

# OPEN Optics and Photonics Education News

Newsletter of the Optics and Photonics College Network

September 2018



## Using LADAR to See Through Fire

A laser detection and ranging (LADAR) system, capable of imaging 3-D objects melting in flames, could potentially be scaled up to enable its application to detect deformation of structural elements to research safety in building fires and objects. NIST researchers demonstrated that laser ranging could "see through flames" to make this image of a plastic skeleton toy. Laser ranging captured the plastic skeleton's complex three-dimensional shape, with depth indicated by false color. The plastic did not melt or deform in the fire.

## From the Executive Director



The first two articles in this month's newsletter (Using LADAR to See Through Fire and No Lens See-Through Cameras) are examples of the rapidly emerging applications of photonics. As this technology continues to expand, the demand for competent photonics technicians is also increasing. Employers across the country are urging SPIE to consider strategies to help colleges produce more photonics technicians.

Krisinda Plenkovich, SPIE Director, Education and Community Services, has recently contacted all OPCN colleges to provide information she is using in a study to explore this issue and determine if there is a role for SPIE in helping to support this community and connect them with employers.

MPEC, the Midwest Photonics Education Center, has recently provided faculty professional development in the use of lasers in materials processing, and plans to offer a hybrid, online course on this topic in the near future. "Manufacturing Day Celebrations" (October 5, 2019), are events hosted by several OPCN colleges, to raise career awareness in this photonics application.

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## Upcoming Events

09/19/18 - 09/21/18  
National Coalition of  
Advanced Technology  
Centers (NCATC) 30th  
Anniversary Fall Conference  
Cleveland, OH

10/05/18  
Manufacturing Day®

10/10/18 - 10/12/18  
National Career Pathways  
Network (NCPN) Annual  
Conference  
Louisville, KY

2/2/19 - 2/7/19  
SPIE Photonics West  
Conference  
San Francisco, CA

03/14/19 - 3/15/19  
OPCN Meeting  
CREOL Industrial Affiliates  
Symposium  
Orlando, FL

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

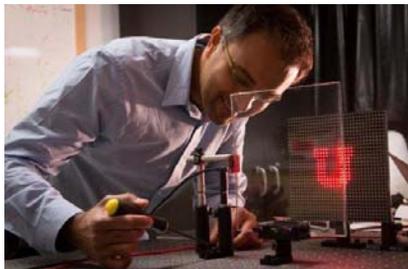
[View Events Webpage](#)

Successful strategies and resources for student recruitment are described in the Resource of the Month.

Dan Hull

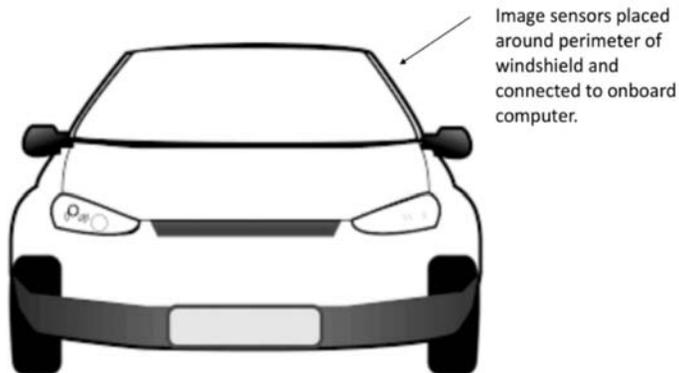
### Lensless See-Through Camera Technology

Imagine using ordinary windows in your home as security cameras, or your car windshield as a giant camera helping you better see the road.



Researchers at The University of Utah recently published an article titled

[Computational Imaging Enables a 'See-Through' Lensless Camera](#). The article describes how an ordinary sheet of glass, like a window pane or a car windshield, can be turned into a lensless camera without obstructing the view of the user. This phenomena is called "see through camera technology." The configuration uses image sensors, placed so they are looking into the edge of the glass. Along the window edge, some of the rays from the scene are redirected into the acceptance angle of an image sensor. Computers are then used to process and reconstruct the scene, which can be displayed to the driver. Here's an example of how a car windshield could be configured.



Because there are no lenses in the system, there cannot be any optical focusing; scenes appear as blobs, unrecognizable to the human eye, but not necessarily unrecognizable to computers. The researchers are optimistic about the potential of refocusing, using advanced computing capabilities. They say, "Since there is no lens in our system, there is no possibility of optical focusing. In the future, it would be interesting to explore the potential for computational refocusing. This might be possible if calibration could capture the full light field information. Furthermore, by applying deep neural networks it is possible to avoid the image reconstruction process for certain applications."

Will this technology replace your eyeglasses? Probably not any time soon! But there is potential for applications in machine vision, and that is where future research will initially focus.

For more details read the [University of Utah research paper](#).

### MPEC Hosts Laser Material Processing Workshop

MPEC hosted a five-day, Laser Material Processing (LMP) Workshop at Indian Hills Community College, in August. Faculty

## Webinar: NSF ATE Funding Opportunities & Mentor Assistance

### Interested in building your STEM program but need some help?

Mentor-Connect is a leadership development and outreach initiative, designed to broaden the impact of the National Science Foundation's Advanced Technological Education program (NSF/ATE) by helping more faculty in two-year community and technical colleges obtain funding to conduct projects that will improve technician education in America. Mentor-Connect provides mentors, faculty development, and resources to help community colleges benefit from the NSF/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 for the Mentor-Connect program.

**Applications for the October 2018-October 2019 Mentoring Cohort can be submitted electronically until October 12, 2018, but there are a few steps you will need to complete before you can submit an application.**

**Mentor-Connect is offering an informational webinar that would be a great way to get started!**

**Thursday, September 13  
1:00-2:30 PM EDT**

The free webinar is produced by Mentor-Connect and hosted by Luka Partners and ATE Central. Participants will learn more about NSF/ATE Program benefits, what Mentor-Connect can offer, and how to apply and receive assistance via the 2018-2019 Mentor-Connect Mentorship.

members from nine colleges attended. The focus of the workshop was on the use of lasers in material processing. The workshop included a review of lasers, optics, and laser safety. Two laser experts from the local John Deere Company shared their experience and knowledge about the laser processes they use in manufacturing, and answered questions from the attending faculty. The attendees also toured Co-Line Manufacturing, a nearby manufacturing facility that specializes in laser cutting processes, including round and square tube cutting, as well as flat work. Co-Line announced that they plan to add another line of lasers and are looking for laser technicians to bolster their workforce.



The LMP Workshop attendees at Co-Line Manufacturing.



LMP attendee Steve Harfst of Eastern Iowa Community College, working with the TRUMPF laser welding system.

The LMP workshop attendees engaged in laboratory activities using a 150 Watt IPG Fiber Laser, a 300 Watt TRUMPF Trulaser Station 5005 laser welding system, and a 75 watt Epilog Helix laser engraving system. Experiments were conducted with the IPG Fiber Laser to drill and cut through various materials, metals, and organic

materials. The Epilog laser was used to cut and engrave on wood materials. The TRUMPF system was used to weld stainless steel parts together. Weld program parameters, such as feed rate and power level, were varied to determine optimum settings, based on weld results. Welds were compared under a microscope and tested for strength.

MPEC plans to offer another Laser Material Processing workshop in the summer of 2019, along with a hybrid, online LMP course that will open soon. For information about registering for the online course please contact MPEC Director Greg Kepner at [greg.kepner@indianhills.edu](mailto:greg.kepner@indianhills.edu) or 641-683-5284.



LASER-TEC Collaborates in LIA Laser Pioneers Series

You can find more information about the Mentor-Connect program at <http://www.mentor-connect.org/get-a-mentor>.

Register for the webinar at <http://www.mentor-connect.org/events>.



### PACT Alumni Spotlight



**Alex Dawson** decided to pursue a career in photonics because he wanted to work in a field that would allow him to advance in his career. "I went back to school after the job market slowed down. I researched my options and found that the photonics job market had not slowed down at all." By researching the photonics industry, Alex discovered a field where he could use his talents to build a successful career and allow him to provide for his family in the way he wanted.

Alex received a hands-on education at Central Carolina Community College (CCCC), and was surprised to learn about the many applications of laser technology. "I realized I had only discovered the 'tip of the iceberg' when I was doing my research before going into photonics." Photonics opened up a whole new world for Alex, not just in career mobility, but also in variety of job opportunities.



# Laser Institute of America

Laser Applications and Safety

Dr. Chrys Panayiotou is collaborating with the Laser Institute of America on a series of articles that will be published in the LIA today online magazine. The series is called "Laser Pioneers", and consists of interviews with pioneering engineers and scientists that contributed to the field of lasers and photonics.

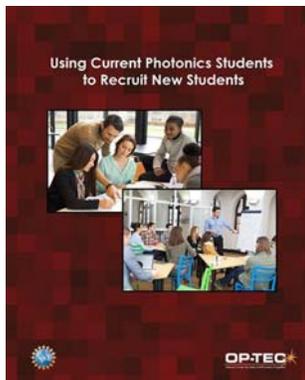
The purpose of this series is to capture the individual stories and contributions made by these notable professionals, and to inspire, encourage and motivate the new generation of laser/photonics technicians, engineers and scientists. The first article will appear in the September/October issue of **LIA Today**, featuring Dr. Michael Bass who established the first laser center in the US, the Center of Laser Studies at the University of Southern California.



## Student Recruitment: A Key Factor in Photonics Program Success

As soon as fall classes have started and the challenges of a new academic year have been addressed, faculty and other staff can shift their focus to plans and initiatives that are needed to assure long term program success. One very important task is student recruitment, to assure that future enrollments will grow with new, capable students who know about photonics and are engaged in education/training to prepare themselves for rewarding careers as photonics technicians.

Most institutional outreach organizations are not sufficiently focused on student recruitment for technologies such as photonics. The primary recruitment responsibility rests with program faculty, and this can place a large demand on faculty time and effort. OP-TEC has developed and accumulated useful recruitment resources and successful strategies from mature photonics programs in 5-6 colleges.



One successful strategy is "Using Current Photonics Students to Recruit New Students". OP-TEC has created a monograph that describes this process, along with a compilation of resources that can be acquired for outreach and recruiting. Using current students for recruitment not only relieves a heavy load from faculty, it also develops "soft skills" that students will need in their careers.

Copies of the OP-TEC student recruitment monograph can be reviewed and obtained on the OP-TEC store [website](#).

## Manufacturing Day® Events Expand Career Awareness and Strengthen Education-Industry Relationships

Alex's education in photonics has paid off well at Preco, Inc. where he works as a laser tech I. Alex aligns and sets up production welding and cutting with a ten-kilowatt fiber laser and a twelve-kilowatt carbon-dioxide laser. He also runs test studies and maintains the machines. Working at Preco gives Alex the career mobility he sought as a student. "After only two months of working with Preco, I was able to move to the more profitable side of the company."

In the future, Alex would like to go back to school to get a bachelor's or even a master's degree in photonics. Research and development in photonics excites Alex; he would like to earn advanced degrees to go even farther in the field. According to Alex, "the new era of technology is in lasers."

Read more about Alex 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

Chair TBD

### Program Assistance Committee

**Gary Beasley, Chair**  
gbeasley@cccc.edu

### Equipment Committee

**Frank Reed, Chair**  
frank.reed@indianhills.edu

**Manufacturing Day® is Friday,  
October 5, 2018**



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

Manufacturing Day® is a celebration of modern manufacturing, observed on the first Friday in October. Manufacturing Day® addresses common misperceptions about manufacturing by giving manufacturers an opportunity to connect with future generations and show what manufacturing really is. Educators can get involved to help students and parents understand the career opportunities available in today's manufacturing sector, and help them prepare for the future.

Last year, an estimated 225,000 students participated in Manufacturing Day® events. This year, more than 1,200 events are being planned by organizations all over the country, including at least two OPCN colleges. For example, students at Indian River State College plan to visit Harris Corporation, a proven leader in tactical communications, electronic warfare, avionics, air traffic management, space and intelligence, and weather solutions. The Midwest Photonics Education Center (MPEC) has sponsored a Manufacturing Day® at Indian Hills Community College for the past four years. Last year, MPEC organized 320 students to attend events, tours, and presentations at nine different regional manufacturers.

While it may be helpful to hold your own event in conjunction with the official Manufacturing Day® on October 5, you can make any day Manufacturing Day® at your college! Just let us know how you choose to celebrate it and send a bunch of pictures to share in OPEN!

For more information about Manufacturing Day®, or to help publicize your event, visit the official website at [www.mfgday.com](http://www.mfgday.com).

### **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 [prmanager@op-tec.org](mailto:prmanager@op-tec.org).

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