LIA TODAY

THE OFFICIAL NEWSLETTER OF THE LASER INSTITUTE OF AMERICA

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

FOCUS: TRAINING | VOLUME 16 NUMBER 2 | MAR / APR 2008

In celebration of LIA's 40th anniversary, LIA TODAY is honoring the advancements in laser applications by featuring 40 articles written by the professionals who have contributed to this beneficial technology over the past four decades.

THE LASER SAFETY MOVEMENT: 40 YEARS OF LEADING, EDUCATING AND PROTECTING

By Heather Teague

The Early Years

When Theodore Maiman invented the ruby laser in 1960 – considered to be the first successful optical laser – it raised a simple, yet highly complicated question: Are lasers safe? Indeed, in the early 1960s some engineers characterized the output energy of the first lasers in terms of "Gillettes" – by having the power to burn through razor blades.

Within one year after Maiman's development, two papers were published in Science magazine that pointed out why a laser is so dangerous (especially to the retina). The potential for damage to the eye was recognized as early as 1961[1-2].

The 1960s can be described as the early beginnings of the laser safety movement, including an extensive research phase. Safety-oriented research efforts were conducted to quantify the actual risk for eye injury[1]. The first study of significance was by Dr. Milton Zaret[2]. Also occurring during this period, TRG, American Optical, Perkin-Elmer-Spectra Physics, and other companies began making and selling commercial lasers.

As a result of working around lasers without safety precautions, a number of accidents occurred during this time and the first laser (*Con't. pg. 6, see* **Safety**)

LIA'S LASER SAFETY TRAINING

By Stephen Lumbert

Lasers and laser-based equipment are constantly evolving as new techniques and uses are developed. The only means to keeping pace with these advances is to educate those using these tools with training, whether through initial or refresher coursework and seminars. Training is an integral tool for the safe use of lasers and laser equipment used in manufacturing, medicine, and research today.

For 40 years the Laser Institute of America (LIA), secretariat for the ANSI Z136 series of laser safety standards (the foundation of laser safety programs nationwide), has dedicated its resources to fostering lasers, laser applications, and laser safety worldwide. Additionally, LIA has recently renewed a formal alliance with the United States Occupational and Safety Administration (OSHA) by establishing a collaborative relationship to foster safer and more healthful American workplaces. Serving the industrial, medical, research and military (*Cont. pg. 8, see* **LIA Training**)

IN THE NEWS

NIST Budget Proposal

President George W. Bush's fiscal year (FY) 2009 budget proposal for the National Institute of Standards and Technology (NIST) includes $634 million for core research and facilities programs, a 22 percent increase over the FY 2008 appropriations for these programs.

"This budget continues the administration's commitment to work toward a doubling of NIST's core budget by 2016 as called for in the President's American Competitiveness Initiative and authorized through 2010 by the America COMPETES Act," said James M. Turner, acting director of NIST.

The total request of $638 million for NIST is divided into three appropriations: Scientific and Technical Research and Services, $535 million — this category includes $526.5 million for NIST laboratory research and $8.5 million for the Baldrige National Quality Program; construction of research facilities, $99 million, and industrial technology services, $4 million.

The proposed NIST research budget would add four new R&D initiatives: 1) Nanotechnology: Environment, Health and Safety Measurements (*Con't. pg. 21*

Don't miss *LIA – Celebrating 40 Years of Innovation, Ingenuity and Inspiration* on page 10.

Laser Institute of America

40th Anniversary

Laser Applications and Safety

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IN THIS ISSUE

FEATURES

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

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CALENDAR OF EVENTS

Laser Safety Officer Training
May 5-7, 2008 | Cleveland, OH
July 14-16, 2008 | Nashville, TN
Aug. 11-13, 2008 | Denver, CO
Dec. 8-10, 2008 | Orlando, FL

Laser Safety Officer with Hazard Analysis*
June 9-13, 2008 | Chicago, IL
Sept. 15-19, 2008 | San Francisco, CA
Nov. 3-7, 2008 | Boston, MA
*Certified Laser Safety Officer exam offered after the course.

PICALO 2008
April 16-18, 2008 | Beijing, China

Advanced Concepts in Laser Safety
Aug. 11-13, 2008 | Orlando, FL

Medical Laser Safety Officer Training*
May 16-17, 2008 | Chicago, IL
Sept. 19-20, 2008 | Boston, MA
Nov. 14-15, 2008 | Phoenix, AZ
*Certified Medical Laser Safety Officer exam offered after the course.

Medical Laser Safety with Hands-On
June 6-8, 2008 | Atlanta, GA

ALAW 2008
May 13-15, 2008 | Plymouth, MI

ICALEO 2008
Oct. 20-23, 2008 | Temecula, CA

ABOUT LIA

Laser Institute of America (LIA), founded in 1968, is the international society for Laser Applications and Safety. It is comprised of laser researchers, manufacturers, integrators, and end users working together to increase the use and safe application of laser technologies. LIA individual and corporate members receive significant discounts on all LIA materials, training courses, and conferences.

Laser Institute of America started with the sole intention of turning the potential of a powerful new technology into a viable industry. The LIA was forged from the heart of the profession – a network of developers and engineers – people who were actually using lasers. These were the first "members" of the LIA, the people who decided that sharing new ideas about lasers is just as important as developing them. The belief, as it remains today, is to promote laser applications and their safe use through education, training, and symposia.

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PRESIDENT'S MESSAGE

Spring and fall are usually busy with numerous conferences. So will be this year. Due to efforts in recent years, LIA is heavily involved in a number of upcoming events. The first event to be mentioned is the exhibition, Laser – World of Photonics China and the related workshop LPC – International Conference on Laser Processing and Components, both taking place in Shanghai in March.

As a second conference, LIA organizes an Asian laser processing summit in Beijing in April. With respect to the location, PICALO 2008 can be regarded as the trial run for the Olympic games. Hopefully, we will see some new world records in welding speed or nanometer accuracy at PICALO.

Finally, ALAW, the Automotive Laser Application Workshop, which is in cooperation with the FMA organization, will be held in Plymouth, Michigan in April.

All events are great opportunities to meet customers and friends from all over the world. These meetings will be the lifelines of LIA. Thus, if you think globally, you should convince your director and/or financial department to attend one or even all of these conferences. I hope to see most of you there.

Andreas Ostendorf
President
Laser Institute of America

EXECUTIVE DIRECTOR'S MESSAGE

LASERMAN!

At the recent meeting of the Accredited Standards Committee which develops and maintains our ANSI Z136 series of laser safety standards, the committee voted to honor four members for their long and tireless years of dedication and contribution to the development of the Z136 standards.

It turns out that the members of this august group were all LIA past presidents, Jim Smith (1972), Dave Edmunds (1975), Sid Charschan (1980) and Myron Wolbarsht (1983). Obviously, these men had contributed to LIA's growth and success in many other ways in addition to their important work in developing standards. Less obviously these guys have a good sense of humor, too. Dave Edmunds sent me a Laserman pin, which you can see in the picture here. He told me that it was developed in the mid seventies as a membership promotion.

I looked back in the archives and found a September 1974 LIA Newsletter promoting a gala social hour in San Francisco. It promised that Laserman himself (rumored to be played by Jim Johnson) would attend. If anyone has photos of this fabulous event please send me a copy.

Maybe it is time for another bold membership promotion – any ideas?

Help us Laserman!

Peter Baker
Executive Director
Laser Institute of America

safety guidelines became available[3-4] and the industry became increasingly concerned about the laser's potential to cause eye injuries. Large companies such as RCA and American Optical, who stood to profit greatly from the commercial applications of the laser, became worried that the government would prohibit the use of lasers altogether. It was time to take action to protect a highly promising technology. The Laser Institute of America (LIA) owes this concern as one of the major reasons for its formation in 1968.

INDUSTRY JOINS FORCES WITH ANSI

The industry quickly realized the solution to the safety problem was the development of standards, along with better training and education about the safe use of lasers. A collaborative effort was made to organize a laser safety committee in conjunction with the American National Standards Institute (ANSI) with George Wilkening as chair and the Telephone Group as the initial secretariat (figure 1 below).

From 1968-1972, there was a major push for developing laser safety standards. The question that was debated frequently and extensively was to what level of exposure is considered to be safe[3]. Many late-night meetings were held at ANSI's office in New York to determine the standards that would become the first edition of ANSI Z136.1, *Safe Use of Lasers* in 1973. Later, the LIA became the secretariat and publisher of the ANSI Z136 series – the foundation of laser safety programs nationwide.

LASER CLASSIFICATION PREVENTS EXCESSIVE RESTRICTIONS

In comparison to other workplace safety hazards, the laser is unique because of its potential risk of injury to the eye, even at far distances. It is also different from other intense light sources due to its very high radiance. Maximum permissible exposure (MPE) limits, introduced in the mid-1960s, have now become standardized and essentially the same worldwide[3, 5-6].

All lasers are not created equal. In fact, there's a low probability of sustaining an eye injury in most applications – certainly for small collimated beams, where the beam must be aligned to the pupil for a retinal injury to occur. Therefore, a laser classification system was developed to classify lasers by their hazard potential, which was based upon their optical emission. For each classification, a standard set of control measures apply [5].

Basically, Class 1 denotes lasers or laser systems that do not pose a hazard. Classes 2 through 4 pose an increasing hazard to the eye and skin.[5]

Figure 1. ANSI Z136 Medical Surveillance Committee meeting, held at the Army Environmental Hygiene Agency, Edgewood, Maryland, in 1985. Photo courtesy of David Sliney.

The main advantage of this Class 1-4 rating system is that it prevents excessive restrictions from being placed on the use of many types of lasers. Manufacturers have been required by Federal regulations to classify their lasers since 1976.[5]

As the use of medium and high-powered lasers increased, it became necessary to require a laser safety officer (LSO) to oversee the operation, maintenance, and service of Class 3B and 4 lasers. ANSI Z136.1 (2007) defines the LSO as the person with the authority and responsibility to monitor and enforce the control of laser hazards. In addition, the LSO evaluates laser hazards and establishes control measures.[5]

LASER SAFETY TRAINING EMERGES

It is interesting to note the first laser safety guidelines developed in the United States date back to around 1966 from Bell Laboratories, other government laboratories and the Surgeon General of the Army. Later, more complete guides were developed, including the Army/Navy medical technical bulletin issued in 1968[5], and an Air Force publication about the same time.[5]

The origin of the first two international laser safety conferences can be traced back to 1968-1970. They were held at the University of Cincinnati and organized by Dr. Leon Goldman and Jim Rockwell of the Children's Hospital Laser Laboratory. Following these conferences, the first laser safety courses were held at the University of Cincinnati and organized by Rockwell, which were funded by a U.S. Army Field Safety Agency grant to provide laser safety training to Army laser technologists and safety specialists. When these courses were completed for the Army safety community, Rockwell decided to offer virtually the same course to non-military persons under the University of Cincinnati and co-sponsored by LIA. This was the forerunner of the current LIA Laser Safety Officer (LSO) courses.

As the market for lasers continued to grow, so did LIA and its role in laser safety. The demand for safety training prompted LIA to completely overhaul its laser safety training program in 1988 with a completely revised one-week course. In 1997, LIA assumed ownership and management of the International Laser Safety Conference (ILSC®), which has become the world's top forum on laser safety.

Now, LIA provides highly specialized training in laser safety for medical, research and industrial applications. In 2002, the Board of Laser Safety was formed as a nonprofit organization affiliated with LIA. It offers two types of certification, which are Certified Laser Safety Officer (CLSO) and Certified Medical Laser Safety Officer (CMLSO).

MEDICAL SURVEILLANCE

The occupational health viewpoint on the requirements for medical surveillance of laser workers has evolved continuously over the past 40 years, with requirements gradually being reduced or eliminated as more confidence evolved that there were not unexpected ocular effects that would show up in workers. A major transition took place after an international conference on laser medical surveillance was held in 1985 in Maryland.

LASER SAFETY IN THE MEDICAL FIELD

Shortly after the development of the first laser in 1960, experimentation began with lasers in surgery and medical procedures. Initial applications of lasers in ophthalmology started

between 1965 and 1970. These early applications of medical and surgical lasers utilized large open beams. Doctors were required to wear goggles and had to be trained in laser safety. It wasn't until the 1980s that lasers became prevalent in general surgery applications.

Published in 1988, *ANSI Z136.3 Safe Use of Lasers in Health Care Facilities* was developed specifically for those working in the health care environment including hospitals and medical centers.

One of the most promising advances fueling the continued widespread use of laser applications in medicine is the delivery system of the laser itself. Manufacturers of delivery systems have become increasingly more sophisticated with safety measures, creating enclosed devices that deliver the laser contact directly to the skin – virtually eliminating the potential hazard associated with an open beam. This innovation protects the patient, nurse or doctor, and the spa employee administering wrinkle or hair removal treatment.

LASER SAFETY TODAY

Today, as lasers have become more reliable and affordable, they are being utilized in almost every field including material processing, construction, medicine, communications, energy production and national defense.[5] Even automobile, aircraft, and boat manufacturers are using lasers to increase productivity and save costs.

As a result, laser safety programs are being implemented in a wide variety of organizations and work environments. With the goal of keeping the workplace safe from hazards associated with lasers, LIA formed a cooperative program with the Occupational Safety and Health Administration (OSHA) in 2005. The program provides guidance and access to training resources to help organizations protect their employees' health and safety by reducing and preventing exposure to laser beam and non-beam hazards in the workplace.

More recently, the use of many laser devices in the consumer world raised safety questions. However, retail products such as laser printers, copiers and scanners emit low power levels with enclosed beams to assure Class 1 products, thus eliminating the hazard.

Another significant development in recent years is that manufacturers are addressing safety issues earlier in the research and development process. In addition, laser safety design has become more sophisticated in recent years. In fact, even the military is building safer laser rangefinders, designators and training devices.

LOW PROBABILITY OF INCIDENT

One of the most important observations regarding laser safety is, generally, that the actual probability of an incident occurring is low. On one hand, this helps the laser technology move ahead in open-beam research applications, but this feeling of "it won't happen to me" can also lead to complacency – all the more reason to keep laser safety "top-of-mind" with continuing education and training.

Even today it is difficult to determine how many laser-related injuries occur each year because several industries do not have mandatory reporting requirements.

In 2008, a new set of exposure limits were issued for the first time by the American Conference of Governmental Industrial Hygienists (ACGIH)[7]. This is partially due to the fact that lasers have gradually evolved, becoming easier to use. It is expected that ANSI and the international laser community will ultimately adopt these new limits with few changes.

So, why is it important to take a look back at the history of laser safety? After 40 years, what is the key to laser safety? We believe the continuing education and training of those who work with lasers is the answer. The more educated they are, the better protected they will be long term. ■

Heather Teague is a freelance writer in Orlando, Fla.

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communities, LIA provides laser users assistance in training, developing and implementing safety programs. Furthermore, they offer technical information and networking opportunities to laser users around the globe. LIA's specialized training courses and seminars related to laser safety cover virtually all genres of laser use. These laser training courses and Board of Laser Safety (BLS) exams are offered periodically at various locations around the U.S. One example is the Laser Safety Officer with Hazard Analysis course offered at the following locations in 2008:

- June 9-13 – Chicago, IL
- September 15-19 – San Francisco, CA
- November 3-7 – Boston, MA

ONSITE OR ONLINE

Although LIA offers several different training courses in a variety of locations, there are many instances where attendance is inconvenient due to scheduling or travel constraints. To address these concerns, LIA has developed the ability to bring laser safety training to the workplace with onsite and online options.

Some of the customized in-house training and auditing opportunities available include: Industrial Laser Safety, Laser Safety Officer, Medical Hands On Skills Validation, Basics of Laser Safety, Medical Laser Safety Update, Industrial Laser Safety Audit, Medical Laser Safety Audit, and Laser Safety in the Lab.

The new Laser Safety Officer Online course joins the existing four training opportunities LIA has to offer. Delivered over the Internet at your convenience these five courses supply self-paced training where and when it is convenient to the client. There are four more online courses. Industrial Laser Safety covers issues pertaining to laser manufacturing activities. Laser Safety in Educational Institutions Online is for those working in laboratory settings. Medical Laser Safety Officer (MLSO) Online is designed to give medical personnel an understanding of laser biophysics, tissue interaction and laser safety in a medical environment. Although relevant to the MLSO training, Laser Safety for Physicians Online differs in that it helps medical practitioners using lasers in the surgical environment to learn the basics of laser safety, legal requirements, laser regulatory issues, safe operating use and safety controls.

CUSTOMIZED ON-SITE TRAINING OPPORTUNITIES

Industrial Laser Safety addresses the issues and presents methods of controlling hazards associated with laser cutting, drilling, welding, and the heat-treating of metals, ceramics, cloth, paper, plastics, and other materials. It also addresses the laser beam hazards and non-beam hazards involved with materials processing.

Laser Safety Officer is designed to provide participants with the knowledge required to perform the duties of a laser safety officer as described in the ANSI Z136.1-2007 *Safe Use of Lasers* standard. Areas covered are lasers and optics, applications, laser bio-effects, laser hazards and hazard analysis, non-beam hazards, and control measures. It also includes training on laser safety program development and administration.

Medical Hands On Skills Validation meets the criteria set up by ANSI and ASLMS. Laser physics and safety will be discussed according to your specific wavelengths. Policies and procedures examples as well as modules and a validated skills check will be provided. The hands on will include demonstration on the various lasers.

Basics of Laser Safety provides a non-mathematical, intuitive framework for understanding the basics of lasers and laser safety. It provides a general overview of laser physics, hazards, and control measures, as well as laser safety standards and regulations.

Medical Laser Safety Update is designed for medical facility personnel working with lasers in medicine and surgery.

LIA offers many valuable laser safety training opportunities.

Clinical, technical and administrative aspects of managing safe and productive laser services in healthcare facilities are discussed.

Industrial Laser Safety Audit assists facilities to achieve compliance with OSHA Workplace Safety Requirements (Public Law 91-596) and ANSI Z136.1 *Safe Use of Lasers* standard. The audit includes hazard analysis, evaluation of the laser use area, area controls, a review of standard operating procedures, laser and laser system requirements, and training requirements for area personnel. Each company receives documentation including a written report of findings, recommendations, policies and procedures, recommendations on training, control measures, and personal protective equipment.

Medical Laser Safety Audit, similar to the Industrial Laser Safety Audit, is designed to assist medical facilities in becoming compliant with ANSI Z136.3-2005 *Safe Use of Lasers in Health Care Facilities* standard. It also helps the client become compliant/prepared for JCAHO and OSHA inspections. The audit includes a review of all aspects of the facility's laser program, including medical staff credentials and competency, current laser policies and procedures, laser documentation, preventative maintenance procedures for laser equipment, training records, responsibilities of the area personnel, and composition of laser committee. Each facility also receives a written report of findings, recommendations, guidelines for establishing competency checklists, sample policies and procedures, preventative maintenance guidelines and a skills validation checklist.

Laser Safety in the Lab is designed to offer solutions

and cost effective options to anyone who is providing laser safety support in a research or academic setting, national laboratory, designated research facility or commercial firm. Topics included are program structure, control measures and non-beam hazards in a research setting, safety protocols, training options, and obtaining user co-operation.

As long as lasers are used as tools for research, industry, and medicine, comprehensive training like the programs described here will continue to be an important part of laser safety. For more information about the training opportunities LIA has to offer visit www.laserinstitute.org. ■

Stephen Lumbert is a freelance technical writer in Orlando, Fla.

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LIA TRAINING ADVANTAGES

LIA has been delivering quality, trusted laser safety training for 40 years.

LIA trains more laser safety officers and laser users than anybody else in the world.

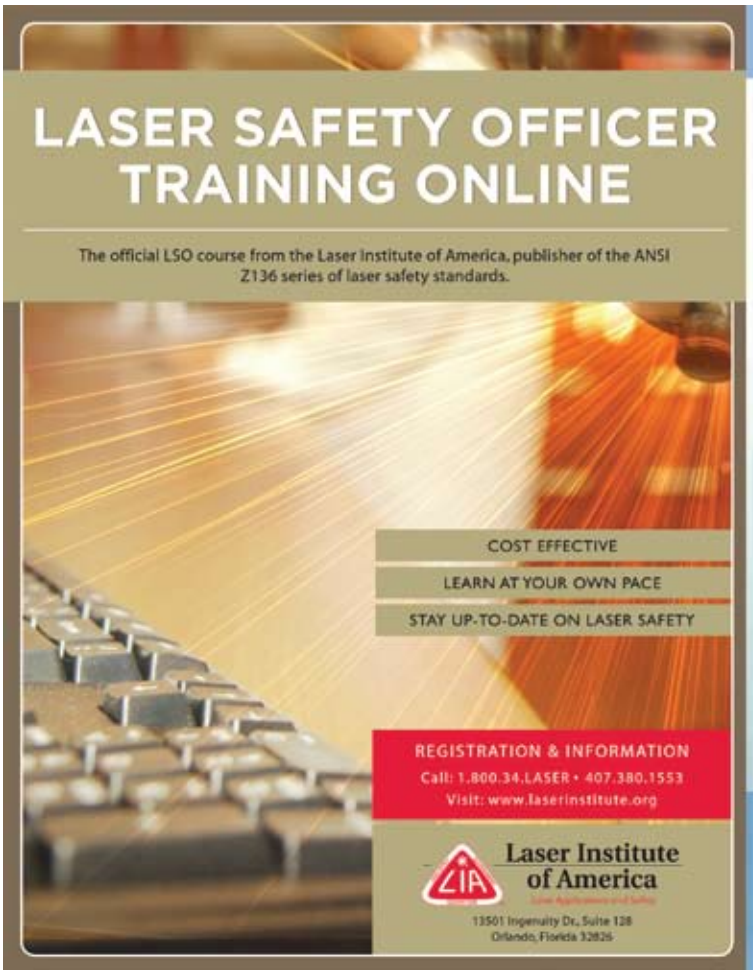
LIA uses only the foremost experts in lasers and laser safety to develop and conduct its training courses.

As secretariat and publisher of the ANSI Z136 series of laser safety standards, the foundation of laser safety programs nationwide, LIA has assisted laser users in developing and implementing safety programs for 40 years.

As the leading publisher of laser safety information, LIA has developed an extensive library of laser safety reference materials and training guides in traditional print format and electronically as well as online training.

Every course attendee receives a certificate of completion from LIA showing his/her organization's commitment to laser safety.

LIA's network of laser safety professionals guarantees continued support in the future.



LIA – CELEBRATING 40 YEARS OF INNOVATION, INGENUITY AND INSPIRATION

By Heather Teague

When the average consumer thinks about lasers, perhaps they think of the latest blockbuster movie available on Blu-Ray disc, or the laser eye surgery that corrected their failing vision. Whatever comes to mind, they probably haven't heard of the Laser Institute of America (LIA). However, for the thousands of people who work in the world of lasers, LIA is an icon that represents the continued growth of laser applications and their safe use across the globe.

We invite you to take a retrospective journey with us over the last 40 years to remember how the laser was born, how it has influenced our lives and the role LIA has played in this remarkable story. In celebration of LIA's 40th anniversary, this is the first installment in a three-part feature article.

PIONEERING A NEW FRONTIER: THE LASER RACE AND LAUNCH OF LIA

The initial concept of the laser can be traced back to Albert Einstein in 1916 with his theory of light emission, which described how atoms could interact with light.[1] As promising as this academic theory was, the world would have to wait until the 1950s before this concept would become a reality. While most people are familiar with the "space race" happening around the same time, the race to create the world's first laser was equally as important.

In 1954, Charles Townes and Arthur Schawlow invented the MASER (Microwave Amplification by Stimulated Emission of Radiation). Unlike the laser of today, the maser technology did not use a visible light. In 1959, Townes and Schawlow were granted a patent for the maser, which was used to amplify radio signals and as an ultrasensitive detector for space research.

Around the same time, Gordon Gould, a 37-year-old graduate student at Columbia University, introduced the term LASER (Light Amplification by Stimulated Emission of Radiation) in a conference paper. His suggestions of using an open resonator would later become an important ingredient for future lasers. However, he was ultimately denied an application for a patent.[1]

In 1960, Theodore Maiman invented the ruby laser, considered to be the first successful optical or light laser. In this controversial race to develop the first viable laser, he beat several research teams including Townes and Schawlow.[1]

There's no doubt that it was the combined ingenuity and determination of these laser pioneers that fueled this historical discovery into the practical laser applications we depend on today. As a result, Townes shared the Nobel Prize in 1964 for his work on quantum electronics. Years later, Schawlow won the Nobel Prize in 1981 for his work in laser spectroscopy.[1]

A SOLUTION LOOKING FOR A PROBLEM

In the early 1960s, the practical applications for the laser were still in the discovery phase. One observer had said perhaps the laser was "a solution looking for a problem." However, it didn't take long for the widespread applications to soon be discovered. In the 1970s, lasers became reliable enough to be utilized in various industries to cut, weld, drill and mark materials. They were emerging into the medical field for surgery, and the use of fiber-optics was taking shape as a promising application. In the 1970s and 1980s, the applications for lasers spread into manufacturing, science, communications, military, data processing and entertainment.[2]

One of the first applications introduced into the daily lives of consumers was the supermarket barcode scanner in 1974. While the laserdisc player was introduced in 1978, the compact disc player did not become common in consumers' homes until 1982.[3]

LIA LAUNCHES IN 1968

With the advent of commercial lasers across multiple industries and government safety legislation looming, it quickly became clear that an organization was needed to enhance the progress of the laser industry and to provide guidance for the safe use of lasers.

In January 1968, the Laser Industries Association was formed by academic scientists, developers and engineers, manufacturers, and government. The founding members of LIA were in good company, with Dr. Arthur Schawlow and Dr. Theodore H. Maiman among the original board of directors.

To more accurately reflect the true educational goals of the organization, the name was changed to Laser Institute of America (LIA).

AT THE HEART OF LIA

LIA was started by people who were actually using lasers. At the heart of the profession, these developers and engineers were passionate about taking this new technology and turning it into a viable industry. The first "members" of LIA decided that sharing new ideas about lasers was just as important as developing them. The belief, as it remains today, is to promote laser applications and their safe use through education, training, and symposia.

More formally, the LIA founding members developed seven specific and primary purposes:

- To promote dissemination of laser-related information and data in publications and symposia.
- To promote, conduct, sponsor or co-sponsor conferences related

to laser subjects on the technical, engineering, scientific and research aspects of lasers on at least a yearly basis.
- To develop and present short courses, programs, and curricula for the educational training and retraining of the various technical levels required by the emerging laser technology.
- To develop, prepare and assemble books, reports, pamphlets, films or other forms of printed, graphic or audio material dealing with various aspects of lasers.
- To act as a focal point for collecting and disseminating of data, inquiries and statistics regarding the laser community with regards to applications, safety, research and development, etc.
- To act as liaison and with other technical societies or organizations in the advancement of laser technology including interaction with industrial, governmental and educational organizations, to publish or endorse journals, magazines or other periodic publications appropriate to the advancement of laser technology.
- To assist federal and state government agencies to enact legislation relating to the safety of laser products by providing these agencies with information, statistics, and research data pertaining to laser products and their use.

"Our founding members were very wise to develop these goals," stated Peter Baker, LIA's executive director. "We're still following these original guidelines with great success 40 years later."

Today, the board is comprised of leading authorities from government, education and industry. It has become more internationally diverse, with one-third of the directors representing countries such as Germany, England, Australia and Hong Kong. Gaining a global perspective has become increasingly important as LIA has grown to become the international society for laser applications and safety.

Look for the next edition of *LIA Today*, where the story continues with Part II: LIA Becomes the World's Authority on Laser Application and Safety. ■

Heather Teague is a freelance writer in Orlando, Fla.

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Anthony M. Johnson	Dr. Theodore H. Maiman

ANSI STANDARDS FOR NON-IONIZING RADIATION

By Thomas E. Johnson, CHP

Many American National Standards Institute (ANSI) standards cover health physics activities. These include multiple non-ionizing standards in addition to those standards that cover ionizing radiation. The two ANSI standard series that cover lasers and radiofrequency radiation are ANSI Z136 and C95, respectively. The ANSI Z136 committees are sponsored by the LIA. The ANSI C95 committee is sponsored by the Institute of Electrical and Electronics Engineers, but this article will focus only on ANSI Z136 guidance for lasers and radiofrequency radiation. There are six main documents describing laser safety:

- Z136.1-2007 *Safe Use of Lasers* (This is the oldest and arguably most useful of the Z136 documents.)
- Z136.3-2005 *Safe Use of Lasers in Health Care Facilities*
- Z136.4-2005 *Recommended Practice for Laser Safety Measurements for Hazard Evaluation*
- Z136.5-2000 *Safe Use of Lasers in Educational Institutions*
- Z136.6-2005 *Safe Use of Lasers Outdoors*
- Z136.7-2008 *Testing and Labeling of Laser Protective Equipment*

ANSI .1

First, it is useful to understand the convention used in naming ANSI documents. The ANSI standard Z136.1- 2007 will be used as an example. The convention used in ANSI documents is the designation Z136 informs the user that this series of documents concern laser safety. The "dot" number (in this case, Z136.1) refers to a specific document in the standard. The next number refers to the release date. Thus, Z136.1-2007 refers to the *Safe Use of Lasers* standard version released in 2007. Z136.1 contains the following key information:

- Laser hazard classification scheme and how to apply it (Class 1 through 4 lasers)
- Safety programs (for example, training, medical exams, hazard evaluation, and control)
- Exposure limits for both the eye and skin
- Non-beam hazards

Table 10 in Z136.1 summarizes the engineering and control measures for each laser class for a health physicist with any level of experience. One of the most useful sections of the standard for those unfamiliar with laser safety calculations is Appendix B. Examples of various types of lasers and how to calculate exposure limits provide excellent guidance for both simple and complex situations. Those health physicists who are not as confident with calculating exposure limits may choose to use Table C1-C4, where exposure limits for many commonly used lasers are specifically listed. If you encounter older lasers and are uncertain how the previous classes of lasers relate to the current classification system (class 1-4), table H2a compares the IEC 60825, FDA/CDRH and ANSI Z136 classification schemes so that equivalent classes can be determined. The majority of health physicists would find this the most useful document they can obtain for laser safety.

ANSI .2 AND .3

No longer available due to its age, the second document in the Z136 series was called *Safe Use of Optical Fiber Communication Systems Utilizing Laser Diode and LED Sources Z136.2-1997*. A replacement document under development will be called *Safe Use of Optical Telecommunications Systems Utilizing Laser Diodes,* which should cover fixed-point, rather than mobile, laser diodes and LED sources.

Z136.3-2005 is the *Safe Use of Lasers in Health Care Facilities*. The JCAHO (Joint Commission on Accreditation of Healthcare Organizations) specifically references this standard as a guideline for hospital laser safety programs. The classes of lasers, engineering, and administrative controls specifically applicable to hospitals and health care are all contained in the standard.

An area of particular interest to safety professionals would be laser generated airborne contaminants (LGAC). The contents and control of LGAC are something that health physicists may not usually consider, and the standard discusses their control. A key topic that can easily cause death to a patient is a laser igniting an endotracheal tube fire, or anesthetic gases. This is a rare case where a laser has caused death. There are at least three known cases of this occurring, and it is unique to the healthcare environment.

Common medical laser exposure limits and wavelengths are provided in Appendix A and at the end of Appendix C but it is not all inclusive. You may still need to purchase Z136.1 to obtain the exposure limits for an unusual laser system. A perioperative laser safety checklist example is provided in Appendix B that is very useful for quickly evaluating laser use.

Another useful page in Appendix B validates the laser operator skills prior to laser use. The ASLMS (American Society for Laser Medicine and Surgery) standards for training are discussed in Appendix D, further delineating the requirements for laser operators. Another handy section is Appendix H, which provides the user with many sample standard operating procedures.

ANSI .4 AND .5

For those needing to classify new laser designs from scratch, *Recommended Practice for Laser Safety Measurements for Hazard Evaluation Z136.4-2005* is invaluable. It provides information on how detectors work, how measurements are made for laser classification, and measuring the various parameters that are needed to perform a detailed analysis of a laser for complex safety evaluations. The selection of a detector is covered in the appendix in great detail for various scenarios. There is a complete appendix on measuring laser parameters for regulatory purposes that would be essential for anyone manufacturing lasers.

Another specialized document that does not contain a complete listing of exposure limits is Z136.5-2000, *Safe Use of Lasers in Educational Institutions.* Appendix A provides a list of commonly used lasers, their wavelengths, and their exposure limits, but for analysis of complex or unusual systems, a copy of

Z136.1 would still be required. This standard is for use of lasers for teaching, not for research. Those using lasers for research should refer to Z136.1. Examples of standard operating procedures, suggested classroom layouts, and special administrative requirements are provided. A revision of this standard is in progress and it should be released in the next year.

ANSI .6 AND .7

If you plan to use lasers outdoors, Z136.6-2005 is absolutely necessary. *Safe Use of Lasers Outdoors* generally applies only to the higher energy/power lasers that are class 3B or 4, unless intentional exposures are planned. There are many risks that are unique to outdoor use of lasers, and they are covered in the standard. For example, visual interference zones are described in detail, and references to the appropriate FAA (Federal Aviation Administration) orders regarding these zones are provided. The exposure limits for those commonly used outdoor lasers is provided, along with diffuse reflection hazard information for computing laser hazards. The use of magnifying instruments is very possible with the use of outdoor lasers, and this too is covered in the standard. The standard and Appendix A provide guidance on how to apply for permission to use lasers outdoors, including standard operating procedures and example forms. Appendix B has multiple examples of calculations that are numerical and explanatory. Atmospheric scintillation of lasers is described, and includes the correction values required.

The latest standard to be issued is *Z136.7-2008 Testing and Labeling of Laser Protective Equipment*. This is the first of the new "vertical" standards designed to help simplify compliance with the standards. Most of the material in Z136.7 applies to those who manufacture laser safety eyewear. If you plan on using eyewear in an unusual situation, such as using regular safety glasses to protect against a CO^2 laser, and need to verify their protective qualities, this standard provides the process required to assure laser safety.

Thomas Johnson of ASC Z136.

FUTURE STANDARDS

There are an additional three Z136 standards in development that should be available soon:

- Z136.8 *Safe Use of Lasers in Research*
- Z136.9 *Safe Use of Lasers in Manufacturing Environments*
- Z136.10 *Safe Use of Lasers in Entertainment, Displays and Exhibitions.* ■

Thomas Johnson, a certified health physicist and assistant professor with the Department of Environmental and Radiological Health Sciences, Colorado State Univ., is a member of ASC Z136 representing the Health Physics Society, member of standards subcommittee 1 (SSC-1 for Safe Use of Lasers), technical subcommittees 1 and 4 (TSC-1 Bioeffects, TSC-4 Control Measures and Training), and the Editorial Working Group. This article also appeared in the December 2007 issue of Health Physics News.

ALAW APPROACHES

ALAW will be held May 13-15, 2008 in Plymouth, Mich. ALAW is a three-day event that starts with a golf tournament on the first day followed by two days of sessions designed to improve productivity and reduce manufacturing costs with laser processing for manufacturers and job shops as well as automotive manufacturers and their suppliers.

The expanded ALAW 2008 conference will focus on laser solutions for new product design and real-world manufacturing challenges. Automotive manufacturers, laser integrators, and tier one and two suppliers from the global automotive industry will deliver presentations and offer solutions 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. Topics include body in white, advanced propulsion, powertrain, frame, established as well as non-traditional laser applications, case studies and more!

ALAW is hosted by LIA in partnership cooperation with the Fabricators & Manufacturers Association, Intl., (FMA). The conference co-chairs are Eckhard Beyer of Fraunhofer WLT and Stanley Ream of Edison Welding Institute.

WHO SHOULD ATTEND?

Track One: "Lasers for Fabricators – Your Competitive Edge" – Owners, managers, supervisors of fabrication 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 costs associated with them.

Track Two: Automotive: Advanced Propulsion, Power Train, Established Laser Applications and Non-Traditional Laser Applications – Manufacturing, production, product design and research/development engineers and anyone interested in using and/or developing flexible applications for automotive material processing systems to reduce costs, improve quality and provide flexible laser manufacturing.

Body in White – Manufacturing, production, product design and research/development engineers and anyone interested in using and/or developing flexible applications for automotive material processing systems to reduce costs, improve quality and provide flexible laser manufacturing.

EXTRA EVENTS

This year ALAW is having a networking golf outing. It will be the day before the conference sessions begin, which is Tuesday, May 13. There is an additional $60 fee for those wishing to participate.

Also on May 13 from 7-9 p.m. there will be an open house at Fraunhofer USA, Center for Coatings and Laser Applications. Fraunhofer provides process development/consulting services for high power laser applications such as welding, cladding, cutting, and heat treatment and has a state-of-the-art laser facility.

IPG Photonics, a manufacturer of active fiber lasers, direct diode and amplifiers for application in several industries, will host a reception immediately after the conference concludes on May 15. There will also be an open house from 5:30-9 p.m. at TRUMPF, Inc. TRUMPF is a world market and technology leader in the area of industrial lasers and laser systems, and will also be open for visitors on Friday, May 16.

REGISTRATION

Visit **www.alawlaser.org** for complete registration information or to download forms and/or a conference brochure. There is an early bird registration discount if you register at least five weeks prior to the conference. For more information contact LIA's Director of Conferences Beth Cohen at 407-380-1553, or e-mail bcohen@laserinstitute.org. ■

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CORPORATE MEMBER PROFILE

ALABAMA LASER

An LIA corporate member since 1998, Alabama Laser, Munford, AL, offers process development, laser systems, specialized laser research services, and complete laser job shop services. Alabama Laser's manufacturing experience coupled with its engineering research team helps the company provide solutions for customer's specific application needs.

COMPANY ORGANIZATION

Founded in 1980 by Don Johnson, who today is the company's CEO, Alabama Laser is a division of Alabama Specialty Products, Inc. and consists of 250 employees.

"The company began by machining metal specimens for corrosion and mechanical testing in 1980. As lasers became part of that machining process, Alabama Laser began performing laser cutting and welding services for many other companies and, over the years, grew into one of the nation's largest laser job shops," explained Alabama Laser President Wayne Penn.

"Our founder and owner Don Johnson saw the need for faster more reliable laser systems in our own shop, so he tasked his engineering team with building our own systems. After completing many systems to handle production in our job shop, other companies approached us with laser system needs of their own, so Alabama Laser started to design and manufacture systems for others. Drawing from our years as a laser job shop, we were able to offer unique experience to help provide customers with solutions to their system needs. Today, Alabama Laser is able to conduct laser research on a customer's project, provide process development for that project, and then build a system to meet their needs."

PRODUCTS AND APPLICATIONS

Alabama Laser first manufactured industrial laser systems for other companies in 1997 and the job shop has provided services to aerospace, auto racing, transportation, industrial equipment, medical, defense/government, furniture, agricultural, automotive, oil field, and chemical industries. The company's laser systems include CO2 lasers, Nd:YAG lasers, fiber lasers, direct diode lasers, and fiber-delivered direct diode lasers. Additionally, Alabama Laser specializes in laser research and development services.

"Our laser research staff and in-house engineering/design team is devoted to providing solutions for laser machining problems, including system development and process development for laser cutting, welding, etching/marking, metal deposition, heat treating, hybrid welding, and laser cladding," said Penn.

According to Penn, custom systems that have been built for customers' specific requirements are the company's biggest selling items.

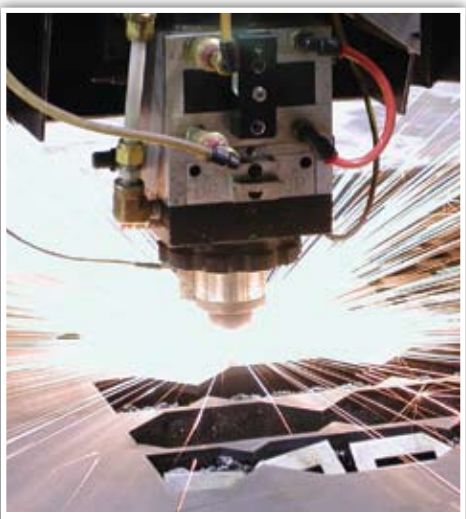
Regarding their latest products, Penn explained that a new line of laser marking systems, including tabletop models and larger automated models have recently been released.

"Another new product line is our modular TetraPORT laser systems that can be designed for welding, cutting, heat treating, metal deposition, and laser cladding," he said.

Penn has seen the largest industry growth in work for military and engine technology industries. He has also seen greater reliability and production speed emerge as positive industry changes.

As an LIA member for 10 years now, Alabama Laser likes being able to network with the laser community through the LIA and also be able to refer its customers to LIA for education in safety and laser processing. For more information visit **www.alabamalaser.com.**

Alabama LASER



Alabama Laser offers research, job shop services, and systems for laser cutting, welding, etching, cladding and other applications.

LIA Membership

BECOME A MEMBER TODAY

ABOUT:

Join the Laser Institute of America and become part of the worldwide laser information and application society. LIA members represent every facet of the laser community.

Our members include:

- Engineers
- Industrial Hygienists
- Medical Doctors
- Laser Operators
- Safety Professionals
- Nurses & Allied Health
- Biomedical Technicians
- Teachers & Students

LIA individual members join with corporate members to create a laser community, allowing you to take advantage of tremendous informational resources and networking opportunities. Join your colleagues at LIA's Northeast, Great Lakes and West Coast chapters and other regional events throughout the world.

Reap the benefits of being associated with the only society dedicated to fostering lasers, laser applications and laser safety worldwide!

MEMBER BENEFITS:

- Complimentary subscription to the peer reviewed Journal of Laser Applications® (published 4 times a year, a $380 value). This is an excellent publication forum for your technical work.
- Complimentary subscription to LIA Today, our bi-monthly newsletter.
- Special member rates on all LIA publications (including the ANSI Z136 series of laser safety standards), videos and safety training guides.
- Substantial discounts on LIA courses, conferences and seminars. This includes laser safety officer training, the International Congress on Applications of Lasers and Electro-Optics (ICALEO®), the International Laser Safety Conference (ILSC®), the Pacific International Conference on Applications of Lasers and Optics (PICALO) and the Automotive Laser Applications Workshop (ALAW).
- Discounts on ANSI eStandards store purchases. Access to a network of information and opportunities. Affiliation with the leaders of the laser industry.

TO RECEIVE AN APPLICATION, OR ADDITIONAL INFORMATION, CONTACT LIA AT (407) 380-1553 OR WWW.LASERINSTITUTE.ORG

ASC Z136 UPDATE

The annual meeting of Accredited Standards Committee (ASC) Z136 took place on Friday, Feb. 8, 2008 in Orlando, Fla. Highlights included:

- The reappointment of Robert Thomas as committee secretary by Peter Baker on behalf of the secretariat (LIA) and the recommendation to reappoint Ron Petersen and Sheldon Zimmerman as committee chair and vice chair, respectively. These recommendations were unanimously approved by the committee.
- The reappointment of all standards and technical subcommittee chairs, as well as the reappointment of the editorial working group chair.
- The approval of Buffalo Filter and LASERVISION USA as new organizational members to the committee.
- The creation of a new membership category "member emeritus" that is based on long and distinguished service in support of Z136 standards. Nominations for member emeritus were considered and approved unanimously by the committee for Sid Charschan, Dave Edmunds, Jim Smith and Myron (Mike) Wolbarsht.
- A report on the findings of the ANSI audit and recommended changes necessary to the ASC Z136 Procedures.
- Status reports from each standards and technical subcommittee, including the announcement of the completion of the new ANSI Z136.7 American National Standard for *Testing and Labeling of Laser Protective Equipment.*
- A report by Robert Thomas on the activities of a new Ad-Hoc group created to address the scientific rationale for exposure limits in the region near 1 mm in wavelength where IEEE and Z136 standards interface.

New business included discussion of the upcoming LSO workshop in Albuquerque (Sandia National Labs) in July.

Next year's annual meeting will be held on March 22, 2009, in Reno, Nev. in conjunction with ILSC® 2009. ■

ASC Z136
Safe Use of Lasers
Accredited Standards Committee

CHAPTER CORNER

NORTHEAST CHAPTER

The last meeting of the Northeast Regional Chapter of LIA was held at Springfield Technical Community College, Springfield, Mass., on Tuesday, Feb. 26. The focus of the meeting was regional photonics education. This meeting allowed current employers and educators to discuss the relevant topics pertaining to photonics education today as well as the future of this area of study. Current professors, graduates, and students spoke on behalf of the institutions and their curriculum and provided insight as to what they are teaching, what they are learning, and what their experiences are. Employers who attended were able to provide feedback as to what they look for in graduates as well as relay insight as to what they feel could be of greater focus with new technologies rapidly improving. A social hour preceded the meeting, as did an optional tour of the Laser Electro-Optics Technology Department. For more information visit **www.laserinstitute.org/membership/Chapters/New_England/**.

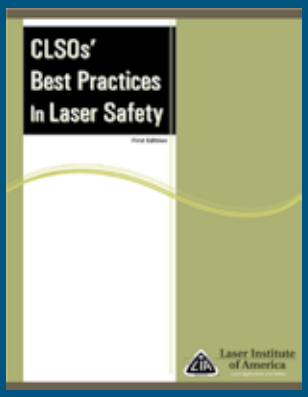
GREAT LAKES CHAPTER

The last meeting of the Great Lakes Chapter of LIA was held in November 2007. The Great Lakes Chapter was started in 2006 and includes not only the state of Michigan but also the supporting states of Illinois, Indiana, Ohio and the province Ontario, Canada. For more information, visit **www.laserinstitute.org/membership/Chapters/Great_Lakes/.**

Membership in an LIA Chapter offers a unique opportunity to meet and network with individuals including end-users, manufacturers of lasers and related products, safety officers, company presidents and researchers. While there are no chapter membership dues per se, it is required that participants join as an individual or corporate member of the LIA. ■

CLSOs' Best Management Practices

CLSOs' Best Practices in Laser Safety is a new book from LIA that concentrates on how to address Class 3B and Class 4 laser hazards and their safe operation. It is a compendium of procedures, policies and practical advice to be used by laser safety professionals. Cost for pub. #214 for LIA members is $120 or $140 for nonmembers. To order your copy, visit **www.laserinstitute.org/store**.



WELCOME NEW MEMBERS

CORPORATE MEMBERS

Andrews Glass Co., Inc, Vineland, NJ
Bayerisches Laserzentrum GmbH, Erlangen, Germany
GE Global Research, Niskayuna, NY
Louis Rudzinsky Associates, Inc., Lexington, MA
Norfolk State University, Norfolk, VA
Revision Eyeware, Effex Junction, VT
Solaris Laser Institute, Mission Viejo, CA
Solaris Laser Institute, Encino, CA
Solyndra, Fremont, CA
Tennessee Rand, Chattanooga, TN

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

INDIVIDUAL

John Bryant, Oxford, AL
Gideon Jose, Oxford, AL
Debra Whittaker, Oxford, AL
Jessica Blackwell, Cabot, AR
Edouard Mouaikel, Chandler, AZ
Morakod Aphaisuwan, Tucson, AZ
Allan Charnaw, Anaheim, CA
Leonardo Lopez, Fullerton, CA
Brian Patterson, Livermore, CA
Barbara Kuntz, Monrovia, CA
Adele Laikin, Pomona, CA
Tzay-Fa Su, Santa Clara, CA
Gianfranco Pellegrini, Santa Rosa, CA
Angel De Mola, Upland, CA
Eric Fong, Westminister, CA
Brenda Samuels, Yucca Valley, CA
Linda Kaley, Denver, CO
Barbara O'Kane, Golden, CO
Brian Peer, Edgewater, FL
John Hallbourg Pinellas Park, FL
Chad Morin, Alpharetta, GA
Melissa Hyde, Suwanee, GA
Kathy Buffaloe, Pocatello, ID
Steven Dulmes, Grayslake, IL
Eric Bieberich, Fort Wayne, IN
Laurette Robey, Fort Wayne, IN
Arthur Ragusa, Ayer, MA
Syed Naveed, Marlborough, MA
Brad Wamsley, Wilmington, MA
James Waterman, Wilmington, MA
Howard Donovan, Lanham, MD
Nick Sorkoram, Sturgis, MI
Janet DuBiel, Traverse City, MI
Leping Li, Bloomington, MN
Brett Maiorano, Charolotte, NC
Lateshsha Alston, Omaha, NE
Sam Siegel, Durham, NH
Wenwu Zhang, Schenectady, NY
John Sowa, Schenectady, NY
Edward Shapiro, Spartanburg, SC
Dusty Brannum, Arlington, TX
Lana Hahn, Dallas, TX
Charles Maricle, Houston, TX
Donna Ware, Wichita Falls, TX
Doug Czerwinski, Murray, UT
Beth DeJong, Murray, UT
Zachary Longson, Murray, UT
Denise Stoddard, Murray, UT
Katie Allsop, Saint George, UT
Catima Allred, Salt Lake City, UT
Tiva Rickers, SLC, UT
Leah Ann Myers, Lancaster, WI
Aline Oliveira, Mogi das Cruzes, Brazil
Wes Depourcq, Vancouver, BC, CAN
Hassan Ztemadi, Richmond Hill, CAN
Russell Duckworth, Richmond Hill, CAN
Tyson Sonnenburg, Richmond Hill, CAN
Malicdim Wilfredo, Richmond Hill, CAN
Patrick Martel, La Pocatiere, QC, CAN
Ronald Javitch, Montreal, QC, CAN
Deepa Bhatt, Loughborough, U.K.
Kostas Kozyrakis, Athens, Greece
Takehiro Watanabe, Chiba, Japan

& Standards; 2) Measurements and Standards to Accelerate Innovation in the Biosciences; 3) Comprehensive National Cyber Security Initiative: Leap-Ahead Security Technologies, and 4) Going at Light Speed: Optical Communications and Computing.

Laser Light Detects Disease On The Breath

An optical spectroscopy technique that uses a laser to detect molecules in the breath could help to diagnose diseases such as asthma or cancer, reports the Feb. 22 issue of *Optics.org*. According to researchers, they have improved a technique, known as cavity-enhanced direct optical frequency comb (OFC) spectroscopy, to be more sensitive and cover a larger spectral bandwidth.

"With our current system we can detect many tens of molecules with sensitivities near the 1 part per billion level," said Michael Thorpe, a researcher from JILA, a joint venture between NIST and the University of Colorado.

Thorpe's team uses a mode-locked erbium-doped fiber laser that generates 100 fs pulses and covers a spectrum between 1.5-1.7 µm. By coupling these pulses into an optical enhancement cavity and using a virtually imaged phased array (VIPA) detector, a high spectral resolution of 800 MHz is achieved. The pulses of laser light were fired into an optical cavity that contained the breath sample. The laser beam bounces back and forth within the cavity allowing the light to sample the entire volume. By comparing the light coming out of the cavity with the light that went in, the JILA team could determine which frequencies of light were absorbed and by how much.

"Light transmitted from the cavity is dispersed into a two-dimensional pattern and imaged onto a camera by the VIPA spectrometer," explained Thorpe. "Computer databases and software compares the recorded spectrum against known molecular spectra to determine the quantities of the individual molecules contained in the gas sample."

Laser Could Improve Radiation Treatment

A 300 TW laser with an intensity of $2x10^{22}$ W/cm^2 has been developed at the University of Michigan (UM), reports the Feb. 26 issue of *Optics.org*. Claims are that the laser, which is a modification of an existing 50 TW laser, sets new records for both output power and beam intensity. What's more, the laser can produce the intense beam once every 10 seconds.

"We have demonstrated the highest power and highest intensity repetitive short-pulse laser," said Victor Yanovsky, a researcher at UM. "We made it first by upgrading our existing 50 TW Hercules laser system."

The Ti:sapphire laser emits at a wavelength of 800 nm with a repetition rate of 0.1 Hz and a pulse duration of 30 fs. The researchers believe that such intense lasers may be helpful in developing better proton and electron beams for radiation treatment of cancer, among other applications.

"The aim of our research was to investigate the basic science of light-matter interactions at ultrahigh intensity and particle acceleration," commented Yanovsky. "New physics such as radiation reactions, quantum effects and relativistic ion plasma is predicted at high intensities. Practical applications of particle acceleration include ion cancer therapy." ■

IPG PURCHASES PATENT PORTFOLIO

IPG Photonics Corporation, Oxford, Mass., has purchased more than 100 key U.S. patents, and their more than 340 foreign counterparts, by acquiring a photonics patent portfolio from British Telecom. This large portfolio includes patents relevant to both current and future photonics components and systems as well as devices and techniques that are commonly used throughout the photonics industry. The acquired patents date back to the 1990s.

"These patents cover pioneering work by British Telecom and we are pleased to have secured the rights to technologies that are so pivotal to our industry." said Dr. Valentin P. Gapontsev, IPG Photonics' CEO. Of particular note to IPG in this portfolio are early patents that cover single mode lasers.

In other news, Gapontsev presided over the NASDAQ stock market opening bell on Monday, January 28, 2008 in New York City, NY.

SYNOVA TEAMS WITH FRAUNHOFER

Synova, Lausanne, Switzerland, a patent holder of water jet-guided laser technology, announced it has joined a research alliance led by the Fraunhofer Institute for Solar Energy Systems (ISE) to explore new manufacturing methods that will speed processing and improve the performance of solar cells. Comprising industry leaders whose offerings span the photovoltaic (PV) manufacturing spectrum, the alliance is investigating the use of Synova's Laser MicroJet® (LMJ) technology with liquids other than pure water to prove LMJ's viability for wafering and microstructuring applications. Through this concerted research effort, the alliance members expect to produce a superior alternative to conventional lasers, chemical processes, diamond blade saws and multi-wire slurry saws, aimed to increase solar cell efficiency while lowering overall cell cost.

"FAST SHIP" PROGRAM INTRODUCED

Ophir-Spiricon, Logan, Utah, has introduced "Fast Ship," a new program that provides one-day shipment of its most popular power/energy, beam profiling, and M2 laser measurement equipment. Select equipment is guaranteed to be in-stock and available to ship in one business day. If the Fast Ship item is not in stock, Ophir-Spiricon will pay for shipping on that order. Same-day shipment is also available for orders placed on in-stock items before 2 p.m. MST. For more information visit www.ophir-spiricon.com. ■

BEST PRACTICES IN LASER SAFETY

LIA is proud to announce a new release – *CLSOs' Best Practices in Laser Safety*. This book concentrates on how to address Class 3B and Class 4 laser hazards and their safe operation and is a compendium of procedures, policies and practical advice to be used by laser safety professionals. An international team of 20 laser safety experts and certified laser safety officers (CLSOs) from the industrial, medical, and academia fields volunteered their time and effort to create this benchmark reference handbook.

The LIA would like to sincerely thank the following CLSOs for their participation in writing *CLSOs' Best Practices in Laser Safety*: Arie Amitzi, Ricky Chan, Surendra Dua, David Ermer, Paul Daniel, Jr., Stephen Hemperly, Bill Janssen, Thomas Lieb, Hoa Ly, Shirley McNeil, Jodi Powers, Timothy Reed, David Schoep, Richard Shea, Geoffrey Sirr, Alice M. Sobczak, Sandu Sonoc, Lawrence Sverdrup, Wei-Hsung Wang, and Susan Winfree. We applaud your dedication and commitment in making laser usage safe.

The different chapters in this handbook cover areas of laser safety practices that are typically needed in the anticipation, recognition, evaluation and control of laser hazards as well as the rules and regulations that exist. An added feature included with the book is the CD ROM Initial Training and Refresher Training PowerPoint presentation for laser safety officers to use to train their facilities' laser users. To order your copy, visit **www.laserinstitute.org/store**. Cost for LIA members is $120 or $140 for nonmembers.

NEW BLS EXECUTIVE DIRECTOR

The Board of Laser Safety (BLS) has appointed Barbara Sams to executive director with unanimous approval from the BLS Board of Commissioners. Sams joined LIA in 1995 initially as assistant to the executive director. Soon after, she assumed the responsibilities of administrative secretary to Accredited Standards Committee (ASC) Z136, and became staff liaison to the American National Standards Institute (ANSI). She participates on the ASC Z136 Administrative Committee (ADCOM), with full voting privileges.

"Currently as LIA's standards director, Barbara has done an outstanding job helping ASC Z136 committee members to revise current ANSI Z136 laser safety standards and develop new ones," stated Peter Baker, BLS chairman. "We are looking forward to her taking the BLS and its certification process to a whole new level."

Sams will be leading the BLS to help achieve its goal of improving the practice of laser safety by providing opportunities for education, assessment, and recognition of laser safety professionals.

NEW ANSI STANDARD RELEASED

The LIA is pleased to release the new *American National Standard for Testing and Labeling of Laser Protective Equipment (ANSI Z136.7)*. This standard provides reasonable and adequate guidance on the test methods, protocols, specifications, report format, and labeling for devices used for eye protection from lasers and laser systems that operate at wavelengths between 180 nm and 1 mm. Such protective devices include laser eye protective devices or instrument filters, laser window filters, and laser area protective barriers, screens or beam blocking curtains. The test procedures provided in this document ensure that eyewear, windows, and barriers maintain their specified level of protection throughout the useful life of the product.

Six informative appendices are included to guide the reader through material characterizations for the different filter/material types. The standard addresses not only absorptive filter materials, but new reflective coatings (e.g., dielectric stacks, holograms) and hybrid filters. The ANSI Z136.7 can be ordered at **www.laserinstitute.org/ANSI** or by calling 407-380-1553.

MARK YOUR CALENDARS

The 27th International Congress on Applications of Lasers & Electro-Optics (ICALEO® 2008) will be held Oct. 20-23, 2008 in Temecula, California. ICALEO 2008 will include three conferences, the Laser Materials Processing Conference, the Laser Microprocessing Conference, and the Nanomanufacturing Conference as well as a Poster Presentation Gallery, the Laser Solutions Short Courses, a Business Development Session and plenty of networking opportunities. For complete details on ICALEO or for sponsorship information, visit **www.icaleo.org** or contact Beth Cohen at 800.34.LASER or e-mail bcohen@laserinstitute.org.

LIA AT LASYS

March 4-6, 2008 saw the debut of LASYS, a new international trade fair for system solutions in laser material processing. The show also featured the Stuttgart Laser Technology Forum that was held for the fifth time. LIA was glad to play a supportive role in the technical programs associated with both of these conferences and had a booth during the show. With 180 exhibiting companies, this was a great opportunity for LIA to gain some international exposure. Attendees were mostly interested in our conferences and membership directory which represents our corporate members. ■

JLA UPDATE

The LIA has appointed Dr. Reinhart Poprawe as senior editor for materials processing for LIA's *Journal of Laser Applications®*. The JLA, first published in 1988, is the official journal of the LIA and serves as the major international forum for exchanging ideas and information in disciplines that apply laser technology. Research coming under Poprawe's purview involves laser material interactions in industrial processes, as well as laser material process design, development, or refinement. Poprawe replaces the well-respected Walter W. Duley, a professor at the University of Waterloo in Ontario, Canada.

Poprawe holds a PhD in physics from the Technical University of Darmstadt. Since February 1996 he has been managing director of the Fraunhofer Institute for Laser Technology and holds the university chair for laser technology at the RWTH Aachen. Poprawe has been an LIA board member since 2001.

The JLA is published four times a year by the Laser Institute of America in February, May, August and November. It is sent to all LIA members as a member benefit. For nonmembers of LIA, call the American Institute of Physics at 1.800. 344.6902 for subscription information.

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