Price per kW decreased with increase in laser power; large units sold in the '90s for less than $40,000 per kW (adjusted for inflation). Early production lasers, however, were large, noisy, required significant auxiliary equipment and exhibited overall system efficiencies of less than 10%. Modern systems, notably the fiber, are compact, quiet, and can offer two or more times the efficiency of the systems of yesteryear. Of note is that lasers in routine, reliable, cost-effective production welding applications around the globe currently number in the thousands.

Conspicuous by its absence from the review article is identification of the primary factor, which has led to widespread use of laser welding in production despite comparatively high equipment costs. This is not "pinpoint accuracy," which is a function of controls, fixturing, and motion equipment in the same manner that a lathe cutting tool is only capable of precision machining when mounted on precision equipment. The major factor contributing to the laser's desirability for production is its unique capability (shared with electron beams) of keyhole welding. Keyhole welding enables direct thermal energy delivery into weld material and not just at the material surface. This results in minimal thermal influence on surrounding material, reduced thermal distortion, high melting efficiency, high welding speeds, and narrow fusion zones exhibiting depth-to-width ratios of the order of 5:1 to 10:1 or greater.

The latter compare to 0.5:1 for conventional welding processes, which are shackled by the constraints of the slow process of thermal diffusion. Although electron beams share keyholing capability, lasers readily provide this capability at atmospheric pressure with an unparalleled ease of adaptability to automation. Finally, I don't share the view that robots have turned laser welding applications "upside down." Although robots may often simplify installation, set up, and multitasking operations, they do not currently possess either the accuracy or the speed required for many production laser welding applications.

It is anticipated that the next few years will see continued growth in the number and variety of production applications as justified by return on investment (ROI) considerations. Refinements in existing processing techniques and development of new, innovative applications are to be expected. As system sales increase, some cost amelioration may occur; this should fuel more rapid expansion of production use. Developments in potential heavy section welding applications (armor plate, line pipe, heavy plate joining, on-site fabrication of structural components, etc.), however, will remain dormant because higher power systems (to 60kW) are no longer available. Currently, little market incentive exists for development of such systems.

Connie Banas

ASC Z136 Update

The annual meeting of ASC Z136 will be held on Sunday, March 18, 2007 in conjunction with the 2007 International Laser Safety Conference (ILSC®) at the San Francisco Airport Marriott. The meeting is scheduled to begin at 9 a.m.

Hotel Accommodations – Committee members who make their reservations prior to Feb. 19 can receive the same conference-special hotel rate of $98 plus tax (single or double) as conference attendees. Reservations can be made by calling 800-228-9290 or 650-692-9100 and asking for the "LASLASA" room block.

This meeting is open to the public; however, an RSVP is required for meal planning purposes. If you would like to attend as an observer, please contact Barbara Sams at bsams@laserinstitute.org or call 407-380-1553 for more information.

Additionally, a number of ancillary meetings relating to the development of national and international laser safety standards will be held in conjunction with ILSC® 2007. The meetings will include working groups of the IEC and ANSI standards. A complete meetings list can be downloaded from the Z136.org website (www.z136.org) or call for a meetings schedule. Don't miss your opportunity to meet the chairs of the three newly formed standards subcommittees during the vendor program on Tuesday, March 20 – be sure to stop by the ASC Z136 booth!

Welcome New LIA Members

Corporate Members

- Lasercut, Inc., Branford, CT
- O R Laser, Elk Grove Village, IL
- Seton Family of Hospitals, Austin, TX

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

Individual Members

Donna Label, Nevada City, CA
Michael Zorn, San Diego, CA
Jim Edwards, East Granby, CT
Salman Syed, Cedar Rapids, IA
Scott Carter, Batavia, IL
Eric Hild, Algonquin, IL
Victoria Plebanovich, Wheeling, IL
Jason Zander, Urbana, IL
Lorraine Calzetta, Ashland, MA
David Farrand, Jackson, MI
Robert Tucker, Charlotte, NC
Guy Goulet, Hanover, NH
Peggy Nixon, Estacada, OR
Carissa Mertz, Philadelphia, PA
Charles Black, Austin, TX
Stephen Adams, Jr., Charlottesville, VA
Steve Foldesi, Hinesburg, VT
Robert Beal, Winnipeg, MB, Canada
Scott Shearer, MD, Vejle , Denmark
Claus Thomy, Hambergen, Germany
Evangelia Lioumi, Keratea, Greece
Giuseppe Daurelio, Bari, Italy
Adekunle Awosika, Jr., Dakar, Senegal
Nam Seong Kim, Ph.D., Anyang, South Korea
Paul Dyberg, Gothenburg, Sweden

Chapter Corner

LIA encourages all LIA members in the surrounding 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 last meeting of the Northeast Chapter was held Dec. 19, 2006 at the Colonial Club in Webster, Mass., with the topic "Intelligent Laser Welding, Beam Delivery and Sensor Considerations." Also on the agenda was an open house of IPG Photonics where attendees toured the manufacturing facility to view fiber lasers in action. For more information, visit www.laserinstitute.org/membership/chapters/new_england/.

Great Lakes Chapter

The Great Lakes Chapter held its first event of 2007 on Jan. 16 in Ann Arbor, Mich. Titled "Industry Snapshot Night," the evening was jointly hosted with the Ann Arbor Chapter of the Optical Society of America (OSA) and took place at the Spark ITZone Events Center. The purpose of the Industry Snapshot Night was to bring together people from the many high-tech, optics-related industries in southeast Michigan in order to foster discussion, innovation, collaboration, and of course to have fun. Area companies set up tabletop displays during the networking session.

There was a presentation from Eric Van Stryland, president of OSA, titled "OSA and University/Industry Partnerships." He talked about how networking fostered by OSA in its Florida Chapter brought about interaction of university research and industry members, and led to several research projects. Hopefully this will serve as a potential model for the LIA and OSA chapters in Michigan as a way to bring the research and industrial communities together.

New 2007 Great Lakes Chapter committee members are: Chair Eric Stiles, Laser Division Manager of Fraunhofer Center for Coatings and Laser Applications; Secretary Mon Myaing of Clark MXR; Advisor Mike Klos of IPG Photonics, Midwest Operations, and Advisor Michelle Stock of IMRA.

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

Northern CA Chapter

The Northern CA Chapter 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. 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 www.laserinstitute.org /membership/Chapters/ West/.

Test Yourself

Do you know the basics?

1. **Which is one of the most important pieces of information included in the Standard Operating Procedure for a laser?**
   - **A.** Identification of potential hazards.
   - **B.** The name of the LSO.
   - **C.** The laser manufacturer.
   - **D.** Medical requirements.

2. **Which of the following is the transparent outer surface of the eye?**
   - **A.** Retina
   - **B.** Lens
   - **C.** Cornea
   - **D.** Fovea

3. **Irradiance is normally measured in which one of the following units?**
   - **A.** Watts per square centimeter
   - **B.** Joules
   - **C.** Centimeters
   - **D.** Watts

4. **Which one of the following is NOT used to determine the MPE for a laser?**
   - **A.** Source size
   - **B.** Wavelength
   - **C.** Exposure duration
   - **D.** Nominal hazard zone

5. **Which of the following is NOT an example of invisible laser radiation?**
   - **A.** A 10,600 nm CO2 laser beam.
   - **B.** A 1064 nm Nd:YAG laser beam.
   - **C.** Ultraviolet radiation.
   - **D.** A 532 nm Nd:YAG laser beam.

Don't know as much as you thought you did? Don't get stressed – call the LIA! No matter what your current level of safety knowledge, we have the training and/or publications you need to pass with flying colors!

Laser Institute of America • 800.34.LASER • www.laserinstitute.org

(Answers: A, C, A, D, D)

LIA Announces

Testing Format Addition

Beginning Jan. 1, 2007, the Board of Laser Safety (BLS) is now offering pencil and paper tests again as well as the computer-based testing for its certification exams – Certified Laser Safety Officer (CLSO) and Certified Medical Laser Safety Officer (CMLSO). There are already over 325 computer testing locations throughout the U.S. and Canada, but BLS, due to popular demand, decided to add the paper version back into the program. This testing requires the applicant to appear in person to take the exam classroom-style on a preset date and requires about a four-week wait for scoring. For those who do not want to wait, the computer-based method scores immediately. The application fee for either exam is $50 with an exam fee of $300 for CLSO and $150 for CMLSO. Contact BLS's Executive Director Rich Greene at 1,800.34.LASER/407-380-1553, e-mail bls@lasersafety.org or visit www.laser-safety.org for more information.

Call for Papers

LIA is seeking abstract submissions for the 26th International Congress on Applications of Lasers & Electro-Optics (ICALEO® 2007), to be held Oct. 29-Nov. 1, 2007 in Orlando, Fla. Papers sought cover topics such as processes like rapid prototyping, surface modification and sensing and monitoring, lasers including diode-pumped and advanced laser sources, applications in medicine and biotechnology, precision mechanics and laser sources.

Abstracts should contain original, recent unpublished results of application research, development or implementation. The abstract submittal deadline is Mar. 23, 2007. For complete details on submitting abstracts for ICALEO or for sponsorships, which are also available, visit www.icaleo.org or contact Beth Cohen at 800.34.LASER or e-mail bcohen@laserinstitute.org.

LIA's Medical Auditing Services

Don't forget LIA offers medical auditing services. LIA's auditing will assist health care facilities to be in compliance with *ANSI Z136.3-2005 Safe Use of Lasers in Health Care Facilities* and also help you become compliant/prepared for JCAHO and OSHA inspections. An LIA medical audit will: review all aspects of your laser program; review current laser policies and procedures; review competencies to operate laser equipment using our checklist; review responsibilities of the laser safety officer, and more.

Each facility that has an audit will receive one complimentary registration to LIA's Medical Laser Safety Officer Training Course (an $895 value!). For more information, contact Rich Greene at rgreene@laserinstitute.org or visit www.laserinstitute.org.

Training IS an Option

Too busy to get away but want training? Don't forget, LIA's Medical Laser Safety Officer (MLSO) and other courses are now available in online format at www.laserinstitute.org.

2007 Publications Fire Sale

LIA is cleaning out its closets and our members get to benefit! Until March 31, 2007, we have discounted many select publications, so take advantage of supplies while they last. Prices listed are in member/nonmember order.

- *LIA Guide to Non-Beam Hazards Associated with Laser Use* (pub. 109) – $6/$9 (regularly $19)
- *LIA Guide to Laser Materials Processing* (pub. 107) – $12/$16 (regularly $22)
- *LIA's Laser Safety Manual* (pub. 204) – $60/$70 (regularly $80)
- *Laser Cutting Guide for Manufacturing* (pub. #205) – $110/$130 (regularly $150)
- *Medical Laser Application Training for Physicians* (pub. 311) – $995 for both members and nonmembers (regularly $1,495)
- LASIM® Training and Simulation Program for Laser Beam Cutting (pub. 307) and Training and Simulation Program for Laser Beam Welding (pub. 308) – $495/$595 each (regularly $795)

To order any of these publications, visit www.laserinstitute.org/bookstore or call 800-34-LASER. ✱

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