

LIA

VOLUME: 29 NO: 3 | MAY/JUN 2021

TODAY

STUDENT SPOTLIGHT

PG 9

PROF STEEN ON PROF
MAZUMDER'S IMPACT

PG 10

OSHA ISSUES
EMERGENCY
TEMPORARY STANDARD
TO PROTECT HEALTH
CARE WORKERS FROM
THE CORONAVIRUS

PG 13

BLS: EXAM STRUCTURE
& STUDYING

PG 15



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.

ISSN 2690-5981

2021
EDITORIAL
COMMITTEE

David Sliney -
US Army, Public Health Center,
retired

Ron Schaeffer -
retired

Managing Editor: Jana Langhans - jlanghans@lia.org



PROF. WILLIAM STEEN ON PROF. JYOTI MAZUMDER'S IMPACT ON INDUSTRY AND COMMUNITY

In a tribute to his late friend, Prof. William M. Steen reflects on his time with Prof. Jyotirmoy Mazumder and the incredible impact he had on the laser industry and community.

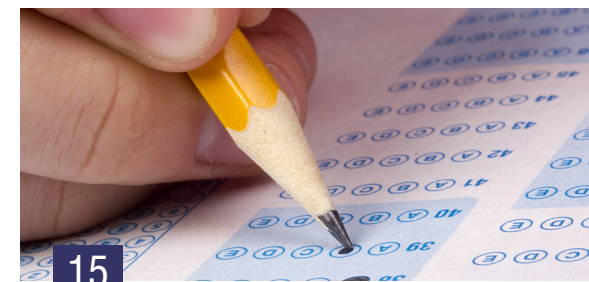
Catch up on all of the past issues!

<https://www.lia.org/subscriptions/lia-today>



US DEPARTMENT OF LABOR'S OSHA ISSUES EMERGENCY TEMPORARY STANDARD TO PROTECT HEALTH CARE WORKERS FROM THE CORONAVIRUS

The U.S. Department of Labor's Occupational Safety and Health Administration has announced it will issue an emergency temporary standard to protect healthcare workers from contracting coronavirus.



BLS: EXAM STRUCTURE & STUDYING

BLS offers two certifications: Certified Laser Safety Officer (CLSO) and Certified Medical Laser Safety Officer (CMLSO). It's important to study for these exams, as experience and training alone may not cover all areas of practice found on the exams. These exams are based on the relevant American National Standard for their industry.

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.

FOLLOW US!

Visit www.lia.org/subscriptions to sign up for our social media outlets.



FEATURES

Upcoming LIA Training	4
President & Executive Director's Message	5
Conference Event Updates	6
Trending in the News	7
JLA Featured Article	8
Student Spotlight	9
Prof Steen on Prof Mazumder's Impact	10
New Corp Member	12
US Department of Labor's OSHA issues emergency temporary standard to protect health care workers from the coronavirus	13

BLS NEWSLETTER

BLS Updates	14
Exam Structure & Studying	15

ADVERTISERS

Photonics Media	13
-----------------	----

If you are interested in advertising space in this newsletter, call +1.407.380.1553/1.800.34.LASER or email marketing@lia.org.

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

MEDICAL LASER SAFETY OFFICER TRAINING

ORLANDO, FL - AUG 21-22, 2021

Are you an RN, OR supervisor, surgical tech or training coordinator who has been assigned the critical responsibility of LSO in a medical facility? Designed to meet the special needs of medical professionals, LIA's Medical Laser Safety Course will provide the training you need to build and maintain a successful laser safety program.

As an LSO at a medical facility, you have a unique set of responsibilities. Not only is laser safety a top priority to protect your staff, but it is critical to protecting your patients. Our MLSO training program addresses the specific laser safety protocols as they relate to medical and healthcare environments.

This course meets all LSO training requirements as outlined by the ANSI Z136.3 Safe Use of Lasers in Health Care standard, OSHA, and The Joint Commission. In addition to the working knowledge you will gain, you will earn 12 Contact Hours, 2.0 BLS CM Points by the Board of Laser Safety, 4 CECs by the AAHP and eligible for ABIH CM points..



Gilbert Haas
LIA President 2021

Be well and stay safe.

PRESIDENT'S MESSAGE

As the United States slowly opens back up from pandemic restrictions, other countries are in different stages of battling the pandemic in their own timelines. During this transitional time, international organizations like the LIA need to carefully consider the impact of international conferences both from humanitarian and financial perspectives.

The LIA is embracing this transition and reinventing itself to move in a direction where social platforms and world communications have changed and evolved.

As a New Year Resolution can encourage a fresh start, a pandemic can also provide a fresh start or transition into a fresh new world with new opportunities.



Nat Quick
Executive Director

EXECUTIVE DIRECTOR'S MESSAGE

The outlook of the pandemic is slowly starting to improve, but this now puts us in challenging times that are testing our resolve and showing our passion for the industry by innovation. We must reevaluate the opportunities that exist to gather together and foster knowledge in ways that are safe and accommodating to all. As President Gil Haas mentioned in his message, this pandemic is providing us with new opportunities to optimize how we grow this industry together, which is something to be excited about.

In this issue you will find a heartfelt tribute to the late Prof. Mazumder from his supervisor and close friend, Prof. William Steen. This piece will give you a deeper understanding of what we, as an industry and a community, have lost. Not only did Prof. Mazumder contribute so much to the research and development of the industry, but this piece also gives insight into the humanitarian aspects of their research process. He put as much time and effort into his students as he did the research, leading to them becoming a family, as seen in Prof. Steen's reflection on their time together.

Also in this issue is the inaugural publishing of a new Student Spotlight segment. We are excited to highlight some of our local students and their passion to learn and use their knowledge to grow this field. In this first Student Spotlight we are recognizing UCF CREOL student Ilina Sunkara who is a Photonic Science and Engineering major.

Stay safe and keep others safe.

International Congress on Applications of Lasers & Electro-Optics

Due to the continued uncertainty in the wake of the COVID-19 global pandemic and the ongoing impact on international travel, LIA has decided to transition ICALEO 2021 to a fully virtual conference experience this October. The health and safety of our members, speakers, attendees, and staff is of paramount importance and we feel this is the safest path forward.

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 available. The call for papers is also open with the abstract deadline being October 12, 2021.

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

Find LIA at these Laser Conferences in 2021!

Upcoming Laser Industry Conferences in North America - 2021

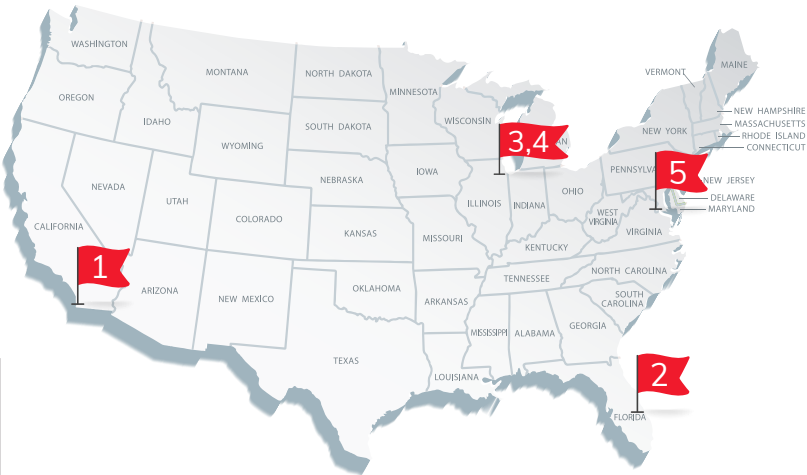
- 1. SPIE Optics + Photonics, Aug. 1-5
- 2. AORN, Aug 7-10
- 3. RAPID + TCT, Sept. 13-15
- 4. FABTECH, Sept. 13-16
- 5. OSA Frontiers in Optics + Laser Science, Oct. 31 - Nov. 4
- 6. ICALEO, Oct. 18-20



40th INTERNATIONAL CONGRESS ON APPLICATIONS OF LASERS & ELECTRO-OPTICS

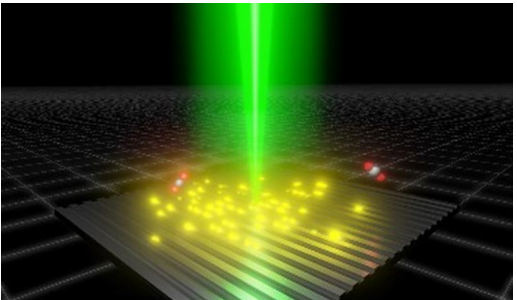
Join us for our 2021 ICALEO® conference! The World's Premier Platform for Breakthrough Laser Solutions, the International Congress on Applications of Lasers & Electro-Optics, brings together the leaders and experts in the field of laser material interaction, providing the world's premier platform for sharing new ideas and discovering solutions.

*Conference LIA is Attending



TRENDING IN THE NEWS:
LIA'S TOP 4 ARTICLE PICKS

1



BREAKTHROUGH SEES CREATION OF LIGHT-EMITTING
SOLID CARBON FROM CO2 GAS

A team of researchers at the University of Ottawa has found a way to use visible light to transform carbon dioxide gas, or CO2, into solid carbon forms that emit light.

[Read more](#)

2

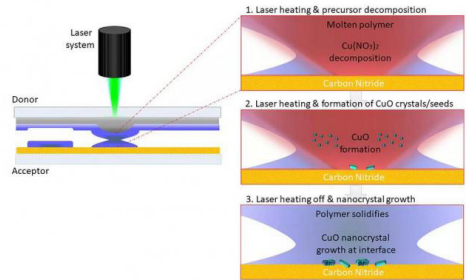


REALIZATION OF THE HIGHEST LASER INTENSITY
EVER REACHED

Laser scientists at the Institute for Basic Science in South Korea realized the unprecedented laser intensity of 1023 W/cm2, a milestone that has been pursued for almost two decades by many laser institutes around the world.

[Read more](#)

3

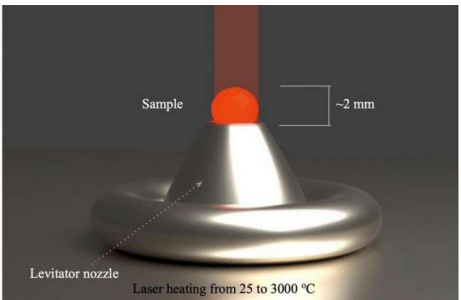


NANOMATERIALS WITH LASER PRINTING

An interdisciplinary team from the Max Planck Institute of Colloids and Interfaces presents for the first time a laser-driven technology that enables them to create nanoparticles such as copper, cobalt and nickel oxides.

[Read more](#)

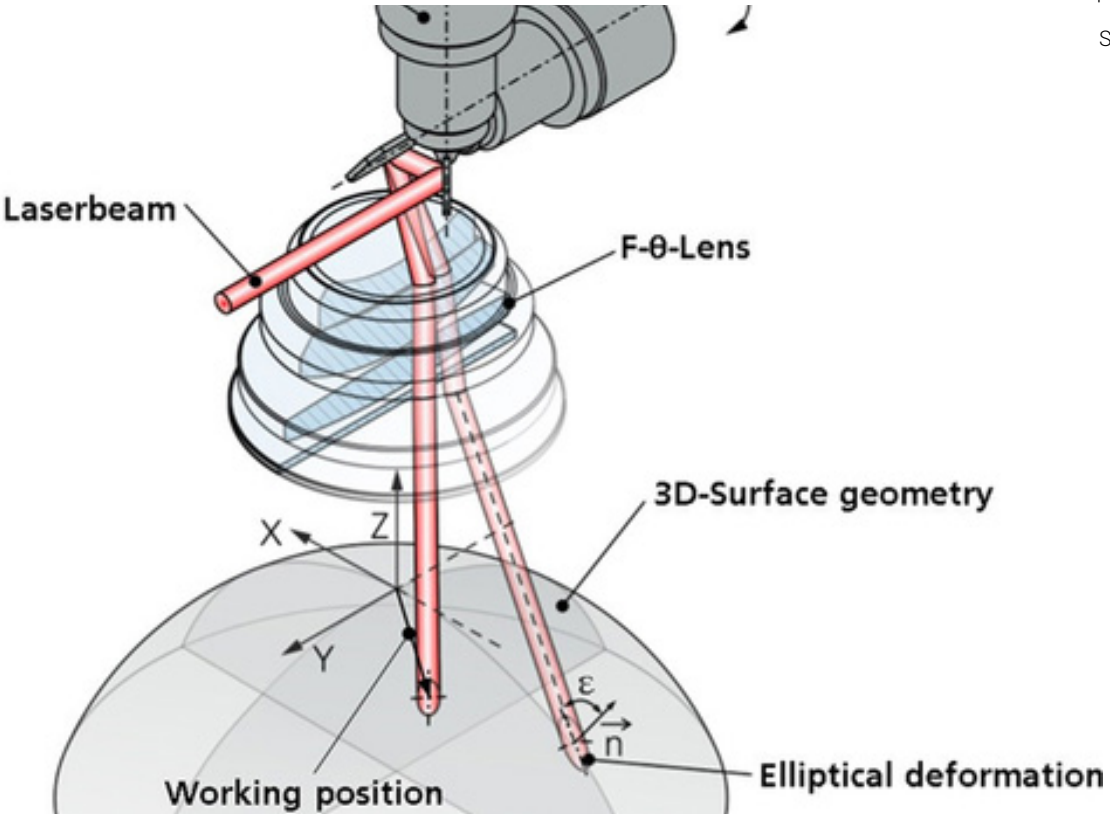
4



LASERS, LEVITATION AND MACHINE LEARNING MAKE
BETTER HEAT-RESISTANT MATERIALS

Argonne scientists across several disciplines have combined forces to create a new process for testing and predicting the effects of high temperatures on refractory oxides.

[Read more](#)



Elliptical distortion of the intensity distribution. Reproduced with permission from Pütsch, "Aktive und adaptive Strahlformungssysteme für die Werkstoffbearbeitung mit Laserstrahlung," Dissertation, Aachen (RWTH Aachen University, 2016).

LASER POLISHING OF METALLIC FREEFORM SURFACES BY USING A DYNAMIC LASER BEAM PREFORMING SYSTEM

By: Judith Kumstel

Abstract: Laser polishing is an automated polishing solution for polishing metallic freeform surfaces, which is hoped to support or replace the time-consuming and cost-intensive manual polishing in the near future. This technique is based on remelting a thin surface layer by laser radiation. The surface tension leads to a material flow from the peaks to the valleys; thus, the surface resolidifies in a smoother way. Laser polishing of 3D surfaces often leads to a nonperpendicular angle of laser incidence. This results in a projection of the focused circular laser beam on the surface of the workpiece that is primarily approximated with an elliptical shape. The beam geometry in the projection depends on the surface geometry of the workpiece and the actual spatial working position of the laser beam. To ensure a constant polishing quality, the circular symmetry of the laser spot on the workpiece has to be maintained. A method is developed and discussed, which enables the compensation of the elliptical deformation,

called elliptical preshaping. This is realized by a combination of an anamorphic zoom lens with a beam rotating device comprising a Pechan prism. It is demonstrated that constant surface qualities up to inclination angles of 60° can be achieved on the tool steel X37CrMoV5-1 using elliptical preshaping.

Journal of Laser Applications 33, 022020 (2021); <https://doi.org/10.2351/1.5128459>

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



Name: Ilina Sunkara
Hometown/State: Orlando, FL
Year in School: 3rd & final year
Area of Study/Major: Photonic Science and Engineering

STUDENT SPOTLIGHT

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

My initial introduction to the field of optics took place in my first high school physics class. While I learned more about geometric optics and ray tracing principles than photonics, I found myself wanting to learn more about the overall field. It was not until college that I learned more about the intersection between electronics and optics along with the various subfields within photonics.

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

Studying optics in high school inspired me to learn more about the overall field though I still wanted to have a large focus on engineering in my higher education. This helped lead me to studying the combination of photonic science and engineering at UCF, as I was able to learn about the principles of optics while still gaining knowledge in electrical engineering. With my computer science minor, I was also able to study more in relation to the intersection of computer science and optics.

Describe your favorite course you have taken so far.

My favorite course so far in my undergraduate degree has been Visual Optics taught by MJ Soileau. Throughout this course, I learned about the biological structure of the eye along with various principles ranging from psychological perception to display technology. I also really enjoyed learning about color theory and how various colors of light and pigments could be combined to create new hues, especially in the context of displays.

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

This past semester, I worked with the Center for Research in Computer Vision at UCF to develop an algorithm with the ability to identify snakes from infrared camera images. The ultimate goal of this project was to be able to find and euthanize Burmese Pythons in the Everglades as they are an invasive species and a threat to the biodiversity in that region. We collaborated with a group in the optics department that developed a specialized infrared camera with a large field of view to better identify these snakes.

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

I plan to attend graduate school this coming fall through a joint program between multiple international universities. I will be studying imaging and light in extended reality and will be specializing in the computational imaging track in the program. Throughout the degree, I will be able to study at the University of Eastern Finland, Jean Monnet University, and Toyohashi University of Technology.



Jyoti in 1989 at the Cabo de Roca in Portugal. The most western point in Europe during a conference in Lisbon on "Surface Engineering with high energy density beams", organised by Professor Rui Vilar.

Professor Jyotirmoy Mazumder (1951-2021)

Jyoti Mazumder scaled the heights of academic achievement being recognised as a leading thinker in the field of laser material processing by his election to the USA National Academy of Engineering, the Indian National Academy of Engineering and the winner of numerous awards including the Arthur Schawlow award from the LIA. One of the giants of the subject of laser material processing has left us.

It is not usual, it is sad, for a supervisor to write an obituary to one of his top students; but that is what I am doing. He joined my embryonic research group at Imperial College, London in 1977 to work on the newly acquired Control Laser 2kW CO2 FAF laser. It was at that time a rare industrial laser with significant power and the best mode structures available at the time, so we found out. Ours was one of the first University based research groups working in this field. Jyoti was in his element as a scientific pioneer. He sailed through his PhD on

laser welding of mild steel and titanium, laying a significant foundation in that topic. This in spite of having come straight from Calcutta into the wet and cold of London at a time when the Government of India would not allow his father, a wealthy business man, to help him financially. His first paper on "Laser welding of Titanium 6Al-4V" was given at the Munich '78 conference a year later.

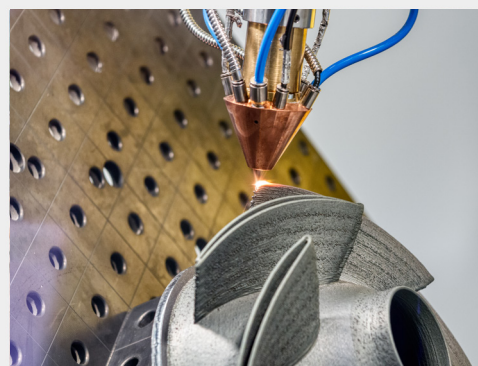
Being at Imperial College in 1978 we had access to one of the few large computers in the world and so together we built a finite difference model of a stationary and moving laser generated hot spot, (all on punched cards using PUFFT - Purdue University Fast Fortran Translator) which, much to our surprise, led to one of our more frequently cited papers [Mazumder J, Steen W.M. "Heat transfer model for CW laser processing" J. App. Phys Feb 1980 51 (2) pp.941-946].

He was always searching for the next development and he had the talent to exploit it when he found it. In the early 1980s he alerted me to the idea that surface treatment might be the next idea to explore. I considered that using the quality laser beam out of focus was missing its value, how wrong I was!

He left my group but stayed in touch and went to the University of Southern California where he developed his own group and network of contacts including Arthur Schawlow, with whom he worked in Stanford University for a while. He then moved to the University of Illinois in Urbana-Champaign and after 16 years there he went to become the Robert H Lurie Professor at the University of Michigan at Ann Arbor and flourished through hard work and talent.

From his 400 or so publications one can see a genius at work. His mathematical models became so sophisticated they could replicate the waves on a weld pool and inside the keyhole. A far cry from where we started in 1980. He was one of the pioneers to recognise that the laser could produce nano particles through ablation at a time when no one thought nano particles would lead to much. Then came laser cladding and the realisation that cladding repeatedly in one place could build features leading to the subject of additive manufacture. Jyoti was one of the first, through his contacts with Chrysler, to start a company, POM, selling additive manufacturing equipment.

Together we helped another of my group, Dr Mahmoud Eboo, start a laser company, Quantum Laser, which was eventually sold to Honeywell. This company developed an expertise in cladding and 3D manufacture. He also helped me in 2010 to write the 4th edition of my book on "Laser Material Processing", at a time when my energy was flagging!



An image of laser additive manufacturing or 3D printing. Jyoti was one of the first to start a company selling additive manufacturing equipment.

Jyoti was a great and esteemed scientist but also a brilliant teacher. Every week he would have a seminar with his group to get them discussing together. He was always helpful to his students, who became a loyal and cohesive force in laser circles - who sometimes generously recognised me as their grandfather! There are now a number of distinguished engineers who are indebted to his care, inspiration and thoughtfulness.

He remained a serious scientist to the end, and a man of considerable courage, never did I hear him complain of his health even after a kidney transplant! In the recent 2020 ICALEO virtual conference he proposed a new method for monitoring a laser weld from the spectrum of the plasma. In an email to me later he stated:

"The Mechanical property and plasma relationship concept came from the simple thought that if hardness is proportional to resistance to deformation then there should be similarity with plasma formation too. If the atom does not want to move sideways,

it will not like to vaporize either. After doing some proof of concept experiments I started getting deeper into it. Plasma behaviour is described using Quantum mechanics whereas mechanical properties are described using classical mechanics. I dream and hope that one day, I can develop a simple equation for transition from quantum to classical mechanics." Email to WMS in Oct 2020.

If he had achieved that goal he would have been in line for a Nobel Prize. He left the world too soon.

At root he was a family man who was totally devoted to his wife, Aparajita, and his two sons Debashis and Debayan. His attitude to family was such that it included many of his close friends of which my wife, Margaret, and I count ourselves privileged to have been. Many others who have worked with him have lost a dear friend.

- William.M.Steen



Jyoti with Igor Smurov from Russia, Helmut Hugel from Stuttgart, Horst Webber from Berlin and myself in Erice, Sicily during a NATO ASI in 1992.



Jyoti with Walt Duley, from Waterloo University Canada, and myself outside the Nagaoka Temple in Japan during the LAMP'92 conference.

ILSC
INTERNATIONAL LASER
SAFETY CONFERENCE
March 21-24, 2022

ILSC 2022
Call for Papers

**NEW Abstract
Submission Deadline:
October 12th, 2021**

Find out more at ilsc.ngo



Welcome New Corporate Member



Serra Laser Center has been metal fabricating parts and components by means of laser cutting, waterjet cutting, laser marking/engraving and CNC milling services. Providing industrial precision cutting and milling services for specifications for OEMs, steel suppliers, sheet metal fabricators and commercial industries.

www.serralaser.com

To find out more about becoming a corporate member, visit lia.org/membership/corporate.

STAY UP TO DATE with the Industry's Leading Content

PHOTONICS
spectra

BIOPHOTONICS
BRINGING LIGHT TO THE LIFE SCIENCES®

EUROPHOTONICS

Vision
spectra

WORLDWIDE COVERAGE OF

LASERS • OPTICS • POSITIONING • SENSORS & DETECTORS

IMAGING • TEST & MEASUREMENT • SOLAR • LIGHT SOURCES • MICROSCOPY

MACHINE VISION • SPECTROSCOPY • FIBER OPTICS • MATERIALS & COATINGS

Available in print and digital formats.

Subscribe Today!

www.photonics.com/subscribe

PHOTONICS
MEDIA photonics.com



US Department of Labor's OSHA issues emergency temporary standard to protect health care workers from the coronavirus

WASHINGTON, DC – The U.S. Department of Labor's Occupational Safety and Health Administration has announced it will issue an emergency temporary standard to protect healthcare workers from contracting coronavirus. The standard focuses on healthcare workers most likely to have contact with someone infected with the virus. OSHA announced the new standard alongside new general industry guidance, both of which are aligned with Centers for Disease Control guidance.

"Too many of our frontline healthcare workers continue to be at high risk of contracting the coronavirus," said U.S. Secretary of Labor Marty Walsh. "As I said when I came to the department, we must follow the science. This standard follows the science, and will provide increased protections for those whose health is at heightened risk from coronavirus while they provide us with critical healthcare services. Given the pace of vaccinations, this standard, along with the guidance OSHA, the CDC and other agencies have released, will help us protect frontline healthcare workers and end this pandemic once and for all."

The emergency temporary standard establishes new requirements for settings where employees provide healthcare or health care support services, including skilled nursing homes and home healthcare, with some exemptions for healthcare providers who screen out patients who may have COVID-19. OSHA will update the standard, if necessary, to align with CDC guidelines and changes in the pandemic.

"This standard is necessary to give our healthcare workers deeply needed protections," said Acting Assistant

Secretary of Labor for Occupational Safety and Health Jim Frederick. "This tailored standard allows OSHA to help the workers most in danger of contracting the virus, while the updated guidance will give other businesses across the country the information they need to help protect unvaccinated workers and continue mitigating spread in the workplace."

In addition to the healthcare-focused ETS, OSHA is issuing updated guidance to help employers and workers in other industries protect workers who are still not vaccinated, with a special emphasis on other industries noted for prolonged close-contacts like meat processing, manufacturing, seafood, and grocery and high-volume retail.

The health care emergency temporary standard is aimed at protecting workers facing the highest coronavirus hazards—those working in health care settings where suspected or confirmed coronavirus patients are treated. This includes employees in hospitals, nursing homes, and assisted living facilities; emergency responders; home health care workers; and employees in ambulatory care settings where suspected or confirmed coronavirus patients are treated.

The standard will require non-exempt facilities to conduct a hazard assessment and have a written plan to mitigate virus spread, and requires healthcare employers to provide some employees with N95 respirators or other personal protective equipment. In addition, covered employers must ensure 6 feet of distance between workers. In situations where this is not possible, employers should erect barriers between employees where feasible.

The standard also requires covered employees to provide workers with paid time off to get vaccinated and to recover from any side effects. Covered employees who have coronavirus or who may be contagious must work remotely or otherwise be separated from other workers if possible, or be given paid time off up to \$1400 per week. For most businesses with fewer than 500 employees, tax credits in the American Rescue Plan may be reimbursed through these provisions.

The ETS exempts fully vaccinated workers from masking, distancing and barrier requirements when in well-defined areas where there is no reasonable expectation that any person will be present with suspected or confirmed coronavirus.

The ETS is effective immediately upon publication in the Federal Register. Employers must comply with most provisions within 14 days and with the remaining provisions within 30 days. OSHA will use its enforcement discretion to avoid citing employers who miss a compliance deadline but are making a good faith effort to comply with the ETS. OSHA will continue to monitor trends in coronavirus transmission.

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 workers by setting and enforcing standards, and providing training, education and assistance. Learn more about OSHA.

Original Release: June 10, 2021

Source: <https://www.osha.gov/news/newsreleases/national/06102021>

NEWSLETTER

Volume 2 • Issue 2

Recently Certified

Georgios Romanos - CMLSO

Kyle Smith - CLSO

Sergey Avanesyan - CLSO

Austin Erb - CMLSO

Luis Carvajal - CMLSO

Tiffany Castle - CMLSO

Phan Daniel - CLSO

Amy Leicht - CMLSO

Deirdre Owen - CMLSO

LIA Classroom Courses for BLS CM Points

The following classroom courses are available to get BLS CM points:

Industrial Laser Safety Officer Training, August 11-12, 2021-Novi, MI
Laser Safety Officer Training, August 18-20, 2021-Orlando, FL
Medical Laser Safety Officer Training, August 21-22, 2021-Orlando, FL
Laser Safety Officer with Hazard Analysis Training, August 23-27, 2021-Orlando, FL

Find more information here: <https://www.lia.org/training>

New ANSI Z136 Standards

The following are the new ANSI Z136 standards that have come out at the end of last year and beginning of this year:

ANSI Z136.5 (2020) - Safe Use of Lasers in Educational Institutions
ANSI Z136.7 (2020) - Testing and Labeling of Laser Protective Equipment
ANSI Z136.8 (2021) - Safe Use of Lasers in Research, Development, or Testing

Find these new standards, as well as the rest, on our website at lia.org/store/laser-safety-standards

International Laser Safety Conference (ILSC) 2022 Dates and Location Announced!

"We are excited to announce that ILSC will be held in Houston, Texas this year! Join us at the Royal Sonesta from March 21-24, 2022 for the laser safety conference you've been looking forward to!" - ILSC Conference Team

Abstract Submissions are currently open to interested speakers with a deadline of October 12, 2022. Find out more about the conference at ilsc.ngo.

Certification Exams

Due to COVID-19 there will not be any paper-and-pencil exams held in 2021. Computer-based testing will still be available year-round through our third-party test administrator at certain locations. For exam information, visit www.lasersafety.org, or contact us at bls@lasersafety.org.

Write for BLS!

Looking for a way to earn BLS CM points for free? BLS has restarted it's newsletter and is inviting CLSOs and CMLSOs to share laser safety knowledge with the laser community! Published article submissions are worth 0.5 BLS Certification Maintenance (CM) points in Category 3. For more information on guidelines and regulations, email us at bls@lasersafety.org. Check out one of our submissions on the next page!

BLS Exam Structure & Studying

Currently, the Board of Laser Safety offers two certifications: Certified Laser Safety Officer (CLSO) and Certified Medical Laser Safety Officer (CMLSO). It's important to study for these exams, as experience and training alone may not cover all areas of practice found on the exams. These exams are based on the relevant American National Standard for their industry, which should serve as your primary study materials.

	CLSO Exam	CMLSO Exam
Areas of Practice	9	8
Number of Questions	100	100
Question Types	Multiple Choice	Multiple Choice
Number of Answer Choices	5	4
American National Standard	ANSI Z136.1 – 2014	ANSI Z136.3 – 2011
Time Allotted for Exam	3-hours	3-hours
Hazard Calculations	Yes	No

Studying

A detailed breakdown of the areas of practice of each exam can be found in the exam reference guides. Many candidates use this information to guide their studying efforts:

[CLSO Exam Reference Guide \(PDF\)](#)

[CMLSO Exam Reference Guide \(PDF\)](#)

Day of the Exam:

Each candidate must provide a valid form of legal ID (State ID, Driver's License, Passport), and a copy of their letter of acceptance on the day of the exam. The only materials allowed during the exam will be provided by the proctor, with the exception of a non-programmable scientific calculator, which CLSO candidates may bring if they choose; equation sheets are prohibited. Study materials are not allowed during either exam. Proctors will provide pencils for paper-and-pencil exams.

Dual Certification

Candidates may apply for both exams; however, each exam requires its own application, references, and fees, and the candidate will only be approved to sit for exams that he/she has met all eligibility requirements for. Maintaining both certifications requires that the candidate earns 10 BLS CM points for each certification over each 3-year certification cycle. For additional information on certification maintenance, please see the relevant Certification Maintenance Manual or contact the BLS office.

About BLS



The mission of the Board of Laser Safety (BLS) is to provide a means for the recognition of laser safety professionals through certification and to promote competency in the field of laser safety. BLS certification will enhance the credibility of a designated Laser Safety Officer, and demonstrate that individuals serving in the field have agreed to adhere to high standards of safety and professional practice. For the employer, having a CLSO or CMLSO on staff demonstrates due-diligence and helps to ensure legitimacy and adequacy of the laser safety program, validating the company's dedication to a safe working environment for all employees.

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

LIATODAY

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).

[VIEW SUBMISSION FORM](#)