

LIA

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TODAY

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(JYOTI) MAZUMDER
IN MEMORIAM

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IMPACT OUR PLANET

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FOR PROPOSED RULE
TO UPDATE HAZARD
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LIA TODAY

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PROF. JYOTIRMOY (JYOTI) MAZUMDER IN MEMORIAM

In place of a traditional Executive Director's message for this issue, the officers of LIA have written a tribute to the late Prof. Jyoti Mazumder who passed away April 10, 2021.

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HOW LASERS CAN IMPACT OUR PLANET

By Jana Langhans

In their 60+ years of existence, lasers have had an impact on countless aspects of life. As another Earth Day comes and goes, we reflect on how lasers have played a role in benefitting the Earth.



U.S. DEPARTMENT OF LABOR'S OSHA EXTENDS COMMENT PERIOD FOR PROPOSED RULE TO UPDATE HAZARD COMMUNICATION STANDARD

OSHA has extended the comment period for the proposed rule to update the hazard communication standard discussed in a previous press release that was shared last issue.

The acceptance and publication of manuscripts and other types of articles in LIA TODAY does not imply that the reviewers, editors, or publisher accept, approve, or endorse the data, opinions, and conclusions of the authors.

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LIA Laser Safety Trainings

LASER SAFETY OFFICER TRAINING

Orlando, FL

Jun. 2 - 4, 2021

Orlando, FL

Aug. 18 - 20, 2021

LASER SAFETY OFFICER WITH HAZARD ANALYSIS

Orlando, FL

Jun. 7 - 11, 2021

Orlando, FL

Aug. 23 - 27, 2021

MEDICAL LASER SAFETY OFFICER TRAINING

Orlando, FL

Jun. 5 - 6, 2021

Orlando, FL

Aug 21 - 22, 2021

INDUSTRIAL LASER SAFETY OFFICER TRAINING

Novi, MI

May 12 - 13, 2021

Novi, MI

Aug. 11 - 12, 2021

Novi, MI

Nov. 10 - 11, 2021

Visit www.lia.org for all course and event listings

Course Highlight

INDUSTRIAL LASER SAFETY OFFICER TRAINING

NOVI, MI - MAY 12-13, 2021

Whether you are new to laser safety, or more experienced, your goal is to uphold the highest standard of laser safety. At LIA, our goal is to help you achieve that by offering the most comprehensive laser safety training program for LSOs in manufacturing and industrial facilities.

Designed to keep you on the leading-edge of safety training requirements and program administration, this course teaches a non-mathematical approach to facilitating the duties of a Laser Safety Officer. Developed and taught by LIA experts - the industry leader in laser safety education - the Industrial LSO course was designed for all levels of experience involved in industrial, and manufacturing applications of lasers. This course meets all LSO training requirements outlined by the ANSI Z136.9 Safe Use of Lasers in Manufacturing Environments standard and OSHA. This course is worth 16 CECs by AAHP and 2.0 BLS CM points by the Board of Laser Safety.



Gilbert Haas
LIA President 2020

much stronger position for the future.

Be well and stay safe.

PRESIDENT’S MESSAGE

The current implementation of the COVID-19 vaccines give us hope and optimism toward the future. Given each country moves their COVID-19 process along in the same way, we hope to be all on our way to opening up again soon.

In-person events this year are evolving as the various countries relax their quarantine criteria. The staff at LIA is closely monitoring these events around the world to get a pulse on the success status of those in-person events. The monitoring of these events will determine how near-term LIA events are held.

In the meantime, the new LIA Board of Trustees and LIA Staff are working hard behind the scenes to further improve the organization and its vision moving forward. This combined with the new restructured staff will bring the LIA out of the pandemic in a very stable and



Nat Quick
Executive Director

In place of a traditional Executive Director’s message for this issue, the officers of LIA have written a tribute to the late Prof. Jyoti Mazumder which can be found on the following page.

EXECUTIVE DIRECTOR’S MESSAGE



Prof. Jyotirmoy (Jyoti) Mazumder in memoriam
(July 9, 1951 – April 10, 2021)

Prof. Mazumder is sadly missed by many including LIA and we would like pay tribute to him for his everlasting legacy. He was a devoted member of LIA and many of us had the pleasure of working with him on various occasions, experiencing his enlightening personality and benevolent spirit. He was an excellent mentor and was respectful and kind to all. He served LIA in various capacities including as the General Chair of ICALEO and was always available when called for assistance. He was a past President of LIA, longtime editor-in-chief of LIA's flagship publication, the Journal of Laser Applications, and he received the prestigious Arthur Schawlow award. He was a Fellow of LIA and many other professional societies.

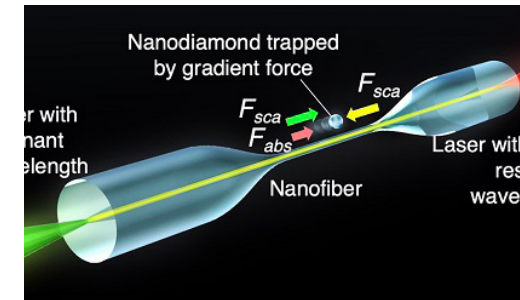
Prof. Mazumder began his academic journey with a baccalaureate degree in metallurgical engineering from Calcutta University (now the Indian Institute of Engineering Science and Technology) in 1972. He earned his diploma (D. I. C.) and Ph.D. in process metallurgy from Imperial College, London, in 1978 under Prof. William M. Steen's laser sharp guidance. His professional career began in the USA as a Post-Doctoral Research Scholar at the University of Southern California for a short time and then he joined the Mechanical Engineering Department at the University of Illinois, Urbana-Champaign. After 16 years of luminary career in this University he took the distinguished position of the Robert H. Lurie professorship at the University of Michigan (UM), Ann Arbor. He held this position for 25 years and unfortunately passed away on April 10, 2021 while in service.

Prof. Mazumder leaves behind an extraordinary history of excellence with numerous awards and achievements. In addition to receiving the prestigious Arthur Schawlow award from LIA he was the recipient of many other awards. To name just a few he was an elected member of the USA National Academy of Engineering, a Foreign Fellow of the Indian National Academy of Engineering, and he received the William T. Ennor Award for manufacturing from the American Society of Mechanical Engineers (ASME), the Thomas A. Edison Patent Award from the ASME, and the Distinguished University Innovator Award from the UM. He Co-authored two books, Theory and Application of Laser Chemical Vapor Deposition, and Laser Materials Processing. While pursuing academic excellence in the field of Direct Metal Deposition (DMD) technology, he also demonstrated entrepreneurial skill by establishing a company for commercializing the DMD technology. This technology and their influence on the industry will be discussed in more detail as part of a series in upcoming issues.

In addition to his professional success, Prof. Mazumder was also an excellent teacher. He educated and trained many students who are now well-established faculty members in various universities, accomplished professionals in different industries, or meticulous scientists in Government laboratories. Just like his own mentor Prof. Steen, he leaves behind a legacy of bright scientists and engineers throughout the world carrying on his teachings and research principles. He touched the lives of many and will be dearly missed. Though he has passed, his spirit and legacy will remain alive.

Aravinda (Arvi) Kar, Treasurer LIA
Gilbert Haas, President LIA
Henrikki Pantsar, Vice President LIA
Islam Salama, Secretary LIA
Nathaniel R. Quick, Executive Director

1



LASERS MANIPULATE DIAMOND NANOPARTICLES TO OPEN APPLICATIONS IN BIOSENSING

A group of scientists showed the ability to use laser beams of different wavelengths, and from opposing directions, to move diamond nanoparticles that are roughly 50 nm in size in a proof-of-concept experiment.

[Read more](#)

2

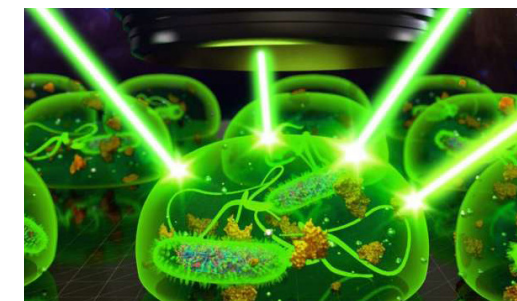


DYSON V15 DETECT USES LASERS TO HIGHLIGHT HIDDEN DUST

Dyson has a new flagship cordless vacuum that uses a laser dust-detecting system to shine a light on every last speck, even if you can't see it with the naked eye.

[Read more](#)

3

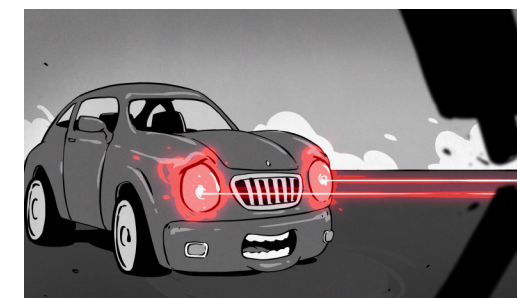


A DISPOSABLE LIVING LASER PRINTED ON CHIP FOR DRUG SCREENING

By using a common office inkjet printer, researchers from NTU Singapore and China developed a disposable living laser on chip by encapsulating living bacteria inside.

[Read more](#)

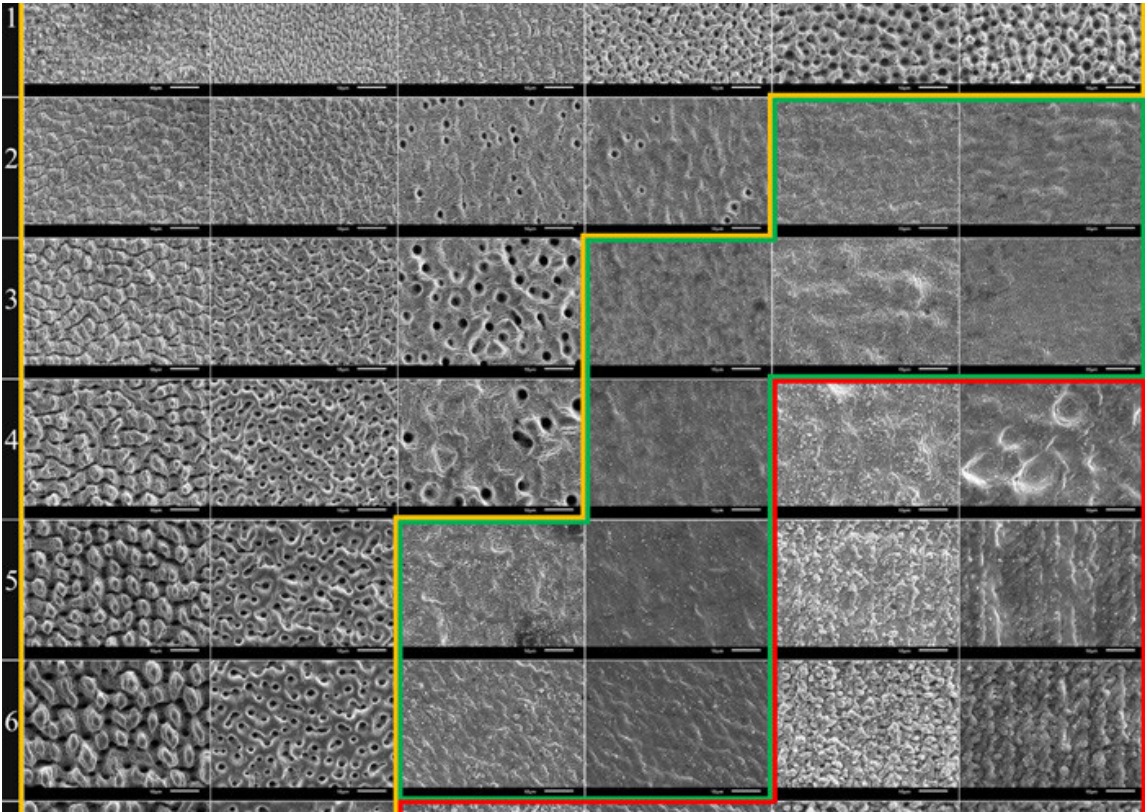
4



HOW LASER HEADLIGHTS WORK

Sealed beam headlights gave way to more modern designs once regulations loosened up, while bulbs moved from simple halogens to xenon HIDs and, more recently, LEDs. Now, a new technology is on the scene, with lasers!

[Read more](#)



SEM images of the surface bottoms generated with the different fluences, pulse durations, and the number of pulses in the burst.

BURST MODE ABLATION OF STAINLESS STEEL WITH TUNABLE ULTRASHORT LASER PULSES

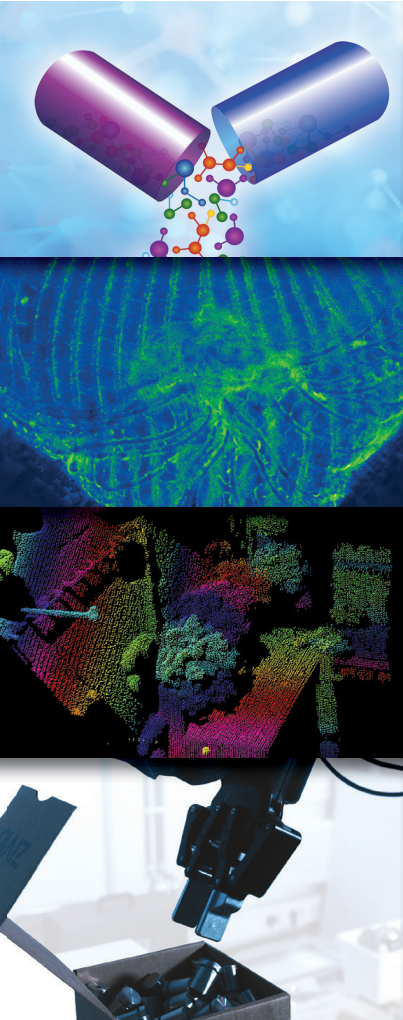
By: Peter Lickschata, Daniel Metzner, and Steffen Weißmantel

Abstract: In this study, an ultrashort pulse laser is used to investigate the removal efficiency and the ablation quality of stainless steel. The employed solid state laser is capable of varying the pulse duration from 0.27 to 10 ps and generates bursts with an intraburst pulse repetition frequency of 65 MHz with up to nine pulses per burst. Depending on the fluence per pulse, the pulse duration, and the number of pulses per burst, the removal efficiency and the ablation quality are presented and discussed based on the depth of the ablation structures and the surface roughness of the structured bottoms. The results prove that compared to pulse durations in the picosecond regime, the ablation efficiency in the femtosecond regime is significantly higher. The removal efficiency per burst is not affected by an increase in the number of pulses in the burst, but a smoothing effect can be identified for a certain number of pulses in the burst depending on the fluence and the pulse duration, which has a positive effect on the ablation quality.

The temperature distribution and the heat accumulation induced by the high intraburst pulse repetition frequency are calculated with a semiempirical two-temperature model. The simulation results demonstrate that the melting film depth has a major influence on the smoothing effect caused by the burst mode.

Journal of Laser Applications 33, 022005 (2021); <https://doi.org/10.2351/7.0000271>

Free to LIA Members!
Visit JLA Online: <https://lia.scitation.org/journal/jla>



International Congress on Applications of Lasers & Electro-Optics

Our ICALEO 2021 conference is currently still planned to be in San Diego, CA on October 18-21. Any updates regarding COVID-19 will be announced.

The abstract deadline for ICALEO 2021 has now passed and acceptances will be sent out at the beginning of May. Sponsorship opportunities are still available.

To stay updated on this event, please visit icaleo.org.

International Laser Safety Conference

The new dates and location for our ILSC conference have been announced for 2022 and we are excited to be hosting you in Houston, Texas on March 21-24!

Early bird sponsorship opportunities are now available. The call for papers is also now open with the abstract deadline being July 12, 2021.

To stay updated on this event, please visit ilsc.ngo.

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HOW LASERS CAN IMPACT OUR PLANET

Written By: Jana Langhans, LIA

In their 60+ years of existence, lasers have had an impact on countless aspects of life. As another Earth Day comes and goes, we reflect on how lasers have played a role in benefitting the Earth. Every year there are new reports on the damage done to our planet, but there is also some hope in the development of new technologies. Although it would never be feasible to cover all of the ways that lasers are being used to benefit our planet, this article hopes to shed light on at least a few interesting ones through two different methods: research and application.

Research

Research is always ongoing and is constantly working towards a better understanding of life. Lasers and laser technology can be used to help conduct a lot of research, including when it comes to studying the planet and its environment.

Lidar (Light Detection and Ranging) specifically has played a significant role in many projects to study the Earth. It uses an airborne laser to send pulses of light that are reflected from the Earth's surface and therefore portrays a very precise image of what the surface of the Earth looks like. In one particular project, researchers studied forest regions in the Amazon that are being degraded as a result of human interference like logging or timber extraction. These and other tropical forests are important to supporting life on the planet because their trees take carbon dioxide from the air and they also play a vital role in the water cycle. The results of this study showed that the degraded area of forests did, in fact, hold less water and absorb less carbon. Not only is this unfortunate for the atmosphere, but it also means that the forests themselves are more prone to catch fire, leading to further loss of trees and wildlife that is incredibly difficult to restore.

Lidar does not only have to be aimed at the ground, however. It has been used as a part of many research studies into our air, tracking precipitation and weather patterns. It also helps in detecting hazardous particles in the atmosphere. NASA has done some research with this, sending a lidar instrument to study the atmosphere as early as the mid-1990s.

Another laser technology that has proved useful for studying our environment is Raman scattering (SRS) microscopy. A company called LaserLaB Amsterdam has helped in researching and identifying the types of microplastics that gather in water using this method. They basically identified each polymer particle by the vibrations of the scattered light that comes through it when shot with a laser. This gives each particle its own

DID YOU KNOW?

In 2015-20 the annual deforestation rate was 10 million hectares (39,000 sq miles), compared to 12 million hectares (46,000 sq miles) in the previous five years.

unique “fingerprint”, so researchers were able to identify what kind of pollutants were caught in a filter they had put in the water.

Another way to assist with the cleaning of water is by using micro-organisms to fight pollutants in the water like when there is an oil spill. Using optical trapping, in which lasers can be used as very small tweezers, individual micro-organisms can be studied to learn their properties and see which types and strains are most affective against certain wastes. This can also be applied to oil spills that may occur underground. Laser technology can be used to identify where the oil is in the soil and then which micro-organism would be best to disperse it or any other pollutants that tend to seep into the ground. As an example, a team of scientists from Manchester University, using laser-based imaging techniques at the Central Laser Facility, conducted a study of how bacteria could prevent radioactive materials from absorbing into soil through chemical reactions. This provided important information on the process and the environment which could help keep waste from further spreading into the environment.

Although these studies do not always give us practical benefits right away, they can show us how we are negatively affecting our planet and gives us the opportunity to start working toward specific solutions

Applications

Research can also be applied to begin providing solutions. Just this past year there was a study done by an international team of researchers that used hollow lasers to divert lightning strikes in a storm by sending particles that would attract the strikes into the clouds. The idea was to prevent them from striking trees and starting forest fires. There has been research into this in the past, but with methods that were costly and more inaccurate. With this more recent study, we are coming to a time when it is being realized that smaller handheld lasers can have better success and be much more easily implemented.

Another thing that we can hope to see more of is a laser robot set up to zap weeds! Recently, a robotics company from Seattle called Carbon Robotics has introduced a machine with cameras and lasers that can remove 100,000 weeds per hour as an alternative to pesticides on a farm. If technologies like this become more commercial and accessible to farmers in the future, it could mean a significant drop in harmful chemicals being put out into the environment and food.

It does not always have to be elaborate, however. Lasers have shown that they are extremely versatile when it comes to going greener in common industries as well. There are now many instances in which laser applications can be used to better the environment in different industries as alternative solutions to outdated processes that are harmful. For example, laser ablation is becoming more popular in many industries. This is the process of using lasers to strip paint or other coatings off surfaces as opposed to chemicals that are harmful for the environment.

Lasers are also a great way to reduce ink which is often made with non-renewable resources. Instead of printing using ink, laser engraving is an option that can even be placed directly on the product itself eliminating the need for paper as well. Another alternative to ink that lasers provide is in using laser printing. Although inkjet printer cartridges can be recycled, it is safe to say that the majority of them unfortunately still end up in the trash. Laser printers use toner instead of ink which lasts longer and is better for the environment.

Although these changes are feasible for some, machines like laser printers can be fairly expensive. There are some simpler changes to better the environment that almost anyone can implement. Switching out old light sources for LED lighting can make a significant difference in the usage of energy, especially around the holidays. For decorating houses around the holidays specifically, there are now laser lights that project onto the side of houses which can perhaps replace some of the traditional string light decorations, being more energy efficient for both the decorator and the planet.

Looking to the Future

While there is still much change needed in the way we handle the Earth, the positive changes that have

DID YOU KNOW?

79% of the plastic waste ever created is still in our environment.

DID YOU KNOW?

The average American generated 4.9 lbs of solid trash (food waste, paper, etc.) daily in 2018, up from 3.7 lbs per day in 1980.

DID YOU KNOW?

In 1980, the average US county had good air quality 59% of days. In 2020, that rose to 88% of days.

already been made can still be recognized and celebrated. It will take a lot of work from individuals, governments, and especially corporations to truly start making a difference on our planet, but there is no doubt that lasers will continue playing a vital role in recognizing these challenges and offering solutions.

If you want to read up more on the specific projects mentioned in this article, you can find them in the source links below.

Do you use lasers in a way that is benefiting the environment and want to share it with your community? Email us about writing an article for the LIA Today! Contact marketing@lia.org or jlanghans@lia.org.

Sources

Amazon Forest Study: <https://news.mongabay.com/2020/12/lasers-reveal-steep-decline-in-ecosystem-function-of-degraded-amazon-forests/?fbclid=IwAR24Nlea3-6LdLSsxvmirBm36OO3aXXxGELJVSPNZ3rfaELpn7M2ZQvqEdk>

Guided Lightning Using Lasers: <https://www.courthousenews.com/laser-guided-lightning-may-help-prevent-wildfires/?fbclid=IwAR16UhlIHABShYlcbHHRWEwrSS8VM9G6R6taSgo02ztOWxoHJosqNx6CU>

Weed Zapping Laser Robot: <https://www.seattletimes.com/business/seattle-startup-sends-laser-equipped-robots-to-zap-weeds-on-farmland/>

Did You Know Facts: <https://usafacts.org/earth-day-facts/>

<https://www.bbc.com/future/article/20210108-where-we-are-on-climate-change-in-five-charts>

Laserlab Projects: <https://www.laserlab-europe.eu/research/lasers-and-water>

<https://www.laserlab-europe.eu/research/lasers-for-the-environment>



U.S. Department of Labor's OSHA extends comment period for proposed rule to update hazard communication standard

WASHINGTON, DC – The U.S. Department of Labor's Occupational Safety and Health Administration has extended the comment period for the proposed rule to update the agency's Hazard Communication Standard (HCS) to **May 19, 2021**. OSHA extended the comment period by 30 days to allow stakeholders additional time to review the proposed rule and collect information and data necessary for comment.

Submit comments identified by Docket No. OSHA-2019-0001, electronically at <http://www.regulations.gov>, which is the Federal e-Rulemaking Portal. Read the Federal Register notice for details.

OSHA expects the HCS update will increase worker protections, and reduce the incidence of chemical-related occupational illnesses and injuries by further improving the information on the labels and Safety Data Sheets for hazardous chemicals. Proposed

modifications will also address issues since implementation of the 2012 standard, and improve alignment with other federal agencies and Canada

Established in 1983, the Hazard Communication Standard provides a standardized approach to workplace hazard communications associated with exposure to hazardous chemicals. OSHA updated the standard in 2012 to align with the third revision of the United Nations' GHS to provide a common and coherent approach to classifying chemicals and communicating hazard information.

Under the Occupational Safety and Health Act of 1970, employers are responsible for providing safe and healthful workplaces for their employees. OSHA's role is to help ensure these conditions for America's working men and women by setting and enforcing standards, and providing training, education and assistance. For

more information, visit www.osha.gov.

The mission of the Department of Labor is to foster, promote, and develop the welfare of the wage earners, job seekers, and retirees of the United States; improve working conditions; advance opportunities for profitable employment; and assure work-related benefits and rights.

Original Release: April 13, 2021

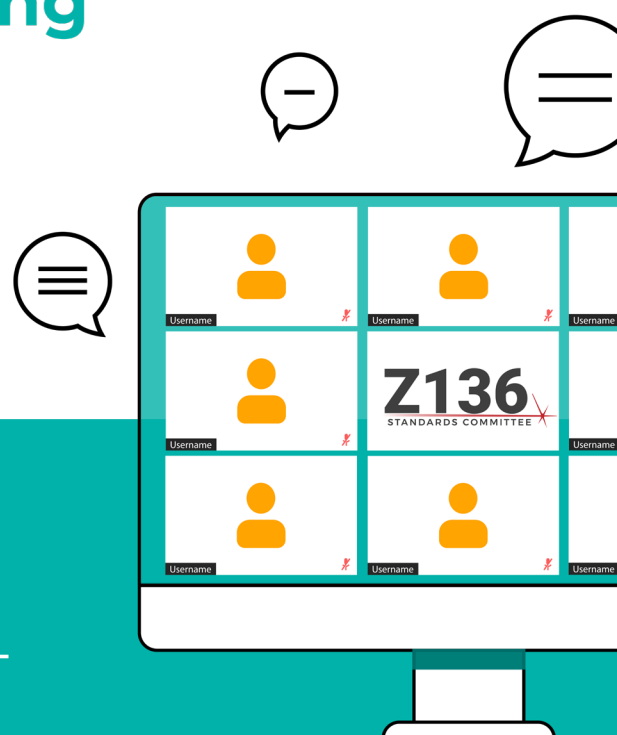
Source: <https://www.osha.gov/news/newsreleases/trade/04132021>

2021 Annual Meeting Z136 Standards Committee for Safe Use of Lasers

Online - Zoom

May 25, 2021

10:00am - 4:00pm EDT



Contact lcaldero@lia.org for more information or to receive the zoom link.

WANT TO SHARE YOUR IDEAS WITH THE LASER COMMUNITY THROUGH *LIA TODAY*?

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Check out the guest article guidelines below
and get in touch with an editor today!

BEFORE YOU SUBMIT:

Content: We are always looking for great newsworthy content that covers challenges and innovations in the field of photonic materials processing, laser safety, and laser market trends. This is not a paid opportunity, but does carry the benefit of publishing your work on a platform that is read by thousands of your peers. All article topics should be confirmed with an LIA TODAY editor before writing your article. Please email your article ideas to liatoday@lia.org and an editor will be in touch with you.

Potential Categories: Safety, medical applications, research and development, laser applications fundamentals, history, business, and other categories.

Potential Industries: Energy storage, aerospace, DoD non-aerospace, automotive, medical devices and biotechnology, microelectronics and IC fabrication, Internet of Things, research and development, and other industries.

SUBMISSION GUIDELINES:

Style: The tone should be editorial and informative; it should not sound like a sales pitch. It should be comprehensible by a broad audience of readers with low to expert experience with the topic, so it is important to include examples and simple explanations alongside any technical language.

Length: 600 - 1500 words

Text: Please use standard fonts such as Arial, Calibri, or Times New Roman. Fonts, font sizes, and line spacing will be reformatted by LIA for the final piece. Grammar and mechanics will be edited to the LIA style guide by LIA, but please be mindful of spelling and grammar as you are writing so that your message is clear.

Headline: Please include two newsworthy headlines suggestions for your article using action verbs.

Images & Figures: Please include images to be used with the article. Submit as an email attachment (PNG, GIF, JPG, JPEG) (min. 1000px in width or height). Images should also be placed in the body of the text where the author would like them to appear in the final article. All figures or images should include captions.

Deadlines: All material is due no later than two weeks prior to the scheduled publishing date. Check with an editor for your deadline.

Note: LIA reserves the right to abstain from publishing a submitted article for any reason.

SUBMISSION CHECK LIST:

- Full text as a Word Document
 - Abstract: A 50 – 100 word summary in plain language
 - Two (2) headline suggestions using an action verb
 - Article 600 – 1500 Words
 - Images with captions placed in the body of the article
 - Article references when applicable
 - Short author *bio* (full title, company, 50 words)
 - (optional) Professional headshot of author
- Images attached in one of the accepted file types (.png, .tiff, .jpeg, .jpg) (min. 1000px width or height).

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