



# LIA TODAY

THE OFFICIAL NEWSLETTER OF THE LASER INSTITUTE OF AMERICA

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

FOCUS: RESEARCH | VOLUME 17 NUMBER 5 | SEPTEMBER / OCTOBER 2009

## HYBRID WELDING THE TECHNOLOGY ADVANCES

By Geoffrey Giordano

Hybrid laser-arc welding (HLAW), already a manufacturing staple in the shipbuilding, automotive and aerospace industries, is poised to be adopted by even more users intent on taking advantage of its superior joining speed and weld penetration.

HLAW's well-documented benefits over other joining methods — including the ability to create long, uninterrupted welds with lower heat, resulting in less distortion — could make the process ideal in the manufacture of railway cars. Also, researchers monitoring industry trends say pipe production and pipe laying could be made more efficient.

Meantime, after years of studying HLAw's vital role in European cruise ship manufacturing, the Navy is getting on board with applying the process in the production of T beams, according to Stan Ream of the Edison Welding Institute in Columbus, Ohio.

Even "green" applications appear to be in the offing. With offshore wind energy gaining more attention in Germany, for instance, engineers are studying the use of HLAw in the production of foundation structures using steel pipes and complex 3-D weld paths, according to Claus Thomy, group manager of joining processes at BIAS GmbH of Bremen.

### HLAW GAINS GROUND

Nearly 30 years after researchers at Liverpool University invented laser-arc hybrid welding, HLAw has made inroads into the (*Con't. pg. 6, see HYBRID*)

## LIA WILL ILLUMINATE LASERS' ROLE IN GLOBAL ENERGY REVOLUTION

By Geoffrey Giordano

Carbon nanotubes, photovoltaics and the "hydrogen economy" — not exactly household concepts yet. But they are technologies at the forefront of the growing worldwide demand for "green" energy and manufacturing. And lasers are critical to this global revolution.

The Laser Institute of America (LIA), the trusted and respected advocate of cutting-edge applications of laser technology since 1968, will unveil the most up-to-the-minute developments in these and other fields when it gathers industry leaders from around the world at the 28<sup>th</sup> International Congress on Applications of Lasers and Electro-Optics (ICALEO®).

When ICALEO kicks off Nov. 2, 2009 at the Hilton located in the WALT DISNEY WORLD® Resort, "green" applications of laser technology will be at the forefront of the conference, which ends Nov. 5<sup>th</sup>. The plenary session "Frontiers and Challenges for the Green Economy" at 9 a.m. on November 2<sup>nd</sup> will "unveil to even the most casual observers the necessity, the inevitability, of applying laser technology to the manufacture of solar-energy cells" (*Con't. pg. 8, see Energy*)

## LIA ANNOUNCES

### NEW LIA WEBSITE 10% OFF ONLINE ORDERS

LIA is proud to announce the launch of its newly upgraded, enhanced and refreshed website. LIA's goal with the new site is to provide a completely integrated user experience that's easy to navigate and serves as a useful resource for members. The new site utilizes some of the most cutting-edge web design techniques to produce a cleaner, faster and more modern online experience. In fact, the site is built to integrate with emerging online vehicles including the latest mobile devices such as the popular Apple® iPhone.

Offering a more user-friendly and streamlined navigation, the new site enables visitors to easily browse LIA conferences and events, helpful resources, a career center and a completely revamped online store featuring more than 100 products. Within two clicks on the customized shopping cart feature, visitors can quickly and conveniently purchase ANSI standards, online courses, training videos and CDs, laser application resources, safety publications and guides, signs, labels and conference proceedings. (*Con't. pg. 19*)

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**Laser Institute  
of America**

*Laser Applications and Safety*

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# LIA TODAY

## THE OFFICIAL NEWSLETTER OF THE LASER INSTITUTE OF AMERICA

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

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

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## ABOUT LIA

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

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

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

## CALENDAR OF EVENTS

### Laser Safety Officer Training

Dec. 7-9, 2009	Orlando, FL
Mar. 9-11, 2010	San Jose, CA

### Laser Safety Officer with Hazard Analysis\*

Nov. 2-6, 2009	Orlando, FL
Feb. 1-5, 2010	Orlando, FL
Mar. 8-12, 2010	San Jose, CA

\*Certified Laser Safety Officer exam offered after the course.

### Medical Laser Safety Officer Training\*

Nov. 14-15, 2009	New Orleans, LA
Feb. 6-7, 2010	Chicago, IL
Feb. 20-21, 2010	Atlanta, GA

\*Certified Medical Laser Safety Officer exam offered after the course.

### ICALEO® 2009

Nov. 2-5, 2009	Orlando, FL
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### PICALO 2010

Mar. 23-25, 2010	Wuhan, China
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### LAM 2010

May 11-12, 2010	Houston, TX
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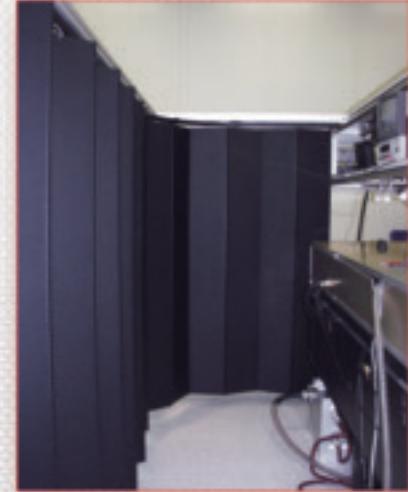
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## LIA Career Center

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Visit <http://careers.laserinstitute.org> today to post your job or search job listings.

### FIND A JOB FILL A POSITION

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

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



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## PRESIDENT'S MESSAGE



After the grim economic beginning of the year, Wall Street seems to have rebounded well. Also, laser companies' stocks have recovered nicely and it gives me a strong sense of hope and optimism for a bright future ahead for lasers.

Companies generally use weak economic times to reinvent and redefine themselves in order to serve their customers more effectively and to ready for strong future growth. Similarly, LIA has used the early part of 2009 to realign and redefine a few of its strategies to ensure it continues to serve and provide benefits to its members and the laser community at large.

Countless volunteering efforts by the executive committee and board members have been committed to compiling and examining information from the past conferences, workshops and safety courses to evaluate and understand what we're doing as a community and redefine how LIA should move forward. While the process is still ongoing, I'm sure that by year-end LIA will have a more focused and strong strategic vision defined for its future activities. I would like to thank all of the executive committee and board members for the time they have dedicated to this important activity.

Speaking of time, it's that time of the year again – ICALEO® time! Many of us look forward to this time of the year to visit a warmer destination, relax a bit, and meet friends and colleagues while we learn what's new and exciting in laser processing. The 28<sup>th</sup> ICALEO conference is being hosted Nov. 2-5 in Orlando, Fla. this year and has a strong technical program with exciting new topics and all the usual LIA-hosted social opportunities to mingle. So let's all get together and discover what's new and exciting for the bright future that lies ahead for the laser community.

I look forward to ICALEO'ing with you all soon.

Rajesh Patel  
President  
Laser Institute of America

## EXECUTIVE DIRECTOR'S MESSAGE

### PLANTING AND HARVESTING

In the absence of "green shoots" in the economic picture we are doing our own planting and harvesting at LIA.

For many (27) years we have been planting seeds at ICALEO® and growing new topics, new leaders, new application areas and new conferences. Along the way, some of the application areas have become mature and widely used, such as cutting, welding, marking and laser additive manufacturing.



As these seeds grow and mature we are transplanting them in the form of workshops, such as the Laser Additive Manufacturing (LAM) workshop we held last March in San Antonio. This was such a success that we will hold LAM 2010 next May 11 and 12 in Houston. We are also planning a laser welding/hybrid welding workshop next year.

Thanks to the seeds that are planted and nurtured at ICALEO, LIA is the trusted source for laser processing applications and will continue to make this knowledge available to a range of application communities such as automobiles (e.g. at ALAW), aerospace, medical and others.

In November at ICALEO we will honor a master planter and harvester, Valentin Gapontsev, with the Arthur L. Schawlow award, LIA's highest honor. Dr. Gapontsev is from Russia, where he occupied the positions of senior scientist in laser material physics and was head of the laboratory at the Soviet Academy of Science. In 1990 he founded IPG Photonics, which initially focused in the communication arena, then built its capabilities in the area of high-powered fiber lasers for materials processing and defense applications. IPG now has a significant presence in Russia, Germany and the U.S.

Valentin Gapontsev has a unique track record in several technologies and multiple application areas. He is that rare individual who has excelled both as a technologist and as an international business leader. Come and hear his Schawlow address at ICALEO and learn more about planting and harvesting!

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

production of everything from civic infrastructure to appliances and food and medical equipment. Shipbuilding, which requires long weld lengths, was among the first industries to introduce hybrid welding.

"Several shipyards are using the process as a core manufacturing technology, not just a developmental one," Ream says. "This application arena primarily involves plate steels in the 8 to 12 mm thickness range, where HLAW is particularly effective. At typical powers of at least 10 kW, CO<sub>2</sub>, disk and fiber lasers have all been utilized in this application."

## HLAW OR GMAW

Now, more manufacturers are taking advantage of the combination of laser and gas metal arc welding, or GMAW, to produce stronger welds faster thus saving time and money.



**Hybrid welding in action using a CO<sub>2</sub> laser for a shipbuilding application**

line for the welding of tailored blanks, depending on the level of automation, the price varies from 4 million to 7 million euros (\$5.7 million to nearly \$10 million). The target for ROI should be 15 percent or more."

Since GMAW equipment is relatively inexpensive, Ream says, the cost of introducing HLAW is primarily driven by the laser cost. "While it is true that HLAW can provide gap tolerance that laser welding alone cannot, it is still the case that joint preparation and fit-up be better than that currently used for GMAW welding alone. HLAW on its own will not free the potential user from improving his normal joint preparation and fit-up methods. The good news is that prices for high-power disc and fiber lasers have been coming down for years, while the need to weld faster and deeper continues to increase."

That bottom-line upside is prompting many parties to explore the addition of HLAW to their production workflows.

## MORE TO COME

"I'm positive that the railway car industry may be the next attractive field for hybrid welding," Thomy asserts. He says railway firms are interested in axis mounting systems and production of welded and extruded aluminum profiles. "Kinki Sharyo (in Japan)

was conducting such panel welding experiments (of 25 meters length) in 2007" with the intent of applying the process to actual production in the near future.

Meantime, the U.S. Department of Transportation, along with the oil and gas industries, is exploring pipeline welding both overland and on lay barges, Ream says. The DOT "is funding at least two projects aimed at developing this capability," he says. "There are several motivating factors for this application, but higher welding speed is certainly the primary one. It is almost certain that some production version of HLAW in the oil and gas industry will emerge in the next year or so."

Thomy concurs, suggesting that new solid-state laser technology such as high-power fiber lasers may be used in pipe production and pipe laying, as is being undertaken in the Bremer Institut fuer angewandte Strahltechnik's (BIAS) FIBLAS project.

## WIDER RANGE OF APPLICATIONS

Investigation of further uses for HLAW includes exploration of how to process unlike materials and panels of varying thickness.

Though many applications are focused on steels in the 8 to 12 mm thickness range, Ream says, "There are other HLAW capabilities that make it attractive for substantially thinner (1 to 3 mm) steels. These applications are found in the automotive industry, but almost exclusively in Europe."

Indeed, Germany's BIAS is exploring the hybrid welding of thin sheet materials with automotive steels, Thomy confirms. "Additionally, hybrid welding may also be an attractive means of joining dissimilar material combinations, such as aluminum to steel — a process recently developed by BIAS and yielding very promising results, such as formable tailored hybrid blanks or aluminum-steel structures for shipbuilding."

Ultimately, Siltanen says, marketplace realities and customer demand will help shape the future of HLAW's use.

"In Finland, companies that already use the pure laser welding are looking to use HLAW in the future; the pressure to do this is coming from customers," he says. "The manufacturing sector of products for lifting, handling and transportation will use HLAW more (and the) normally very conservative construction industry is looking for possibilities for using it as well. There are several issues to solve, like how to convince the customers (of its benefits) and getting standardization to the right level." ■

*Geoffrey Giordano is a freelance editor and writer.*

## LASER WELDING WORKSHOP TO COME

Intent on fostering HLAW's future, LIA has taken the lead in educating current and potential users. LIA, a trusted source for fundamental laser technologies and applications, is presenting an entire program on hybrid welding during the International Congress on Applications of Lasers and Electro-Optics (ICALEO®, [www.icaleo.org](http://www.icaleo.org)) in Orlando on Nov. 2-5.

"ICALEO is the place where new technology is brought to light," notes LIA Marketing Director Jim Naugle. "This technology is developed and then perfected/transitions into end-user workshops like our Laser Additive Manufacturing Workshop. We soon will be introducing a workshop for laser welding."

## LASER INNOVATION PRIZE NOMINATIONS OPEN

Developers and researchers who work in the field of laser technology can now apply or be proposed for the Berthold Leibinger Innovationspreis 2010. The international prize of the private foundation Berthold Leibinger Stiftung is granted every other year for innovations pertaining to the application or generation of laser light. The prize money has been increased this year to 30,000, 20,000, and 10,000 euros for the first, second and third prizes respectively. The award ceremony will take place on July 9, 2010, 50 years after the invention of the laser.

The objective of this biennial competition is to foster advances in research and development in laser technology and to showcase the results to the public. The awardees are looking for ideas that are not only novel, but also have proved to be marketable and application-relevant already, explains Sven Ederer of the Leibinger Foundation.

Eligible to apply or be nominated are individuals and project groups worldwide whose main development efforts and market potential lies in the application or generating of laser light. The application deadline is Dec. 1, 2009. For more information, visit [www.leibinger-stiftung.de](http://www.leibinger-stiftung.de) or contact Sven Ederer at [sven.ederer@leibinger-stiftung.de](mailto:sven.ederer@leibinger-stiftung.de).



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and other environmentally friendly energy solutions," says LIA Executive Director Peter Baker. "Lasers more than ever will be vital to helping companies satisfy customer demands for efficient and sustainable energy, while producing consistently high-quality products in the automotive, medical, food and aerospace industries."

Dr. John Turner, a research fellow from the National Renewable Energy Laboratory in Golden, Colo., will give an overview of the future of energy in his keynote address "Frontiers, Opportunities and Challenges for a Hydrogen Economy." Other topics will include:

- "Lasers — An Enabling Technology in the Photovoltaics Revolution" by Dave Clark, Senior Director, Strategic Marketing, Photovoltaics at Newport Corporation/Spectra-Physics, Mountainview, Calif.

• Laser processing of carbon materials, from high-speed diamond film deposition to carbon nanotubes as semiconductor devices, by Dr. Yongfeng Lu, Lott Professor at the Department of Electrical Engineering, University of Nebraska-Lincoln.

"The prospect of lasers in the green energy economy has never looked better," notes Congress General Chair Xinbing Liu, Director, Panasonic Boston Laboratory, Newton, Mass., USA. "This is the time to turn vision into reality."

ICALEO has been devoted to the field of laser materials processing for 27 years and is viewed as the premier source of technical information in the field. For more information and to register, please visit the LIA's ICALEO website at [www.laserinstitute.org/ICALEO](http://www.laserinstitute.org/ICALEO). ■

*Geoffrey Giordano is a freelance editor and writer.*

## NANOMANUFACTURING AT ICALEO

### Transforming the way products are manufactured – precision, flexibility and cost reduction!

The Nanomanufacturing Conference at the International Congress on Applications of Lasers & Electro-Optics (ICALEO®) 2009 will explore topics in this still emerging but rapidly advancing field and the role various lasers can play in manufacturing.

Organized by Conference Chair Costas Grigoropoulos of the University of California-Berkeley, presenters will discuss a wide variety of nanomanufacturing technologies, including nanopatterning, nanolithography, nanoprocessing and nanoparticle fabrication. These technologies are put to use in such applications as flexible electronics, solar devices and biomedical nanomaterials.

#### NEAR-FIELD PROCESSING

Near-field processing will be examined in session one of the Nanomanufacturing Conference. Near-field nanomanufacturing can break the diffraction limitation and generate features at nanoscale. However, current near-field nanomanufacturing suffers from the low throughput which hinders its practical applications. In the paper "High Throughput Laser Assisted Near-field Nanomanufacturing," Heng Pan of UC Berkeley presents a new approach of adopting a tip array and generating an array of features with nanoscale resolution. Additionally, the nanodevices fabricated by this technique will be demonstrated.

Under the vision of a new nanotechnology manufacturing paradigm combining fundamental scientific research with industrial outlook, the Center for Scalable and Integrated Nano-Manufacturing (SINAM), UC Berkeley, is developing high-throughput, large scale nano-manufacturing tools through the collective effort of its exceptional interdisciplinary team. One challenge in the commercialization of nanoscale devices is the development of a high-throughput nano-fabrication technology

that allows frequent and easy design changes.

In the presentation by Li Zeng of SINAM, "Flying Plasmonic Lens at Near Field for High Speed Nano-Lithography" maskless nanolithography, such as electron-beam and scanning-probe-lithography, offers the desired flexibility but suffers from low throughput. SINAM has proposed and demonstrated a new low-cost high-throughput approach to maskless nanolithography that uses an array of plasmonic lenses that can "fly" at high speed above the surface to be patterned, concentrating short wavelength surface plasmons into sub-100 nm spots for photolithography. This low-cost nano-fabrication scheme has the potential to achieve throughputs that are two to five orders of magnitude higher than other maskless techniques.

#### NANO-FABRICATION

Nanoprocessing and nanoparticle fabrication is covered in session two of the conference. In "Bionanomanufacturing: Processing, Devices and Cell Studies," presenter Shaochen Chen of the National Science Foundation in Arlington Va. explains the lab's goal of investigating light-matter interactions at extremely short time and length scales by theoretical analysis and experimental studies. From such fundamental research, they develop advanced nanomanufacturing techniques and micro/nano-systems for applications ranging from biomedical engineering to solar energy harvesting.

Understanding surface properties of materials at the atomic-scale is of fundamental interest in advanced materials processing. In "Characterization of Aluminum, Brass and Steel Nanoparticles after Laser Ablation" Nancy Van Suetendael of the Florida Institute of Technology, Melbourne Beach, Fla., discusses how an interdepartmental research group at FIT is currently ablating samples using a state-of-the-art ultra-short pulse laser to create

nanostructures. These lasers are unique because they can be used to modify or machine any substance in an athermal ablation process, independent of melt point or composition, due to the physics of non-linear optical absorption. This research will culminate in a materials library where scientists can select candidate substances for developing a new class of high-temperature sensors for military, NASA and civilian aircraft.

## NANOSTRUCTURES

Session three will cover laser growth and interaction with nanostructures. The paper "Rapid Growth of Carbon Nanotubes using Laser-induced Chemical Vapor Deposition" presented by Sungho Jeong, Gwangju Institute of Science of Technology, Gwangju, South Korea, discusses the growth of single-walled and multi-walled carbon nanotubes by laser-induced chemical vapor deposition on a transparent substrate at room temperature.

Single-walled carbon nanotubes (SWNT) are regarded as one of the most promising materials for next-generation nano-electronics. However, there are still several challenges limiting its wide applications, including the inability in controlled growth of SWNT connections. In "Simultaneous Growth of Single-Walled Carbon-Nanotube Bridge Structures using Optical Near-field Effects" presented by W. Xiong of the University of Nebraska-Lincoln, they have developed a laser-based in-situ growth approach to simultaneously fabricate SWNT-bridge arrays on a single silicon substrate with precise control. Furthermore, laser polarization also shows significant influence on the control of growth site for SWNTs. The laser-based growth method suggests a promising solution for the fabrication of SWNT-based systems in nano-electronics.

In "Experimental and Theoretical Study on the Synthesis of Nanofibers by Laser Spinning" presented by Felix Quintero, Universidade De Vigo, Vigo, Spain, laser spinning, a new technique to produce ultralong amorphous ceramic nanofibers with tailored chemical compositions, is discussed. In this method, a high-power laser is employed to melt a small volume of the precursor material at high temperatures. At the same time, a supersonic gas jet is injected on this molten volume producing its rapid cooling and elongation by viscous friction with the high-speed gas flow, hence forming the amorphous nanofibers.

LIA's goal in hosting ICALEO is to bring both academic and industrial people together who may benefit from laser technology. For those especially interested in the new and emerging field of nanotechnology, this is the conference to attend. For more information about ICALEO 2009 or to view the full advance program that includes the Nanomanufacturing Conference, visit [www.icaleo.org](http://www.icaleo.org). ■

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## LASERS TO START CARS INSTEAD OF SPARK PLUGS

Scientists at Liverpool University and engineers at car giants Ford have developed a new ignition system that uses focused beams of laser light to ignite the fuel, reports a July 11, 2009 article by Richard Gray, science correspondent with *The Telegraph* ([Telegraph.co.uk](http://Telegraph.co.uk)).

The researchers claim the technology is more reliable and efficient than current spark plug technology and will enable cars to start more easily in cold and damp conditions.

It is understood that Ford, the world's fourth largest car manufacturer, hopes to put the laser ignition system into their top of the range vehicles within the next couple of years before making it more widely available.

Liverpool University's Dr. Tom Shenton, who is leading the project, said, "We are running engines everyday in our laboratory with this system now and our ultimate objective is to have it inside cars driven by consumers.

"Lasers can be focused and split into multiple beams to give multiple ignition points, which means it can give a far better chance of ignition. This can really improve the performance of the engine when it is cold, as this is the time when around 80 percent of the exhaust emissions are produced and the engine is at its least efficient.

"The laser also produces more stable combustion so you need to put less fuel into the cylinder."

In current engines, spark plugs are positioned at the top or bottom of a cylinder and they can often fail to ignite fuel effectively if the petrol is not in the right position in the cylinder.

In the new system, the spark plug is replaced by a laser powered by the car battery, which is sent along thin optical fibers into the engine's cylinders where lenses focus the beam into an intense pinprick of light.

When fuel is injected into the engine, the laser is fired, producing enough heat to ignite the fuel and power the engine.

The researchers claim that the laser, which will need to fire more than 50 times per second to produce 3000 RPM, will require less power than traditional spark plugs.

Some of the laser can be reflected back from inside the cylinder to provide information for the car on the type of fuel being used and the level of ignition, allowing the car to adjust the quantities of air and fuel automatically to optimise the performance. This raises the prospect of mixed fuel cars that can run on a number of different biofuels while ensuring they still run efficiently.

A spokesman for Ford said: "Ford, like all vehicle manufacturers, is obliged by European legislation to reduce emissions and our work in this area is led by Ford's UK R&D centre in Essex. This collaboration with the University of Liverpool is part of that effort, with Ford contributing in kind, with engineering time and equipment use, as well as financially."

The project has now been awarded a £200,000 grant by

the Carbon Trust to help develop the system further. Transport accounts for 25 percent of carbon emissions and it is hoped new ignition systems can help to cut this level of pollution.

Robert Trezona, Head of Research & Development at the Carbon Trust, said: "Laser ignition is attractive in a number of ways. It has a real potential to reduce greenhouse gas emissions in the future by improving the ignition and combustion of fuel, particularly in engines starting from cold, but it can also be used in mixed fuel engines such as biofuels." ■

### ENERGY INCENTIVE PROGRAMS

In the last issue (July/August 2009) of *LIA TODAY*, we published a small article titled "Funds for Fibers" that stated stimulus money is available to customers to purchase fiber lasers through the Clean Energy and Industrial Efficiency Program of the Massachusetts Department of Energy Resources (DOER). DOER provides financial incentives for many forms of energy savings related to, among other things, higher efficiency equipment replacement and/or the first purchase of high efficiency equipment as well as various kinds of lasers. For additional information on this topic, visit the Massachusetts Department of Energy website at [www.mass.gov](http://www.mass.gov).

### WHERE TO BEGIN

We would like to further report that there are literally hundreds of such programs available to businesses on federal, state and local levels, yet the topic is extremely complex. There is no easy route to finding those incentives for which a particular business might qualify; however, the Database for Incentives for Renewables and Efficiency website is a good first step/stop: [www.dsireusa.org/](http://www.dsireusa.org/). This site provides information about renewable energy and energy efficiency incentives and policies in effect in the United States. Relevant incentives and policies established by the federal government, state governments, local governments, electric utilities and non-profit organizations are included.

### DO THE RESEARCH

The network of opportunity is vast, and the only way to discover what's available to your business is to do the legwork. As there are numerous energy savings programs available, finding one that's right for your business typically requires extensive research. However, if you find an incentive program that covers up to 50 percent of new equipment costs, the time spent can be well worth the effort.

# LASER INDUSTRY & LIA LOSE FRIENDS

The LIA laser community is saddened by the sudden passing of two of its members – Glenn Golightly and Diane Laurin.

Laurin began her career with Laurin Publishing shortly after graduating from Russell Sage College in 1973 and left the company in July 1991, becoming vice president of a public relations agency in Lenox, Mass.

Diane returned to Laurin Publishing in early 2008 and was named group publisher in May 2008, spearheading a rebranding and refocusing of the company's three magazines. Her ambitious goal was to reinvigorate industry pride and position Laurin Publishing for the 21<sup>st</sup> Century, and one of her first accomplishments was giving the company a new identity,

Photonics Media, to describe its full suite of print and online media.

LIA was shocked and saddened to learn of her passing on August 3<sup>rd</sup>.

"Diane and all of the Laurin family members have been solid and consistent friends and supporters of LIA almost since our founding," said LIA Executive Director Peter Baker. "When Diane returned to Laurin Publishing as group publisher of *Photonics Spectra*, *BioPhotonics* and *EuroPhotonics* in 2008, it was a pleasure to see her and renew our friendship. Now that she is gone all of us at LIA feel the loss and extend our sincere condolences to the Laurin family."

Glenn Golightly, a 30-year industry veteran, was the managing director-Pacific Rim at LIA Corporate Member Laser Mechanisms, Inc. (Farmington Hills, Mich.) where he was a strong advocate for industrial laser material processing. His wide circle of friends included a large number of associates and customers he met in his international travels on behalf of Laser Mechanisms.

Golightly joined Laser Mechanisms in 1989 as a sales engineer and held a number of management positions throughout his career with the company. He served as Laser Mechanisms' general manager of industrial operations from 2001 to 2007.

"Glenn had a take-charge personality and was the driving force in the success of countless company initiatives," said Laser Mechanisms' President Bill Fredrick.

"Glenn was one of the truly great assets the industrial laser community has ever had. His energy, passion and knowledge of laser technology were unrivaled. His global diplomacy and infectious sense of humor always made Glenn a must-see at any event no matter where in the world you might find him. We will all miss him as an industry innovator and great friend," said Neil Ball, president of Directed Light. ■



**Diane Laurin**

*Photonics Spectra*, *BioPhotonics* and *EuroPhotonics* in 2008, it was a pleasure to see her and renew our friendship. Now that she is gone all of us at LIA feel the loss and extend our sincere condolences to the Laurin family."

## MOPA-M Pulsed Fiber Lasers @1064 nm

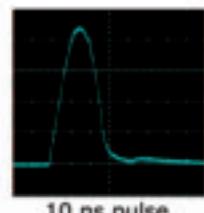
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\* Not all characteristics available simultaneously



10 ns pulse

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#### US Office (CT)

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aheld@multiwavephotonics.com  
Phone: +1 (860) 676-7875

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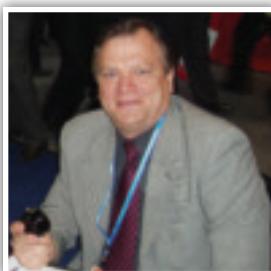


## CENTER FOR LASERS AND PLASMA FOR ADVANCED MANUFACTURING

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CLPAM is a National Science Foundation Center driven by Industry for Industry-University Cooperative Research. This is a multi-university Center with membership from major industries such as GE, Toyota, IMRA, Focus Hope, Trumpf and others. Some of the important benefits are:

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- Reduced funding costs, because the research investment is shared among all site members
- Proprietary rights to intellectual property developed at LAM sites, shared with other member companies, government organizations and educational institutions
- Improved networking opportunities within other interested industries



**Glenn Golightly**

Please visit our website <http://www.engin.umich.edu/research/lamircuc/> for more information. Please contact Ms. Debbie Hemmeter (hemmeter@umich.edu, phone 734-657-6824) for membership information.

## CORPORATE MEMBER PROFILE

## ACCELERON, INC.

LIA Corporate Member Acceleron, Inc. is a major provider of precision-welded parts and component assemblies to the medical, aerospace, aircraft, defense and semi-conductor industries. The company currently operates the largest privately owned electron beam and laser production facility in North America.

As a manufacturer specializing in electron beam and laser technology, Acceleron currently meets the needs of customers worldwide whose products vary in size and category. Other in-house services provided are sheet metal rolling, TIG welding, various types of parts testing, CNC milling, CNC turning and CNC grinding.

Located in East Granby, Conn., Acceleron was founded in 1974 by Don Montano and presently has 40 plus full- and part-time employees. Their operation consists of two plants located within close proximity totaling 48,000 square feet. One location provides all laser services while the other provides all electron beam services. Today's owners are Rory Montano and Lance Montano.

Acceleron got its start 35 years ago by providing services to medical- and defense-related programs. Today, the company's two most active industries are aerospace and defense.

### COMPANY MISSION

"Acceleron has shown its commitment to service and excellence for over three decades, and we take pride in being a leader in our areas of expertise. We are proud to be the largest and most diversified electron beam and laser service company in North America," said owner Rory Montano. "We are fortunate to have a dedicated and skilled staff, modernized equipment and a commitment to explore and develop new technologies, such as electron beam "additive manufacturing," that enable us to provide an unsurpassed level of quality in meeting some of the most complex challenges in the industry."

### INVITE THEM IN

Placing great importance on customer relationships, Acceleron, Inc. has developed an in-house educational seminar program to give engineers and technicians a better understanding of Acceleron's various technologies and how they differ. The goal is to educate customers on the capabilities of laser and electron beam technologies, including where and how they can be effectively used for present and future designs.

"Our seminars have been well-attended by existing customers, and feedback has been very good. Through our seminars, our customers are educated on the breadth of our capabilities. This becomes an avenue for them to become aware of additional services we offer while expanding our business opportunities," said Montano.

### STAYING STRONG

During its 35-year history, Acceleron, Inc. has seen many industry changes that have caused a continual evolution to occur within the company.

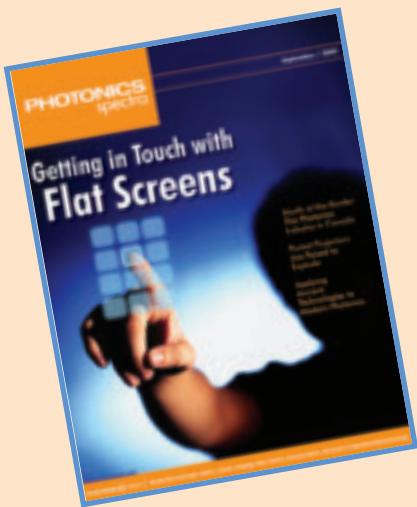
"The increasingly competitive nature of our present economic environment has caused us to look seriously at current practices and methods for process improvement that will best support the needs of our customers. As a result, we are implementing 'Lean Practices' that will provide increased efficiency while eliminating waste," said Montano.

"In early March, we embarked on an in-depth, 12-week continuous improvement training program attended by a dedicated core team. As part of that program, we have executed and continue to work on shop cleanup and organization for improved flow and efficiency; value stream mapping; process improvement and process/quality standardization.

Acceleron, Inc. has been an LIA Corporate Member for a decade. As the company is currently building up its sales and marketing functions, Montano anticipates high usage of LIA research materials to identify appropriate investments based on the latest technologies and to understand potential new markets. For more information, visit [www.acceleroninc.com](http://www.acceleroninc.com). ■



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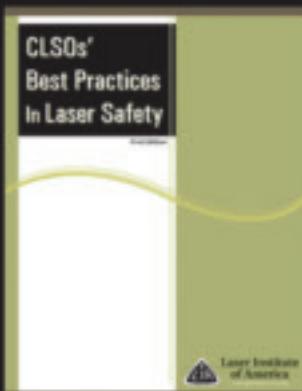
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## ASC Z136 UPDATE

Save the date! The 2010 annual meeting of ASC Z136 will be held on Friday, March 12, 2010 at the Hilton Doubletree Hotel in San Jose, Calif. As we get closer to the meeting date, additional details will be released, including hotel rates and ancillary meetings.

Reserve your space today! ASC Z136 Subcommittee Chairs – if you would like to hold a subcommittee meeting during the week starting March 8 in conjunction with the annual meeting, please contact Barbara Sams at [bsams@laserinstitute.org](mailto:bsams@laserinstitute.org) or 407-380-1553. Meeting space is available on a first-come, first-serve basis. ■

## JLA UPDATE

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

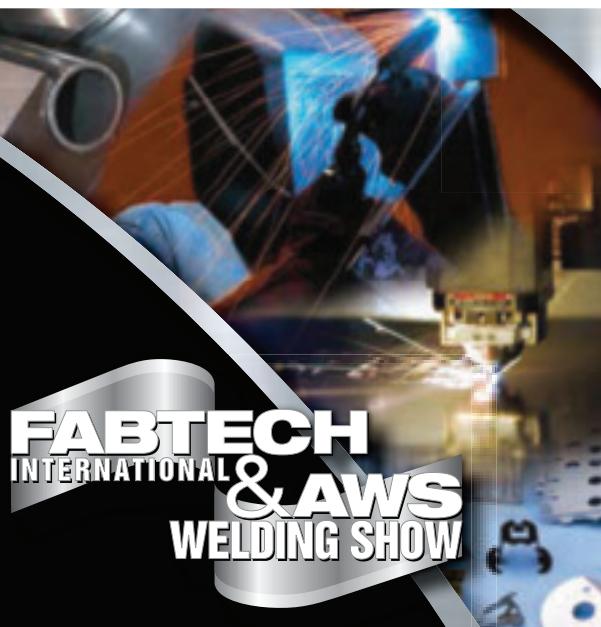
The JLA is published four times a year by the LIA in February, May, August and November. It is sent to all LIA members as a member benefit. For nonmembers of LIA, call the American Institute of Physics at 1-800-344-6902 for subscription information. Sign up at <http://scitation.aip.org/jla/alert.jsp>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

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# BLS UPDATE

Are you a practicing laser safety officer? Are you eligible for benefits under the GI Bill? If so, you should know that the reimbursement of fees associated with becoming a Certified Laser Safety Officer (CLSO) and Certified Medical Laser Safety Officer (CMLSO) have been approved for veterans' benefits by the State of Florida, Department of Veterans' Affairs. These certifications are available through the Board of Laser Safety (BLS).

In March 2001, the VA established rules to allow the cost for certifications and licenses to qualify for VA reimbursement. Under the GI Bill, if veterans qualify, the VA will reimburse them for taking a license or certification test. In 2008 the CLSO and CMLSO certification exams were added to its list of approved tests.

"This is an excellent opportunity for veterans to utilize their reimbursement benefits to gain a competitive edge in their workplace," said BLS Executive Director Barbara Sams. "Becoming a CLSO or CMLSO validates one's level of competency; it enables an individual to achieve higher recognition as a laser safety officer."

BLS certification demonstrates that individuals serving in the field of laser safety have agreed to adhere to high standards of safety and professional practice. It can play a key role in career advancement, and reentry into the work force.

Veterans who are interested in obtaining reimbursement for the CLSO and CMLSO certification programs must submit an

application at [www.gibill.va.gov](http://www.gibill.va.gov) for approval. Certain standards must be met in order to qualify.

To learn more about the VA reimbursement program, call 1-888-GIBILL.1 or visit [www.gibill.va.gov](http://www.gibill.va.gov). To learn more about the CLSO and CMLSO certification programs from the Board of Laser Safety, visit [www.lasersafety.org](http://www.lasersafety.org). ■

*The Board of Laser Safety (BLS) is affiliated with the Laser Institute of America (LIA), a professional society dedicated to fostering lasers, laser applications and laser safety worldwide. The mission of the BLS is to provide a means for improvement in the practice of laser safety by providing opportunities for the education, assessment and recognition of laser safety professionals.*



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# WELCOME NEW MEMBERS

## CORPORATE MEMBERS

- Fletcher Allen Health Care, Burlington, VT
- Laser Operations LLC (QPC Lasers), Sylmar, CA
- OptecNet Deutschland e.V., Hannover, Germany
- SoMatiqe Medical Dental Corporation, Dallas, TX
- UNIVET s.r.l., Rezzato BS, Italy

For a complete list of corporate members, visit our corporate directory at [www.laserinstitute.org/membership](http://www.laserinstitute.org/membership).

### INDIVIDUAL

William Nickell, Birmingham, AL  
Clifford Young, Fort Irwin, CA  
Ralph Schneider, Irvine, CA  
Michael Mielke, Petaluma, CA  
Michael Bennett, Redwood City, CA  
Ken Dzurko, Santa Clara, CA  
Manuel Leonardo, Santa Clara, CA  
Yongjin Xie, Santa Clara, CA  
Cheryl Levie, Sebastopol, CA  
Lawrence Shacklette, Melbourne, FL  
Sam Bosworth, Gainesville, GA  
Dean Wolfer, Morris, IL  
Gary Trueblood, Rockford, IL  
Holly Fortune, Indianapolis, IN  
Rohan Kelkar, Indianapolis, IN

Joel Shores, Indianapolis, IN  
Susan Myers, Lexington, KY  
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Zhongyan Sheng, Newton, MA  
Josue Alfaro, Waltham, MA  
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Jeffrey Triebel, Houston, TX  
David Carpenter, San Antonio, TX

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Walter Hammans, Logan, UT  
Gerald Dominick, Chesapeake, VA  
Lesly VanDen Heuvel, Chilton, WI  
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# MEMBER INNOVATIONS

## NEW FROM COHERENT

A new, pulsed green laser from Coherent, Inc., Santa Clara, Calif., delivers high performance for cost sensitive processes that require only moderate output power. The new AVIA 532-23 is a Q-switched, frequency doubled, diode pumped solid-state laser, offering 23 Watts of average power at a wavelength of 532 nm. This AVIA laser delivers a combination of high throughput speed and low cost of ownership for applications such as P2 and P3 patterning of thin film solar cells, micromachining of micro SD card packages, microelectronics package singulation and silicon via drilling. For more information, visit [www.Coherent.com](http://www.Coherent.com).

## HUFFMAN ADDS CHAMBER

Huffman Corporation, Clover, S.C., now offers its popular laser welding system – model HP-115 – with a fully enclosed atmospheric welding chamber. The benefits of laser powder fusion welding are further enhanced with the addition of a fully enclosed atmospheric chamber for welding in an inert gas environment. The system is designed for welding oxygen sensitive or reactive materials like titanium. The system can be configured with a variety of features like antechambers, inert gas handling and purification systems. For more information, visit [www.HuffmanCorp.com](http://www.HuffmanCorp.com).

## LASER CALORIMETER DEVELOPED

In order to determine the optical quality of laser optics, the Laser Zentrum Hannover e.V. (LZH), Hannover, Germany, has developed a laser calorimeter able to measure the absorption of light in the material. Specific advantages of the device are its high sensitivity, absolute calibration and a wide spectral range of the test wavelength. By using a precise temperature measurement of the material, the laser calorimeter is able to detect an absolute absorption of <1 ppm (one millionth of the irradiated laser power). This precision can detect the smallest absorption data deriving from surfaces, coatings or impurities in the material. The laser calorimeter is industrially available at the LZH in customer-specific versions. For more information, visit [www.laser-zentrum-hannover.de/en/](http://www.laser-zentrum-hannover.de/en/).

## NEW 5W GREEN LASER WELDER

Miyachi Unitek, Monrovia, Calif., has released the LW5AG green laser welder. The new 5 W laser offers increased weld speed (2.5x), penetration (~30%) and integration flexibility (2 energy- or time-share outputs) over the previous 2 W model. It utilizes a 532 nm wavelength in the visible (green) spectrum that is better absorbed by highly reflective materials enabling precision micro-welding of gold and copper alloys – applications that cannot be done with a traditional 1064 nm YAG laser. For more information, visit [www.muc.miyachi.com](http://www.muc.miyachi.com).

## ENERGY SENSOR FROM OPHIR

Ophir-Spiricon, Logan, Utah, has introduced the 3A-P-FS Very Low Power/Energy Sensor. The 3A-P-FS is designed to measure very low power and energy light sources and divergent beams, such as LEDs and diode lasers. The sensor can measure divergent beams up to  $\pm 40$  degrees. The 3A-P-FS measures very

low power, pulsed or CW lasers in the 0.19 to 20  $\mu\text{m}$  wavelength range. For more information, visit [www.ophir-spiricon.com](http://www.ophir-spiricon.com).

## NEW FROM NEWPORT

Newport Corporation, Irvine, Calif., has introduced the S-2000-TC, an addition to the S-2000 Stabilizer™ Series of pneumatic vibration isolators that feature compatibility with tie-bars and casters. The S-2000-TC, with a 2,000-pound load capacity per isolator, is an ideal solution for isolating optical tables, large inspection equipment, heavy machinery and can also support large-area sub-floors. The new tie-bar caster system permits the individual legs to be bolted together to improve mobility and system rigidity. For more information, visit [www.newport.com](http://www.newport.com).

## HIGH BRIGHTNESS

After release earlier in 2009 of the PLD-60 series with output power up to 60 W in a 105  $\mu\text{m}$  core fiber, IPG Photonics, Oxford, Mass., has extended the power into the same fiber with the new PLD-100 series. The available choice of wavelength covers all 9xx nm spectral range. Combining emission of these laser diodes, it is now possible to manufacture high power diode laser modules or complete system solutions with output powers up to multiple kW's out of a reasonably thin fiber with a narrow linewidth of emission. Such solution provides new opportunities for plastic and metal welding, brazing, cladding, medical and other applications. For more information, visit [www.ipgphotonics.com](http://www.ipgphotonics.com). ■



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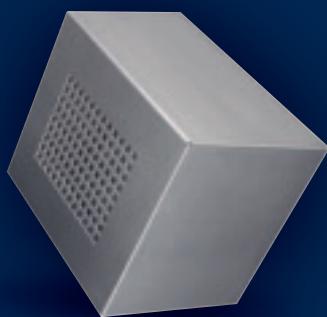
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- Fabricating Equipment

## MEMBERS IN MOTION

### ALD CERTIFICATION PROGRAM

An Academy of Laser Dentistry (ALD) certification program will be held on two pre-conference days, April 13-14, 2010 in Miami, Fla. in conjunction with ALD 2010, the academy's 17th annual conference and exhibition. The program includes lecture, hands-on, a 75 question multiple choice on-line examination and a clinical proficiency simulation examination. For details and to register, visit [www.laserdentistry.org/certification/index.cfm](http://www.laserdentistry.org/certification/index.cfm).

### MIDWEST LAB OPENS

Miyachi Unitek, Monrovia, Calif., has opened a new laser applications laboratory in the Wixom, Mich., which is just outside Detroit. The new facility enables Miyachi Unitek to work with customers and prospects to conduct sample evaluations and produce applications reports outlining results attained utilizing its range of Nd:YAG and fiber laser welders and markers. The lab will be managed by staff with practical experience in the lab which includes application and process development, design, assembly and troubleshooting of standard and custom laser systems. For more information, visit [www.muc.miyachi.com](http://www.muc.miyachi.com). ■

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# LIA ANNOUNCES, CON'T FROM PG. 1

In celebration of the launch of the new site, LIA is offering a special promotion on all publications sold via the new online store. Now through Oct. 31, 2009, both members and non-members will save 10% on any online purchase made via the new shopping cart (enter promo code: **SAVE10**). You can check out the new site at [www.laserinstitute.org/store/](http://www.laserinstitute.org/store/). Not valid with any other discount. Does not include membership, conferences, workshops or courses.

## SIGN SALE!

The LIA is having a "Laser Area Warning Sign Blowout Sale." For a limited time, all aluminum and magnetic signs are only \$10!

One of the most important aspects of implementing a successful laser safety program is displaying proper signage. According to ANSI Z136.1 *Safe Use of Lasers*, laser area warning signs should be posted around Class 2M and 3R laser areas, and are required to be posted around all Class 3B and 4 laser areas.

LIA is selling the rest of its inventory of aluminum and magnetic laser warning signs for only \$10 per sign (originally \$39)! Supply is limited, so call the LIA at 1.800.34.LASER to receive this special offer today! Not valid with any other discount. Does not apply to quantity discounts or to customized signs.

## LIA LASER SAFETY TRAINING SPECIAL OFFER – BUY ONE GET ONE 50% OFF!

From now until the end of 2009, if you register for one of LIA's industry leading laser safety training courses you are eligible to receive 50% off one additional registration for that same course. Keep yourself, employees or co-workers trained and committed to keeping the workplace safe from laser hazards today.

Call the LIA office to register at 1.800.34.LASER. Courses available for this offer are the Laser Safety Officer course to be held Dec. 7-9, 2009 in Orlando, Fla.; the Laser Safety Officer w/ Hazard Analysis course to be held Nov. 2-6, 2009 in Orlando, Fla. and the Medical Laser Safety Officer course to be held Nov. 14-15, 2009 in New Orleans, La.

This offer is not valid with any other discounts, special offers or early bird pricing. Only one discount per full course registration fee. Not applicable towards future courses or online courses. This special is only valid for courses taking place in 2009.

## LAST CALL FOR ICALEO

Just a reminder that your last chance to register for the International Congress on Applications of Lasers & Electro-Optics (ICALEO®) 2009 is rapidly approaching. The conference will be held Nov. 2-5 in Orlando, Fla. ICALEO has a long history as the conference where researchers and end-users meet to review the state-of-the-art in laser materials processing and predict where the future will lead. Don't miss it! Visit [www.icaleo.org](http://www.icaleo.org) to register and for more information, or call 1.800.34.LASER.

## PICALO CALL FOR PAPERS

The 4<sup>th</sup> Pacific International Conference on Applications of Lasers and Optics (PICALO) will be held March 23-25, 2010

in Wuhan, Peoples Republic of China. Presented by LIA, in cooperation with Laser Processing Committee of China Optical Society (LPC-COS) and Huazhong University of Science & Technology, PICALO will focus on the growth and application of lasers and optics in the Pacific region. A call for papers has been announced with an abstract submission deadline of Oct. 23, 2009. Topics such as aerospace, forming and drilling, welding, manufacturing, research, laser modeling and simulation, ultrafast fabrication and hybrid processes will be covered. For more information on PICALO 2010, including sponsorship and exhibiting opportunities, visit [www.laserinstitute.org/PICALO](http://www.laserinstitute.org/PICALO) or e-mail [picalo@laserinstitute.org](mailto:picalo@laserinstitute.org).

## NATIONAL ENGINEERS WEEK

Beginning this fall, thousands of middle school students across the country will focus on conservation, reuse and self-sufficient systems in the 2010 National Engineers Week Future City Competition. Future City aims to stir interest in science, technology, math and engineering among young people. Students work in teams under the guidance of a teacher and a volunteer engineer mentor to design and build a city of tomorrow. For more information, visit [www.futurecity.org](http://www.futurecity.org) or [www.eweek.org](http://www.eweek.org). The LIA is proud to be associated with National Engineers Week and will continue its support as an endorsing society. ■



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# PICALO

PACIFIC INTERNATIONAL CONFERENCE  
ON APPLICATIONS OF LASERS & OPTICS

March 23-25, 2010

Shangri-La Hotel – Wuhan, People's Republic of China

## THE PACIFIC PLATFORM *for Laser & Optics Technology*

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PICALO brings together researchers, engineers, equipment suppliers and industry personnel to share the latest developments and progress in lasers and applications and to share knowledge, experiences and visions.

Presented by Laser Institute of America in cooperation with Laser Processing Committee of China Optical Society (LPC-COS) and Huazhong University of Science & Techology.



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