

# LIA

# TODAY

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OSHA ANNOUNCES  
UPCOMING MEETING

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THE LASER'S ROLE  
IN ENVIRONMENTAL  
EFFORTS

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UCF CREOL STUDENT  
SPOTLIGHT

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# LIA TODAY

THE OFFICIAL NEWSLETTER OF LIA

LIA TODAY is published bimonthly to educate and inform students and professionals of challenges and innovations in the field of photonic materials processing.

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### MEETING FOR NATIONAL ADVISORY COMMITTEE ON OCCUPATIONAL SAFETY AND HEALTH

The U.S. Department of Labor's Occupational Safety and Health Administration will hold a meeting of the National Advisory Committee on Occupational Safety and Health.



### THE LASER'S ROLE IN ENVIRONMENTAL EFFORTS

Over the years, scientists and researchers have been using light science and lasers to help with environmental monitoring, conservation, and restoration efforts. In honor of Earth Day, this article aims to expand on the different ways in which lasers are being used to aid in environmental efforts.



### STUDENT SPOTLIGHT

Meet Kevin Nilsen, this issue's Student Spotlight from the University of Central Florida's CREOL, The College of Optics and Photonics!

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# LIA Laser Safety Trainings

## LASER SAFETY OFFICER TRAINING

Orlando, FL	Feb. 22 - 24, 2023
New Orleans, LA	Apr. 19 - 21, 2023
Denver, CO	Aug. 15 - 17, 2023
Orlando, FL	Nov. 8 - 10, 2023

## LASER SAFETY OFFICER WITH HAZARD ANALYSIS

Orlando, FL	Feb. 27 - Mar 3, 2023
New Orleans, LA	Apr. 24 - 28, 2023
Denver, CO	Aug. 21 - 25, 2023
Niagara Falls, NY	Sep. 25 - 29, 2023
Orlando, FL	Nov. 13 - 17, 2023

## MEDICAL LASER SAFETY OFFICER TRAINING

Orlando, FL	Feb. 25- 26, 2023
Minneapolis, MN	May 6 - 7, 2023
Virtual, Zoom	July 17, 2023
Denver, CO	Aug. 18 - 19, 2023
Virtual, Zoom	Oct. 21, 2023
Orlando, FL	Nov. 11 - 12, 2023

## INDUSTRIAL LASER SAFETY OFFICER TRAINING

Novi, MI	Feb. 15 - 16, 2023
Novi, MI	May 17 - 18, 2023
Novi, MI	Aug. 9 - 10, 2023
Novi, MI	Nov. 1 - 2, 2023

## Course Highlight

### MEDICAL LASER SAFETY OFFICER TRAINING VIRTUAL, ZOOM - JULY 15, 2023

Does your facility have an MLSO? According to the ANSI Z136.3 (2018) Safe Use of Lasers in Health Care, a Medical Laser Safety Officer, or MLSO, is required if your facility uses lasers of Class 3B or 4.

Designed for medical professionals, LIA's Medical Laser Safety Officer Course will provide the training you need to build and maintain a successful laser safety program.

This 1-day MLSO course is taught by Vangie Dennis, MSN, RN, CNOR, CMLSO and will take place via Zoom. In this virtual course, students can ask questions to the instructor and discuss their laser safety programs together, while also saving time and travel expense, perfect for the busy schedules of working professionals in the medical fields.

In addition to the working knowledge you will gain, you will earn 6 Contact Hours and 1.0 BLS CM Points by the Board of Laser Safety.



Henrikki Patsar  
LIA President 2023

## PRESIDENT'S MESSAGE

Spring is the time of renewal and reawakening. We can certainly feel that here at LIA as well. At the time when I was writing the previous President's message, our Executive Director Nat Quick was transitioning to his well-deserved retirement. Nat guided the organization to a new growth phase and through the pandemic, and we all are grateful for his leadership. The next Executive Director we are searching for will inherit a motivated team and an organization ready for further growth. While it was sad to say goodbye to Nat, it is exciting to see what the renewal of LIA will look like. The ingredients are there and with the leadership of our future Executive Director we will continue to evolve.

I am also happy to report that we had a successful ILSC conference on laser safety and from what we can see at the moment we will have an excellent ICALEO conference in Chicago. We will have a program full of latest trends in battery technology and artificial intelligence, in addition to our more traditional conferences on high power laser applications and micro processing. We will finish the conference with tours to Bystronic, DMG-Mori and TRUMPF!

Wishing everyone a great start to the summer!

Stay Safe



Gilbert Haas  
Interim Executive Director

## EXECUTIVE DIRECTOR'S MESSAGE

From the time Nathaniel Quick announced his retirement until the next Executive Director is appointed, as the Board of Trustees past president, I am acting as the interim Executive Director.

During this transition period, the LIA has remained energized in moving forward to accomplish the goals outlined by the organizations current strategic plan. The Executive Director appointment committee is currently interviewing several applicants and hopes to fill the position very soon.

We all wish Nathaniel Quick the very best during his retirement years and gratefully thank him for his past years of service.

A Look Ahead at Upcoming Laser Industry Conferences!

- 1. Photonics West - Jan 28-Feb 2, 2023 (San Francisco, CA, USA)
- 2. MD&M West - Feb 7-9, 2023 (Anaheim, CA, USA)
- 3. ILSC - Feb 27-Mar 2, 2023 (Portland, OR, USA)
- 4. AORN - April 4-5, 2023 (San Antonio, TX, USA)
- 5. Laser World of Photonics - June 27-30, 2023 (Munich, Germany)
- 6. RAPID + TCT - May 2-4, 2023 (Chicago, IL, USA)
- 7. ETOP - May 15-18, 2023 (Cocoa Beach, FL, USA)
- 8. FABTECH Mexico - May 16-18, 2023 (Mexico City, Mexico)
- 9. FABTECH Canada - June 11-13, 2023 (Toronto, OT, Canada)
- 10. ALAW - June 13-15, 2023 (Plymouth, MI, USA)
- 11. FABTECH - Sept 11-14, 2023 (Chicago, IL, USA)
- 12. ICALEO, Oct. 16-19, 2023 (Orlando, FL, USA)

Cooperating Conferences



LIA is proud to be the on site Laser Safety Officer for the 3 international Fabtech conferences again this year.



National Advisory Committee on Occupational Safety and Health to meet May 31

WASHINGTON, DC – The U.S. Department of Labor's Occupational Safety and Health Administration will hold a meeting of the National Advisory Committee on Occupational Safety and Health on Wednesday, May 31, 2023, from 9 a.m. to 4 p.m. ET. The committee will meet in person, while the public is invited to participate in person or online.

The meeting will include new member introductions, updates from OSHA and NIOSH, discussion about OSHA's Whistleblower Protection Program, and a report from the NACOSH Heat Work Group on proposed recommendations of potential elements of a Heat Injury and Illness Prevention rulemaking.

To attend the meeting, please

register on the NACOSH webpage. Once registered, online attendees will receive a link for remote meeting access and in-person attendees will receive directions for participation. In-person attendance by the public is limited to 25 people.

Submit comments and requests to speak to the Federal eRulemaking Portal, Docket Number OSHA-2023-0003, by May 15, 2023. Be sure to include the docket number on all submissions. Read the Federal Register notice for submission details.

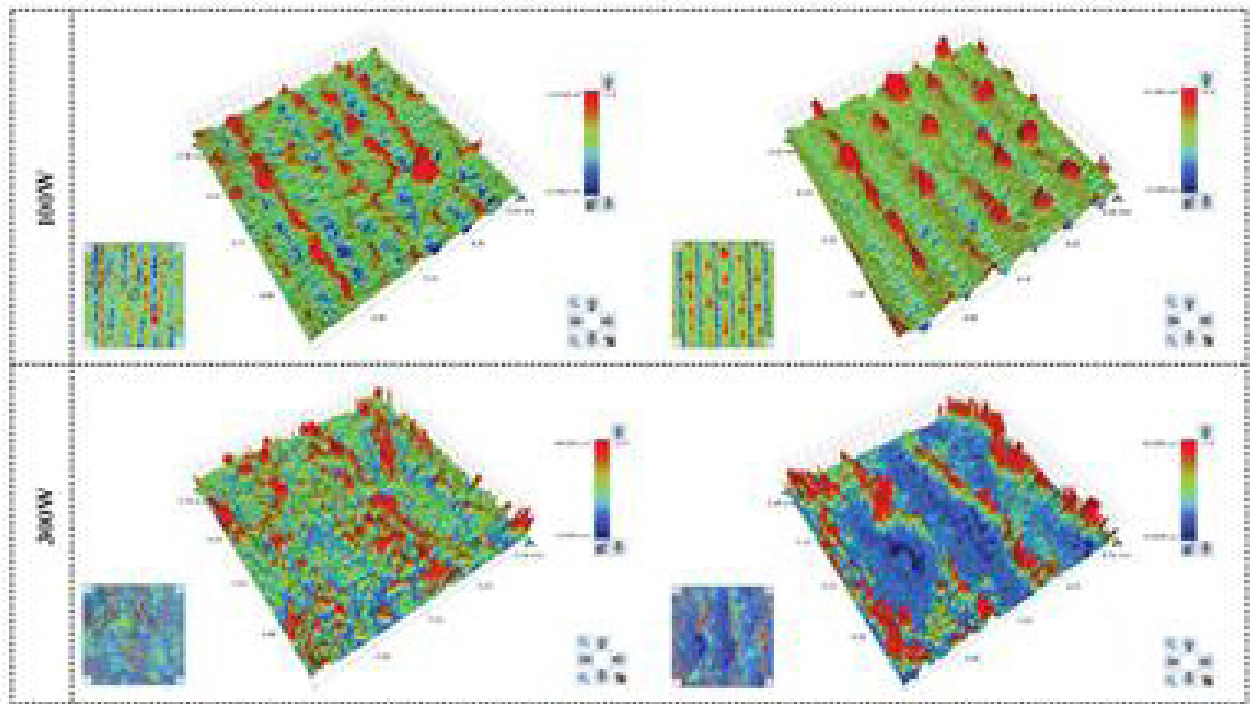
NACOSH advises, consults, and makes recommendations to the Secretary of Labor and the Secretary of Health and Human Services on matters relating to the administration of the Occupational Safety and

Health Act of 1970. NACOSH is a continuing advisory committee of indefinite duration.

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.

For more information, visit [www.osha.gov](http://www.osha.gov).

Original Release: April 27, 2023  
Source: <https://www.osha.gov/news/newsreleases/trade/04272023>



# EFFECT OF DOUBLE LASER BEAM SURFACE TREATMENT ON THE SURFACE MORPHOLOGICAL CHARACTERISTICS OF Ti6Al4V AT DIFFERENT HEAT SOURCE INCIDENCE ANGLES

By: Fei Ji; Hui Chen; Yuanxing Li; Qian Wang; Feisen Wang; Dasong Liao

**Abstract:** With the development of the high-end equipment manufacturing industry, the requirements for the surface performance of critical components are likewise increasing. To control the heat and mass transfer in the laser surface treatment process more efficiently and flexibly, the multiangle double laser surface treatment technology shows unique advantages. This study is focused on the experimental study of the laser surface treatment process for Ti6Al4V material. By changing the laser power and the incidence angle of the laser beam, the effects of single-laser beam surface treatment (SLST) and dual-laser beam surface treatment (DLST) on the surface morphology of the alloy were studied. The effects of laser treatment on the surface morphology, element distribution, roughness, surface chemical state, and surface structure of the alloy were emphatically analyzed. The mechanism of SLST and DLST at different incident angles of heat source and the effect of DLST on the formation of an oxide layer on the surface of the alloy were compared and analyzed. The

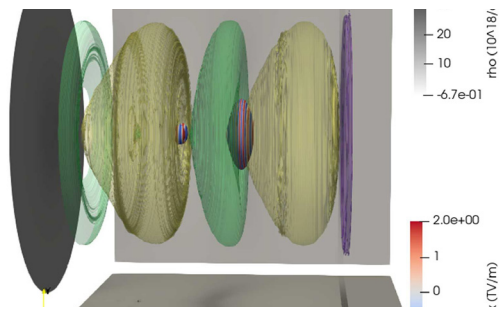
results show that when the average power of the high-power nanosecond pulse width laser in DLST is 100 W and the incident angle is 135°, the surface oxygen content reaches the lowest, as low as 8.31%. The secondary effect of the laser makes the alloy surface remelt again, and then the best roughness after laser processing is obtained, with a roughness value of 2.801 μm. Finally, we obtain the optimal process for laser surface treatment and conclude that DLST can significantly optimize the surface state after a high-energy laser beam action.

Journal of Laser Applications 35, 022029 (2023); <https://doi.org/10.2351/7.0000912>

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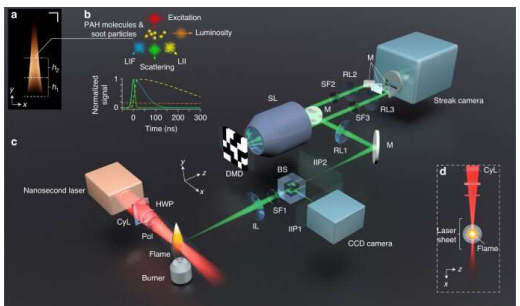


## PRODUCING EXTREME ULTRAVIOLET LASER PULSES EFFICIENTLY THROUGH WAKESURFING BEHIND ELECTRON BEAMS

A laser pulse surfing in the wake of an electron beam pulse could get upshifted from visible to extreme ultraviolet light, simulations done at the University of Michigan have shown.

[Read more](#)

2

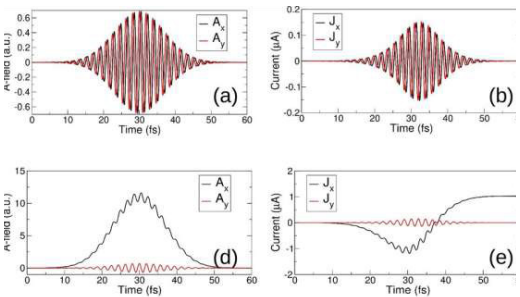


## SINGLE-PULSE REAL-TIME BILLION-FRAMES-PER-SECOND PLANAR IMAGING OF ULTRAFAST NANOPARTICLE-LASER DYNAMICS

A research team used single-shot laser-sheet comprised ultrafast photography per billion frames per second, for the first time, to observe the dynamics of laser-flames.

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3

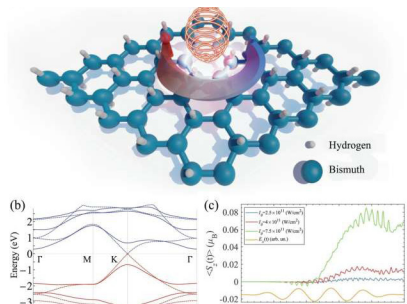


## LASER LIGHT HYBRIDS CONTROL GIANT CURRENTS AT ULTRAFAST TIMES

Researchers at the Max Born Institute have recently discovered a route to induce and control the flow of spin and valley currents at ultrafast times with specially designed laser pulses, offering a new perspective on the ongoing search for the next generation of information technologies.

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## INTENSE LASERS MAGNETIZE SOLIDS WITHIN ATTOSECONDS

Theoreticians used advanced simulations to determine that intense laser light can induce magnetism in solids on the attosecond scale—the fastest magnetic response to date.

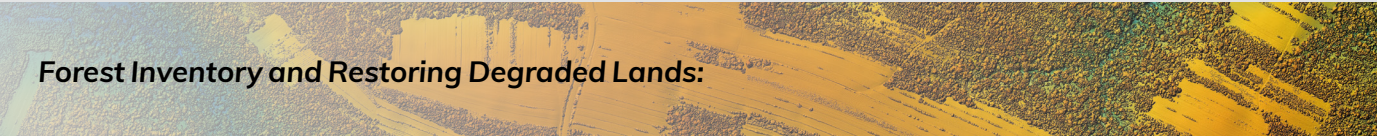
[Read more](#)

# The Laser's Role in Environmental Efforts

By, Jana Langhans, The Laser Institute



Lasers are an incredibly versatile tool for numerous applications in many different industries and fields, including environmental efforts. Earth is a dynamic system, with its ecosystems intricately connected and environmental challenges that are ongoing and ever-changing. Over the years, scientists and researchers have been using light science and lasers to help with environmental monitoring, conservation, and restoration efforts. In honor of Earth Day, this article aims to expand on the different ways in which lasers are being used to aid in environmental efforts.



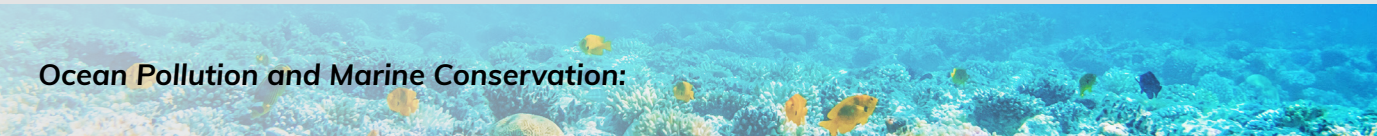
## Forest Inventory and Restoring Degraded Lands:

Deforestation is a significant risk to the planet, one that has been escalating. The removal of trees not only disrupts ecosystems by altering weather patterns, destroying habitats, and eroding soil but also contributes to increased greenhouse gas emissions. Lasers can be instrumental in forest management by helping to gather data of these phenomena. Light Detection and Ranging (LiDAR) technology, in particular, is invaluable in creating 3D and topological maps of forests, tracking density, and providing valuable information about their composition, structure, and health.

LiDAR works by emitting laser pulses to the forest floor and measuring the time it takes for the light to bounce back. By analyzing the time it takes for the light to return and the intensity of the signal, LiDAR can create a detailed 3D map of the forest floor and identify areas that require attention. This information is crucial for monitoring forest growth and decline. It can also help predict forest fire risks and thus provides an opportunity for preventive measures to be taken.

Additionally, lasers can be used to restore degraded lands by tracking and removing invasive species and preparing the soil for re-vegetation. Thereafter, the technology can also be used to monitor the growth and health of newly planted vegetation, facilitating efficient restoration efforts.

Moreover, lasers have found applications in precision logging, which involves the selective cutting of trees to minimize the environmental impact. By using laser scanning technology to accurately assess tree size and growth rates, loggers can optimize their harvesting strategies and preserve the overall health and biodiversity of the forest ecosystem.



## Ocean Pollution and Marine Conservation:

Coral reefs are one of the most diverse and valuable ecosystems on our planet. They provide habitats for countless species of fish and other marine life, protect coastlines from erosion and storms, and support human

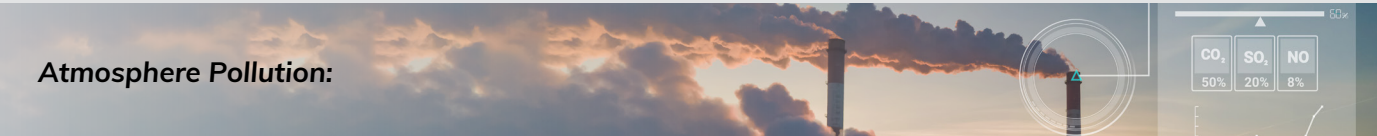
livelihoods through fishing and tourism. Unfortunately, coral reefs face numerous threats, including climate change, overfishing, and pollution. To protect and restore these ecosystems, scientists and conservationists are utilizing lasers as a valuable tool.

Similar to forests, lasers can be used to map the seafloor in three dimensions, offering detailed information about a coral reef's structure, health, and biodiversity. LiDAR enables rapid and accurate mapping of large areas of the seafloor, even in areas with poor visibility. It can even be deployed during nighttime, when many marine animals are more active, facilitating the study of their behavior and movements.

Laser mapping can also help to identify areas of the reef that are particularly vulnerable to threats such as pollution and overfishing, allowing conservationists to target their efforts to protect these areas. Scientists can also measure the density and size of coral colonies, which can provide insights into their health and resilience.

In addition to coral reef monitoring, lasers play a crucial role in monitoring overall water quality. They aid in identifying the abundance of trash and microplastics present in the water, which have been detrimental to marine ecosystems. By detecting and quantifying these pollutants, lasers enable effective management strategies and actions to mitigate their impact.

Furthermore, lasers are being used in the development of underwater robots and autonomous underwater vehicles (AUVs) that can navigate through complex marine environments, collect data, and conduct underwater surveys. These technologies are essential for environmental monitoring, mapping, and studying marine ecosystems, allowing scientists to obtain valuable insights into the health of oceans and make informed conservation decisions.



## Atmosphere Pollution:

Lasers can be used to measure and monitor air pollutants, including particulate matter and volatile organic compounds (VOCs). Raman spectroscopy, a laser-based technique, utilizes scattered light to identify the chemical composition of substances. Applied to the atmosphere, it allows the analysis of particle density and chemical makeup in specific air sections. This technique is particularly useful in determining the presence of harmful chemicals and assessing the level of PM2.5 particulates, which are solid and liquid particles larger than 2.5  $\mu\text{m}$  and can cause respiratory health issues when inhaled.

One notable initiative by the United Nations Environment Programme (UNEP) is the development of a real-time air pollutant calculator that utilizes data from 27,417 air quality stations. The calculator generates an air quality map, offering a comprehensive overview of air pollution. Find it here: <https://www.igair.com/unep>. Environmentalists can leverage this information to identify the most affected areas and populations, track pollution sources, and focus efforts on mitigating its impact.

Additionally, lasers can be employed in atmospheric research to study phenomena such as aerosol concentrations, cloud formation, and atmospheric composition. By using laser-based remote sensing techniques, scientists can collect data over large geographical areas, providing a better understanding of atmospheric processes and their implications for climate change.

In conclusion, lasers are a valuable tool for aiding environmental efforts, from monitoring and conservation to restoration and renewable energy. The examples provided in this article only highlight the significant role that lasers and photonics applications play gathering information and monitoring environments to make informed decisions in efforts to preserve our planet. There are also a whole host of applications for lasers in research and manufacturing that will help the environment, in ways like improving efficiency and reducing the cost of renewable energy technologies.

While Earth Day provides an excellent platform for raising awareness and taking action, the challenges our planet faces require sustained efforts and continuous care. As technology continues to advance, lasers are poised to play an increasingly important role in our collective efforts to protect and restore the Earth.



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# STUDENT SPOTLIGHT

**Name:** Kevin Nilsen  
**Hometown/State:** Riverview, FL  
**Year in School:** 4th year Undergraduate  
**Area of Study/Major:** Photonic Science and Engineering

### When were you first introduced to photonics/electro-optics?

☞ I learned about photonics in my freshman year of college at UCF. I learned about the field through Mike McKee, the undergraduate advisor at CREOL, the college of optics and photonics. The talk he gave to my class introduced me a whole world to explore that I never knew of before. I later studied more about the college and the research being done, and I changed my major soon after. ☞

### What or who inspired you to choose your line of study?

☞ Throughout my time in the undergraduate program at CREOL I have always appreciated having a close, tight-knit, group of people that was always there to help me along in my journey. I do not believe I would have had that in most other programs. I was initially brought into optics and photonics through the prospect of amazing technology, but I stayed because of the connections I made with the community around me. ☞

### Describe your favorite course you have taken so far.

☞ I would say that my favorite course was Laser Engineering taught by Dr. Peter Delfyett. He brought an unmatched energy to every lecture, and I always appreciated it. It came at a more difficult time in my academic career and this class kept me inspired and motivated me enough to get through it. ☞

### Are you researching anything at the moment? Can you tell us about it?

☞ I am currently a research assistant with Dr Shin-Tson Wu, and I have been spending a lot of my time learning about the optics and light engines of virtual and alternate reality displays. In the past I have made flat, diffractive lens waveplates that can help replace more heavy and bulky glass lenses. ☞

### What would you like to do in the future with your studies?

☞ I am going to be starting my PhD in Optics and Photonics at CREOL in the fall of 2023 and I will be continuing to work with Dr. Wu. I love the technology I am working on, and I hope that I continue to make an impact on virtual reality optics as I continue my educational career. ☞

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

**LIA**TODAY

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](mailto: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).

[VIEW SUBMISSION FORM](#)