

OPEN Optics and Photonics Education News

Newsletter of the Optics and Photonics College Network

December 2017

A VERY COOL LENS

A lens made entirely of ice focuses sunlight to burn plywood.



Credit: Joseph A. Shaw, Montana State University.
www.osa-opn.org

From the Executive Director



I encourage you to capture the picture (above) of the "Cool Lens", and send it to your friends, colleagues and relatives. My experience was that they all understood what it was, and were utterly amazed at the recorded results. The "Laser Cannon" article is also interesting, and very relevant.

This issue of OPEN contains several excellent opportunities for professional development:

- MPEC summer workshops on "Laser Materials Processing" and "Fundamentals of Photonics"
- NSF Funded Mentoring Opportunities
- Community College Innovation Challenge CCIC
- OP-TEC Winter and Spring Webinars on Available Faculty Resources
- Photonics West conference

The 2018 winter-spring term will culminate with many of your students graduating and entering the world of work. Helping these students find the best jobs is of primary importance. OP-TEC has recently completed a new "best practices" monograph on Successful Student Job Placement that is described, and will be available early next month.

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Upcoming Events

12/06/17 - 12/09/17
**ACTE CareerTech
VISION 2017**
Nashville, TN

01/27/18 - 02/01/18
SPIE Photonics West
San Francisco, CA

03/12/18 - 03/15/18
Innovations Conference 2018
San Francisco, CA

04/28/18 - 05/01/18
**American Association of
Community Colleges (AACC)
Annual Convention**
Dallas, TX

[View Events Webpage](#)

**Monroe Community
College Faculty Position**

Have a wonderful and memorable holiday!

Dan Hull

Laser Cannons for US Fighter Jets

Lockheed Martin technicians and engineers have been tasked with the development of a fighter jet laser cannon. This comes on the heels of a Raytheon demonstration at White Sands Missile Range in New Mexico, where a laser mounted on a moving Apache AH064 helicopter shot a truck from over a mile away. In addition, Boeing is in the process of building an anti-drone laser cannon.

Solid state lasers, specifically fiber lasers that run on electricity and use fiber optics to enhance the power of the beam, have been the key enablers for these new weapons. Prior to the development of solid state lasers, chemical lasers were used. Although very powerful, chemical lasers require large amounts of chemicals for beam generation. Over the past ten years, solid state lasers have grown in power and efficiency according to Raytheon CEO Tom Kennedy "We're now able to generate a focused, powerful beam and are able to hold it on the target long enough to disable it. It represents a limitless magazine, as long as you have electricity."



The Lockheed program is part of the Air Force Research Lab's Self-Protect High Energy Laser Demonstrator program that has the goal of building a system it can test on a fighter jet by 2021. The primary program goal is protection against ground-to-air and air-to-air missiles with multiple individual lasers bundled together to create a scalable system. Together, they would work to heat up an incoming missile's fuel tank, causing it to explode, or target control surfaces like fins to disable it.

Challenges for the design team include reducing the power consumption, size and weight of the laser so it can be attached to a small jet fighter. According to Paul Shattuck, Lockheed Director of Directed Energy Systems, current beam control technology for ground devices enables the precision equivalent of shooting a beach ball off the top of the Empire State Building from the San Francisco Bay Bridge. Despite recent advances, making a laser weapon work on the highest-speed military vehicle poses a much more significant challenge. "We're putting a weapon traveling at the speed of light onto an aircraft capable of traveling the speed of sound, while targeting threats likely also traveling at supersonic speeds," says Rob Afzal, Lockheed's senior fellow for laser weapon systems. And it has to work on the move, no matter the turbulence or weather conditions. "Ruggedization is critical."

Technicians, working with development engineers will need to have a good understanding laser systems including beam control and cooling, fiber lasers, optics and electronics as these new weapons are developed and rolled out.

For more information, see the Lockheed Laser Weapons Systems website at <http://lmt.co/2jwmHfd>

Reference: <https://www.wired.com/story/lockheed-martin-fighter-jets-lasers>

Successful Job Placement for Technician Students

The Engineering Technology Department at Monroe Community College in Rochester, NY is seeking applicants for a full time temporary faculty member in the Optical Systems Technology program for the Spring 2018 semester. The temporary assignment will convert to a Full-Time Tenure-Track position in the Fall of 2018. Click [here](#) for more information on this position and to apply.

Community College Innovation Challenge



The Community College Innovation Challenge (CCIC) is a prestigious, two-stage competition where community college teams use science, technology, engineering and mathematics (STEM) to innovate solutions to real-world problems, compete for cash awards, and earn full travel support (students and faculty) to attend an Innovation Boot Camp in Washington, D.C.

The CCIC is an annual event in its fourth year. It is sponsored by the National Science Foundation (NSF) and the American Association of Community Colleges (AACC).

Teams must submit their ideas before February 14, 2018.

[Read More](#)

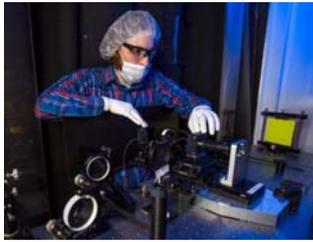
SPIE Photonics West

Make plans to attend the world's largest photonics technologies event consisting of three conferences and two world class exhibitions.

The conference takes place January 27 - February 1, 2018 in San Francisco, CA.

Indian Hills Community College is hosting an Alumni & Friends

New OP-TEC Monograph



If your students complete their two-year technician program, they have demonstrated an interest in technology and willingness to work hard. They can understand and apply relevant math, science and technology, and are proficient in equipment and hands-on lab procedures. The rewards for these student accomplishments should be:

- Employment in a job that provides a substantial income
- A job that is not only enjoyable, but is personally meaningful and fulfilling.
- A choice to live in a desired geographical area.
- The beginning of a rewarding, life-long career.

In addition to the required academic/technical knowledge and experience, faculty must assure that their students are educated/trained (guided) about the workplace they will be entering, the variety of job responsibilities that are available, how to identify, qualify and apply for jobs, and how to be successful in their career.

A new OP-TEC monograph on Successful Job Placement has been completed and will be available in early January. It is based on the best practices of six experienced photonics faculty and the recruitment plans of several major photonics technician employers. In addition to recruitment plans/tasks, descriptions of student assignments and employer outreach strategies, the monograph contains models for preparing a student resume and letter of introduction.

MPEC to offer Professional Development Courses

The Midwest Photonics Education Center (MPEC) will be offering 2 professional development opportunities in the summer of 2018. The first will be a Laser Material Processing workshop that will be offered from August 6-10, 2018 at Indian Hills Community College. This workshop will include an introduction to light & lasers, laser safety, and an emphasis on laser applications. Industry experts will present information about laser material processing in their plants and company tours with manufacturing and laser application examples will be provided. Students will have the opportunity to perform hands-on laboratory activities in laser etching, laser marking, laser cutting, and laser welding.

The second opportunity will be a Fundamentals of Photonics workshop that will be offered on July 30-31, 2018. This workshop will include an explanation of the nature and properties of light and lasers and optical components. Laser theory and operation along with descriptions of typical laser application examples will

event on Wednesday, January 31 from 5-7:30 pm at Jillian's next to Moscone Center. All OPCN members and affiliates are invited to attend.

For more information on SPIE Photonics West please click [here](#).

SPIE. PHOTONICS WEST

PACT Alumni Spotlight



After college, **Aaron Schwehofer** began a career teaching industrial education at Grant Community High School in Fox Lake, Illinois. Aaron's principal asked that he consider adding photonics into his curriculum.

While exploring photonics, Aaron became very excited about the subject matter, as well as the career opportunities in the field. "Everything I was learning about photonics made me more assured that photonics was the career for me," he recalls. Aaron began researching colleges with two-year degree programs and was most impressed with Indian Hills Community College (IHCC) where he enrolled in the Laser and Optics Technology program. He couldn't be happier with his choice; as he says, "Choosing a different career path to obtain an associate of applied science degree in laser and optics technology at IHCC has been the best career decision I have made at this point."

After graduating from IHCC, Aaron began working as a Manufacturing Laser Technician for L-3 Insight Technology, a military contracting company located in New Hampshire. His responsibilities include troubleshooting and testing

be explored. An overview of laser safety will be emphasized.

Hands-on laser and optics laboratory activities will be a major part of this workshop. Workshop participants will gain a better understanding of photonics technology and the use of photonics in everyday life.

Registration will be provided by the Midwest Photonics Education Center and travel expenses will be reimbursed. Register online at www.midwestphotonics.org. These workshops both qualify for recertification CEUs for a fee through the Great Prairie Area Education Agency.



CCCC Student Industry Site Visits

Central Carolina Community College's Laser and Photonics Technology students visit Northrop Grumman SYNOPTICS and Optics Research Center at UNC Charlotte.

Second-year students in the Laser and Photonics Technology (LPT) program at Central Carolina Community College's Harnett Main Campus experienced first-hand learning of photonics applications during a field trip to Charlotte, NC.

On September 28, the students toured SYNOPTICS, a division of Northrup Grumman. SYNOPTICS is one of the world's few manufacturers of crystals used in solid-state lasers. Dr. Kevin Stevens, Director of Research & Development at SYNOPTICS, who is also an advisor to the CCCC LPT program, conducted the tour. He showed the students all of the processes used to make the synthetic crystals, explaining the science and technology used in each process. The students departed the tour excited to see laser crystal rods made as they had studied in classroom lectures and labs.



On September 29, the students toured the Optics Research Center at the University of North Carolina at Charlotte. Scott Williams, Assistant Director of the Center, who is an advisor to the CCCC LPT program, conducted the tour. He showed the students various research labs, pointing out and discussing some advanced photonics applications.

CCCC students on the tour were Darin Anderson, Richard Dickens, Cody Flowers, Michael Kropp, Brandon Pasley Disher, and Jamal Robinson, from Harnett County; Seth Kuenzler and Derrick Kuhl, from Lee County; and Nickolas Jorgenson, from

diode-pumped solid-state laser systems. He also is responsible for cleaning and grading optics, communicating with suppliers, writing work instructions for multiple production lines and training of production personnel, maintaining clean-room protocol, and testing lasers systems at the design level.

Aaron finds working at L-3 Insight Technology rewarding for many reasons. The products he's helping make have an important purpose: L-3 Insight Technology develops and produces advanced night-vision and electro-optical technology and systems for the United States military. Aaron says, "I know that what I do as a laser technician contributes to keeping the men and women of the U.S. military safe." He also enjoys the challenging nature of the work. "There is always something new to learn, change, fix, or make better," he says. "I find it very rewarding to be able to discuss intricacies discovered during product and process improvement testing with engineers and then implement changes in production and products."

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

OPCN Committees

The Committees of the Optics and Photonics College Network are dedicated to sharing expertise, best practices, resources, and advice on issues of importance to photonics technician educators at colleges throughout the United States.

Professional Development Committee

Anca Sala, Chair
anca.sala@baker.edu

Student Recruiting Committee

Christine Dossey
cdossey@op-tec.org

Cumberland County. Also on the tour was CCCC Laser and Photonics Technology Lead Instructor Gary Beasley. During the tours, they were able to observe some of the latest technology in the laser and photonics industry. In addition, students were able to get answers to some very difficult technical questions that arose during the tours, making for a great learning experience.

The field trip was funded through CCCC's laser club, SPIE student chapter, and a National Science Foundation (NSF) Laser and Fiber Optics Grant (LASER-TEC), which CCCC participates as a Co-Principal Investigator. The LASER-TEC Grant supports preparing more students for the fast growing fields of lasers and fiber optics technology. Dr. Chrys Panayiotou, from Indian Rivers State College, is the Principal Investigator of LASER-TEC. To learn more about LASER-TEC, visit www.laser-tec.org.

To learn more about Central Carolina Community College's Laser & Photonics Technology program, contact Lead Instructor Gary Beasley at 910-814-8828 or by email at gbeasley@cccc.edu.



Program Assistance
Committee
Gary Beasley, Chair
gbeasley@cccc.edu

Equipment Committee
Frank Reed, Chair
frank.reed@indianhills.edu

**For Previous Issues of the
OPEN Newsletter please
visit OP-TEC's [News Page](#).**

NSF Funded Mentoring Opportunities

Interested in building your STEM program but need some help? The National Science Foundation (NSF) has funded a couple of programs you may want to consider. The Mentor-Connect and MentorLinks programs have been designed to help colleges develop or strengthen technician training programs in STEM fields through mentoring, professional development opportunities, and technical assistance. If you have ATE grant experience as a PI or CoPI you may want to consider applying to be a mentor for either or both programs. Here are some details on each.

Mentor-Connect

Formed out of Florence-Darlington Technical College's South Carolina Advanced Technological Education Center of Excellence (SC ATE), Mentor-Connect has been designed and refined to provide mentors, faculty development and resources to help community colleges benefit from the NSF Advanced Technological Education (ATE) program.

If your college has not received NSF grant funding in the past seven years, has a need to develop or strengthen STEM technician education programs to meet industry needs and you want assistance in preparing a competitive grant proposal for the NSF ATE program, you should consider applying as a mentee for the program. Mentor-Connect also offers opportunities throughout the year to get assistance including free technical assistance webinars. More information about Mentor-Connect can be found at <http://www.mentor-connect.org/>



MentorLinks

Since 1999, the American Association of Community Colleges (AACC) has been hosting MentorLinks: Advancing Technological Education program, a national grant competition. Colleges applying for these two-year grants must be interested in working with an experienced community college mentor who has successfully developed a new STEM technician education program, or who has planned and implemented a major change in an existing program.

Colleges may request the assistance of a mentor to design a new

program; revise an existing program to make it more responsive to industry needs; develop or redesign curriculum or materials; build training programs for faculty and staff; recruit students; engage local industry for internships or other field experiences for students or faculty; and evaluate results.

More information about MentorLinks can be found at <https://www.aacc.nche.edu/programs/mentorlinks/>



OP-TEC Spring 2018 Webinars

OP-TEC is planning a series of webinars to begin in early February. The webinars, which will be archived on the OP-TEC website, will cover topics such as Student Recruiting Resources, Student Retention Ideas, Use of Video Teaching Resources, Navigating the OP-TEC Website, and Using OP-TEC Resources.

If you have ideas for additional webinar topics, please send them to op-tec@op-tec.org.

HI-TEC MIAMI High Impact Technology Exchange Conference
July 23-26, 2018
InterContinental Miami
HI-TEC Educating America's Technical Workforce
Sponsored by a consortium of NSF ATE centers and projects
highimpact-tec.org

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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