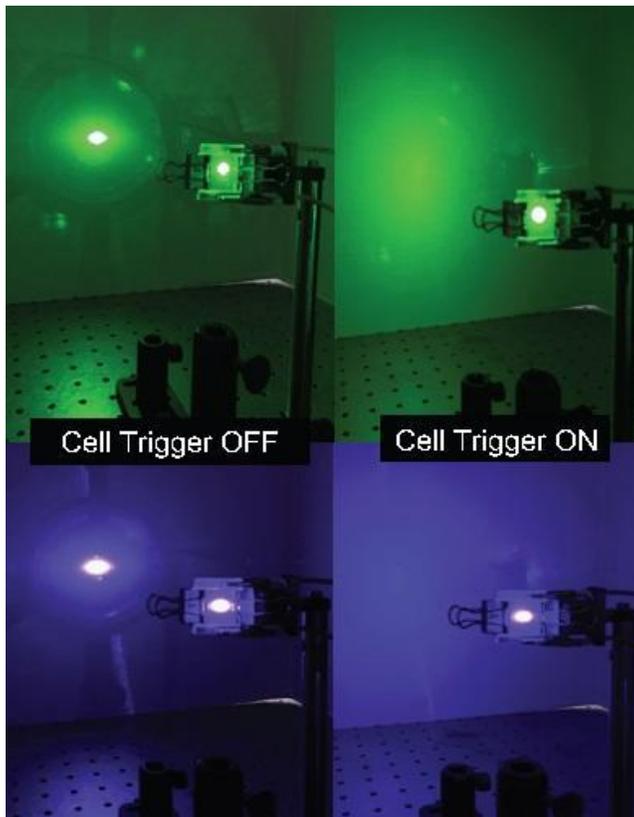


OPEN Optics and Photonics Education News

Newsletter of the Optics and Photonics College Network

April 2019

Liquid Crystals Could Help Protect Against Laser Pointer Attacks



Recent research has shown that liquid crystals may someday be used to help deflect laser pointer attacks on aircraft. According to the FAA, 6,754 laser strikes on aircraft were reported in 2017. The unexpected flash of intense light from even a low-tech boardroom laser pointer can distract pilots and be a potential hazard. Liquid

crystals, sandwiched between two 1-inch squares of glass, scatter green and blue light on a wall when the cells are triggered by laser illumination (see right panels in figure). This application could be used on windows of the cockpit.

www.photonics.com/Article.aspx?AID=64549&refer=PDA&utm_source=PDA_2019_04_02&utm_medium=email&utm_campaign=PDA&PID

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Upcoming Events

06/10/19 - 6/13/19
 Laser Material Processing
 Workshop at Indian Hills
 Ottumwa, IA

06/24/19 - 6/28/19
 OP-TEC Online Course
 Hands-on Capstone Labs
 Indian Hills, Ottumwa, IA

07/22/19 - 07/25/19
 High Impact Technology
 Exchange Conference
 St. Louis, MO

08/5/19 - 08/6/19
 Fundamentals of Photonics
 Workshop at Indian Hills
 Ottumwa, IA

HI-TEC 2019 Conference Plans

From the Executive Director



In its thirteen years of operation OP-TEC, the National Science Foundation Advanced Technological Education National Center for Optics and Photonics Education has developed and updated over 2,500 pages of educational materials:

- * 16 Student texts and Faculty Teaching Aids for the laser and optics courses that are used in the Photonics and Precision Optics curriculum models.
- * An introductory student text on Integrated Photonics.
- * 16 Student modules in photonics-enabled technologies (laser applications)
- * Three Program Planning Guides
- * Two National Skill Standards
- * Three monographs of Best Practices in Student Recruitment, Student Retention and Job Placement

In addition, OP-TEC has created 103 video tutorials and 24 computer-generated, animated graphics to study/understand optical phenomena and mathematical equations (such as trig functions).

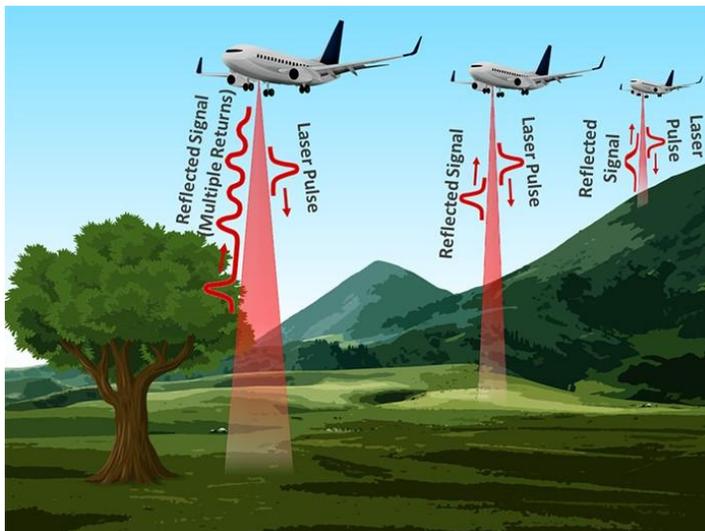
In order to sustain its impact in photonics technician education, in May 2019 OP-TEC will release copies of these materials for use by colleges, faculty and students. They will be available without cost, from the OP-TEC web site in May. Later this summer LASER-TEC, CREOL/UCF, ATE Central and other organizations (such as technical societies) will also distribute these materials.

A complete list of these materials is shown in the right column of this newsletter.

Dan Hull

Narrow Band Interference Filters Improve LIDAR Resolution

LIDAR, which stands for Light Detection and Ranging, is a remote sensing method that uses a pulsed laser to measure ranges (variable distances) to the earth. LIDAR systems are also used for mapping, or to locate a specific object on the earth's surface.



The national and regional photonics centers will host the next annual in-person OPCN network meetings and photonics industry site visits at the HI-TEC Conference, July 22-25, 2019 at the Hyatt Regency at the Arch in St. Louis, MO.

The HI-TEC Conference provides a wonderful opportunity for educators to learn, network, give presentations, share best practices, and disseminate project resources with other STEM educators.

OPCN events are being planned for the HI-TEC Preconference on Monday and Tuesday, July 22-23. The general conference keynotes, presentation sessions, and exhibits will take place on Wednesday and Thursday, July 24-25.

As in previous years, OP-TEC will be offering conference registration codes for OPCN representatives to attend. OPCN Coordinators and Members will receive priority for these free registrations. Actively reporting OPCN coordinators may also request reimbursement for airfares following OP-TEC guidelines. Some hotel assistance will also be available.

Interested educators should contact Christine Dossey at cdossey@op-tec.org to request registration codes and travel assistance.

We hope that all OPCN members will be able to attend July 22-25 in St. Louis!

PACT Alumni Spotlight

LIDAR sensors scan a pulsed laser across the environment and determine the return time of the reflected signals by calculating the precise position and orientation of the sensor as the signals are emitted and received.

If a single LIDAR pulse only encounters one object, such as bare ground, the result will be a single corresponding return signal. However, multiple objects such as tree branches and shrubs can be encountered before the signal reaches the ground, resulting in multiple reflected signals. When specified and designed for a specific LIDAR application, ultra-narrowband interference filters can optimize signal-to-noise and improve LIDAR sensor performance.

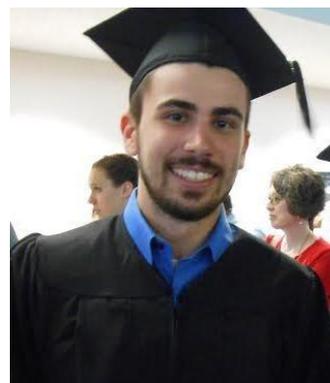
For a brief tutorial on LIDAR and filtering to improve resolution, see www.laserfocusworld.com.

Summer Learning Programs at LASER-TEC

Summer 2019 will be rich with multiple student learning programs at LASER-TEC. The programs will differ in lengths, major learning areas, and populations to which they cater, but they are designed to introduce students to advancements in modern electronics, automation, lasers, fiber optics, photonics, and robotics technologies. These transitional camps provide a platform for students to get ready for college, build skills, advance knowledge, bring awareness and prepare them for careers in photonics that will elevate their social-economic status.



Enrollment has begun for the following programs: Coding with Arduino-Visible Light Spectrum (one week), Coding with Arduino-Wireless Technologies (one week), Coding with Arduino - Game Programming (one week), Electronics Maker (one week), and Emerging Technologies Summer Camp (8 weeks). LASER-TEC's camp modules have been embedded in multiple college, K-12, and afterschool learning programs such as Environmental Learning Center Summer STEAM Mentorship Program, QUEST, TEKnow Camp, Upward Bound Math & Science Summer STEM Institute, Summer Trek, and others. Through these summer learning programs, LASER-TEC is planning to impact close to 1,000



Christopher Loehr didn't start out with a plan to work in photonics. Right out of high school, he was working a patchwork of part-time jobs to create full-time income. Things changed for the better after Chris's mom picked up a brochure on the Laser and Photonics Technology Program at Central Carolina Community College (CCCC) and brought it home for Chris. Touring the facilities with program director, Professor Gary Beasley, Chris met students who had volunteered to stay after class and demonstrate different laser applications. "It kind of impressed me," he says. "Who wants to stay after class?" As these students explained the program and described their classes, their excitement was obvious and by the end of the day, Chris knew he wanted to be a part of that program.

When Chris began at CCCC, he thought of a college degree as a way to get a better-paying job. But, as he continued in the photonics program, he found himself enjoying learning. Chris graduated from CCCC with an associate of applied science degree in laser and photonics technology and began work as a Slab Fabrication Operator at Northrup Grumman Synoptics. Chris works with a variety of production parts to cut the crystals down to size and match them to specifications. Working with engineers, Chris helps solve problems, do testing, and provide feedback.

Chris is considering furthering his education with an electrical engineering degree from the University of North Carolina at Charlotte. He hopes to

students.

If you'd like to learn about summer program curriculum and tools, or if you need any assistance in planning or hosting a camp, please contact Dr. Chrys Panayiotou at (772) 462-7621 or cpanayio@irsc.edu.

To view a description of LASER-TEC's major camps and camp schedule go to www.laser-tec.org/bootcamps.html.



MPEC Participation in OPCN @ CREOL Industrial Affiliates Symposium & Trumpf University Tech Day

The Midwest Photonics Education Center staff members, Frank Reed and Greg Kepner, will attend the University Tech Day, April 11, at the TRUMPF laser facility in Plymouth, MI. Reed will present Fundamentals of Lasers and Laser Material Processing. TRUMPF experts will present topics such as Ultrafast Lasers: Lighting Up the Next Gen Applications, E-mobility and Power Storage Laser Processing Techniques, Overcoming the Medical Black Marking Challenge, and Introduction to Additive Manufacturing. After these presentations, there will be live demonstrations of laser welding, laser cutting, laser marking, 3D metal printing, micro-processing, and Laser Metal Deposition.

MPEC also participated in OPCN meetings during the Industrial Affiliates Symposium at CREOL, March 13-15 in Orlando, FL. See related article.

MPEC staff are working with area high schools to offer hybrid online courses (Photonics Fundamentals I and II) for Fall 2019. These dual credit courses were developed through a project grant titled "Developing Photonics Education in Iowa's Rural Secondary Schools". Students will take the courses online and perform laboratory activities at their high schools using the MPEC Photonics Kit. Greg Kepner and Frank Reed have been meeting with high school principals, counselors, deans, curriculum directors, program directors, teachers, and students to explain the course and discuss career and educational opportunities in the field of lasers and optics. Several area high schools have expressed interest in offering the course and students have been registering for the course.

MPEC Professional Development opportunities:

- Laser Material Processing workshop on June 10-13, 2019
- Hybrid Online Laser Material Processing course (now open) with lab activities on July 8-12, 2019
- Fundamentals of Photonics workshop on August 5-6, 2019



March OPCN Meetings at CREOL Industrial Affiliates Symposium

continue working for Northrup Grumman. Chris is confident he has built a foundation that will enable him to move up in the company.

Read more about Chris and other successful technicians in [Success Stories in Photonics Careers](#).

OP-TEC Materials List



Course 1 Fundamentals of Light and Lasers, 3rd Edition

- * Student Text
- * Figures & Images for Instructors
- * Course 1 Videos (62)
- * Course 1 Widgets (24)

Course 2 Laser Systems and Applications, 2nd Edition

- * Student Text
- * Figures & Images for Instructors
- * Course 2 Videos (8)

Integrated Photonics

- * Student Text
- * Figures & Images for Instructors

Quality Assurance of Precision Optics

- * Student Text
- * Figures & Images for Instructors
- * QAPO Videos (9)

Metrology of Optical Systems

- * Student Text
- * Figures & Images for Instructors

Introduction to Lasers & Optics

- * Student Guide Laboratories and Demonstrations
- * Reference Guide for Instructors

Essential Math for Engineering Technicians eTextbook

- * Student Text
- * Essential Math for Engineering Technicians Videos (13)



OPCN members at the IAS: Kary Ioannou, Gary Beasley, Frank Reed, Greg Kepner, Chrys Panayiotou and Will Keiser.

Members of the Optics and Photonics College Network (OPCN) met March 13-15 in conjunction with the CREOL Advances in Optics and Photonics Industrial Affiliates Symposium in Orlando. OPCN members attended a Wednesday evening meeting that began with dinner, sponsored by SPIE (The International Society for Optics and Photonics). Meeting attendees included eleven educators representing eight OPCN colleges (Gary Beasley, Tracy Barnes, Rishie Rambarack, Greg Kepner, Frank Reed, Moamer Hasanovic, Chrys Panayiotou, Stephanie Bostwick, Alexis Vogt, Scott Prah, and Kary Ioannou). Also in attendance were special guests Dean Bahaa Saleh (CREOL), Professor M.J. Soileau (OP-TEC CoPI), Elizabeth Rogan (OSA), John Taylor (OSA), and Krisinda Plenkovich (SPIE). Activity reports were presented by the National Center for Optics and Photonics Education (OP-TEC), the Midwest Photonics Education Center (MPEC), and the Southeast Center for Laser and Fiber Optics Education (LASER-TEC).

Thursday morning began with short courses offered by CREOL faculty on the University of Central Florida campus. At lunch, OPCN members met in a focus group, conducted by, Krisinda Plenkovich (SPIE) and John Greivenkamp (Univ. of AZ), to gather perspectives of technician educators on how to address the photonics technician shortage currently affecting employers across the country. Some of the discussion questions included: "What can SPIE do to help you strengthen your programs and get more students in the pipeline?"; "What can industry do to help you get more students in the pipeline?"; "What are your greatest concerns related to OP-TEC completing its operation in August 2019?"; and "If SPIE hosted an activity at Photonics West next year to bring community college instructors and interested industry together, what would you like to happen at that event?" (The educator's focus group followed an earlier focus group conducted in February at the Photonics West conference to gather input from photonics employers about their needs for technicians and their interest in technician education and training. These focus groups are part of a study being conducted by a special committee organized by SPIE in response to a number of its industry members requesting the organization's assistance. A white paper on the subject is due to be published in May.)

Following the OPCN meeting on Thursday, members attended a reception that included 21 industry and professional society exhibitors, a poster session in which CREOL students presented 28 research projects, and tours of seven CREOL laboratories. After the activities on campus, OPCN members returned to their hotel and met in small groups to continue their networking at area restaurants.

The Friday Industrial Affiliates Symposium in the UCF Student Union began with a welcome from Dean Bahaa Saleh and a schedule of technical presentations, including SPIE's new CEO,

Mathematics for Photonics Education

- * Student Text
- * Student Assessment and Answer Key
- * Mathematics for Photonics Education Videos (11)

Manufacturing Applications

- * Laser Material Removal: Drilling, Cutting and Marking
- * Lasers in Testing and Measurement: Alignment, Profiling and Position Sensing
- * Lasers in Testing and Measurement: Interferometric Methods and Nondestructive Testing
- * Laser Welding and Surface Treatment

Homeland Security Applications

- * Lasers in Forensic Science and Homeland Security
- * Infrared Systems for Homeland Security
- * Homeland Security: Imaging System Performance for Homeland Security Applications

Biomedicine Applications

- * Lasers in Medicine and Surgery
- * Therapeutic Applications of Lasers
- * Diagnostic Applications of Lasers

Optoelectronics Applications

- * Photonics Principles in Photovoltaic Cell Technology
- * Photonics in Nanotechnology
- * Photonics in Nanotechnology Measurements

Environmental Applications

- * Spectroscopy and Pollution Monitoring
- * Basics of Spectroscopy Spectroscopy and Remote Sensing

Program Planning Guides

- * Photonics Systems Technician Curriculum Guide
- * Photonics Lab Manual For High Schools
- * Photonics Program Planning Guide for High Schools

Skill Standards

- * The National Skill Standards for Photonics Systems Technicians
- * The National Precision

Kent Rochford, followed by product reviews from industry representatives.

The next meeting of the OPCN will take place at the HI-TEC Conference July 22-25 at the Hyatt Regency at the Arch in St. Louis, MO.

Optics Skill Standards for Technicians, 2nd Edition

Program Monographs

- * Using Current Photonics Students to Recruit New Students
- * Improving Student Retention in Photonics Technician Education
- * Successful Job Placement for Technician Students

For Previous Issues of the OPEN Newsletter please visit OP-TEC's News Page.



Join the Conversation

We hope you enjoyed this edition of the OPEN newsletter. We would really like to hear from you. If there is some subject that you would like us to discuss or look into, please let us know at pmanager@op-tec.org.

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