OPEN Optics and Photonics Education News

Newsletter of the Optics and Photonics College Network January 2018

An Optical Fiber You Can Eat

A cross-section of a persimmon fruit illuminated from behind. The central star-like core serves as a natural light waveguide, while the scattering periphery transmits only diffuse light. Credit: OSA OPN Images, Alexey P. Popov, University of Oulu, Finland.

From the Executive Director

This issue marks the first anniversary of the monthly, online newsletter from the Optics and Photonics College Network. Faculty and administrators in colleges teaching photonics, as well as other technologies, have received the OPEN briefings from colleges and centers of useful events, strategies, resources, emerging photonics applications, grant opportunities and exemplary photonics students. The documentation of these "best practices" is also valuable to assure the sustainability of the progress that has been made to improve and expand technician education provided by NSF through the awards of Centers and project grants.

This year OP-TEC will continue to document best practices of centers and colleges through the development and dissemination of monographs. Three examples of recently development monographs are described on this month's OPEN. I urge you to obtain and study these useful documents.

The articles that follow describe the emergence of Free Space Optical communications, a new recruitment brochure from LASER-TEC, a MPEC-hosted networking meeting at Photonics

In This Issue

Upcoming Events

HI-TEC Presenter Deadlines
January 15 (Workshops)
February 5 (Sessions)

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

03/18/18 - 03/21/18
Innovations Conference 2018
San Francisco, CA

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

06/24/18 - 06/27/18
American Society for Engineering Education (ASEE) Annual Conference
Miami, FL

07/23/18 - 07/26/18
HI-TEC Conference
Miami, FL

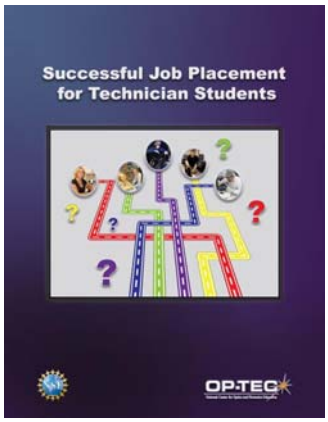
View Events Webpage

West, a February webinar on student recruitment and opportunities for faculty training.

I am personally grateful that LASER-TEC and NSF are providing the assistance to the Puerto Rico Photonics Institute to help Jonathon Friedman and his colleagues regain and maintain the outstanding photonics technician program following the disaster of hurricane Maria.

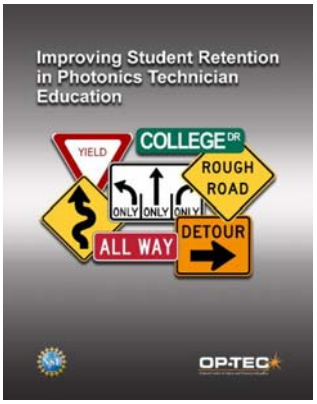
Dan Hull

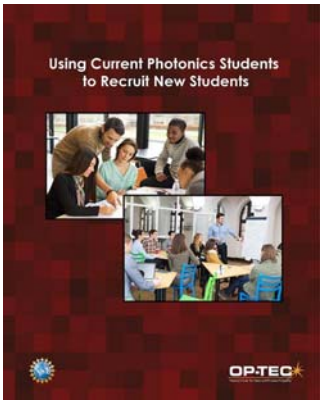
Sharing Best Practices in Photonics Technicians Education



The Optics and Photonics College Network (OPCN) was formed by OP-TEC in 2009 to provide networking opportunities for photonics faculty. OPCN members meet online, in committees and at the HI-TEC conferences to receive professional development and share resources and best practices.

Experienced faculty have shared their successful strategies in curriculum modifications, student recruitment and retention, lab/equipment development, and laser safety. OP-TEC staff have compiled these strategies and created "best practices" monographs. See: https://www.optecstore.org/product-category/teaching-resources/reports-and-monographs/





This month OP-TEC is releasing a new monograph on Successful Job Placement for Technician Students. It encourages faculty to take the leadership role in student job search and selection, and presents a six-stage process to identify employers, create a Student Placement Plan and support students in job discovery, applying to employers, interviewing/follow-up and selecting the best job offer. The monograph also provides a model resume, letter of introduction and advice from former students. Digital copies of the student placement monograph can be downloaded from the OP-TEC website **www.op-tec.org**. OPCN coordinators will also receive a printed, bound copy.

Google and Free Space Optical Communications

Free space optical communications or FSO, combined with wireless technologies like Wi-Fi has long been considered a viable approach for addressing internet access in difficult to reach areas. These systems, that establish communication links by transmitting laser beams directly through the atmosphere, are

OP-TEC Student Recruiting Webinar

Highly educated and trained technicians are vital to our country's dominance in emerging technologies, manufacturing, energy and national defense. At a time when our nation's employers are demanding more technicians, many colleges are experiencing declining enrollments in their technical education programs. Low enrollments in some programs have placed them at risk of being closed.

This apparent trend must change and the responsibility for improving enrollments falls to the college faculty and leadership. **Help is on the way!** Enroll in New Student Recruitment Webinar.

Enrollment in two-year college STEM programs depends on the colleges' ability to make prospective students aware of the programs' benefits. Simply posting information about the programs in college catalogs or on websites has not been effective. General college promotions have also shown very limited success.

But several college faculty members have shared their successful strategies for student recruitment in photonics. This OP-TEC webinar will present recruitment tools, resources and best practices such as the use of students as program recruiters, along with web, mobile, and other strategies for attracting potential students.

If your schedule prevents you from enrolling in the live webinar, you may access it after it has been presented from a recorded, archived version.

Register Now

now ready for large scale implementation in large part due to work being done at companies like Google.

You've probably heard rumors of Google's "secret" Alphabet X lab, typically referred to as just "X" and located about 1.5 miles from Google's Googleplex corporate headquarters complex in Mountain View, California. X first started with the development of Google's self-driving car and has the mission of launching "moonshot" technologies that aim to make the world a radically better place. A moonshot is defined by X as the intersection of a big problem, a radical solution, and breakthrough technology. X projects have focused on a number of areas in addition to self-driving cars including flying delivery vehicles, Google Glass, smart contact lenses, floating data centers, and using balloons to provide wireless internet access.

X has a new project, recently announcing a signed agreement with India to build a free space optical communications network in Andhra Pradesh, a southeastern coastal state with 53 million people that currently has around 15 million high-speed internet subscribers. X will place a team of technicians and engineers in Andhra Pradesh this year to build the free space optical network. Lasers will be used to create a network backbone of 2,000 line of site boxes installed as far as 20 kilometers (12 miles) apart on posts and roofs, supplying service to cellphone towers and Wi-Fi hotspots, endpoints that users would then access, bringing fast internet connectivity. The optical system backbone is expected to hit 20 Gbps from box to box and connect an additional 12 million Andhra Pradesh households to the internet by 2019.

Free space optical communications is not a new technology, with existing systems achieving speeds of around 10Gbps using safe to use in public (except when passed through magnifying optics) Class 1M lasers. FSO advantages include a low initial investment, flexible and quick high bandwidth rollouts, low power usage per transmitted bit and because it is line of sight, high security. However, atmospheric disturbances like rain, snow, fog, dust, and heat can all interfere with light beams, and they have been the major limiting factor in commercialization and rollout of this communications method. X claims they are piloting a "new approach" to deal with these free space optical communications issues with no details yet. This will be interesting to watch!

References:
https://arstechnica.com/gadgets/2017/12/alphabet-wants-to-deliver-internet-access-via-laser-beams/

https://www.reuters.com/article/us-alphabet-india/alphabets-x-sells-new-wireless-internet-tech-to-indian-state-idUSKBN1E83BQ

LASER-TEC and NSF Assist Puerto Rico Photonics Institute Students

Hurricane Maria desolated the island of Puerto Rico, and left many people without homes, power, or access to fresh water. Strong winds and flooding destroyed critical infrastructure and most communication lines. The city of San Juan, home to the Puerto Rico Photonics Institute (PRPI) at the Universidad Metropolitana, was no exception. Despite the devastation, the PRPI Laser and Photonics Certificate program courses restarted in late October of this year. However, the Institute struggled with placing students in the Industry Technical Internship program due to economic challenges currently present on the island.

LASER-TEC with the support of the National Science Foundation

SPIE Education Outreach Grants

January 31 Application Deadline

SPIE's Education Outreach Grants Program offers small grants twice a year to non-profit organizations and educational institutions for photonics education outreach activities. This is a potential funding source for OPCN colleges planning summer camps, teacher workshops, and similar outreach activities. Proposed activities must take place sometime between April 2018 and March 2019. Applications are due January 31. Notifications will be made in April or May.

At least four OPCN college faculty members have received these grants:

1. Brian Sweeney, OPCN Coordinator at Northwestern Michigan College, received a grant in 2014 that covered half the purchase price (matched by college funds) of an isolation table used for outreach & recruiting activities.

2. Andres Diaz/Jonathan Friedman at Puerto Rico Photonics Institute, received a grant in 2014 to buy equipment and supplies for their optics and photonics outreach program.

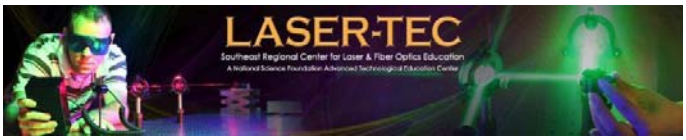
3. Feng Zhou, OPCN Coordinator at Indiana University of Pennsylvania, received a grant in 2007 for conducting a photonics summer camp.

4. Texas State Technical College, has received two grants to support teachers attending summer photonics institutes.

In 2017 SPIE awarded over $80,000 in education outreach grants to 25 organizations. Most of the grants are $2,000-$3,000. The key criterion in evaluation and ranking applications is the potential to impact students and to increase optics and photonics awareness. For information about the grant program, last year's recipients,

Advanced Technological Education program offered stipends for students in need, allowing them to pursue the eight-week internship requirement of the program, and finish their certificate on time. The students will be working for local fiber optics companies to gain valuable hands-on experience and help restore the telecommunication systems of Puerto Rico. The stipends will cover students' wages, cost of living, and transportation during the length of the internship.

For more information about LASER-TEC please contact Dr. Chrys Panayiotou, Executive Director at cpanayio@irsc.edu or 772-462-7621.



Photonics Workforce Development "Meet & Greet" at SPIE Photonics West 2018

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. For more information on SPIE Photonics West please click here.

If you are traveling to the Photonics West Conference you are cordially invited to join Indian Hills Community College, the IEEE Photonics Society, Universidad Metropolitana (UMET), the Puerto Rico Photonics Institute, OP-TEC, the Midwest Photonics Education Center (MPEC) and AIM Photonics for a Photonics Workforce Development "Meet and Greet" at Photonics West 2018.

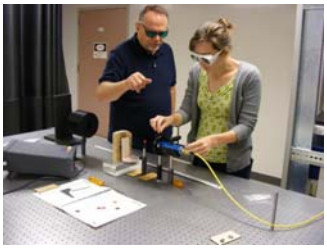
The event will include a networking reception for conference attendees, college alumni, local IEEE members and industry partners to discuss the vital role community and technical colleges play in the photonics community. This is also an opportunity for alumni from community and technical colleges to meet prospective employers and IEEE fellows.

Date: Wednesday, January 31, 2018
Time: 5:00 p.m. - 7:30 p.m.
Location: Jillian's Restaurant
175 4th St, San Francisco, CA
(Across from Moscone Center)

Click here to view the invitation.
If you plan to attend please register online.

and applications visit the program webpage.To see a preview of the fields in the application form, click on the Application Form link and then click on Preview.

Online Faculty Courses



OP-TEC Offers Online Faculty Development Courses for *Fundamentals of Light and Lasers* & *Laser Systems and Applications*

A new year and a new semester have begun! Spring is a great time to complete one of OP-TEC's online professional development courses developed to prepare faculty and laboratory staff to teach with OP-TEC's *Fundamentals of Light and Lasers* (Course 1) or *Laser Systems and Applications* (Course 2). The open entry/open exit courses are available through the Canvas online learning management system 24/7 through May 31. Participants gain access to course syllabus, end of module tests, video links, and other resources that support teaching with these textbooks. Participants who successfully complete their online course will be invited to a hands-on laboratory capstone experience during the week of June 18-22 at Indian Hills Community College in Ottumwa, Iowa.

For more information or to enroll in Course 1, visit www.op-tec.org/faculty.

For Course 2, please email cdossey@op-tec.org.

Where do Robotics and Photonics Technicians Work?

LASER-TEC, working with employers and partner colleges in the Southeast U.S., has developed an informational brochure entitled "Where do Robotics and Photonics Technicians Work?" The brochure presents seven broad categories of work, with typical employers, technician titles and salaries for categories.

You can obtain copies of the brochure for your students and recruiters by contacting Dr. Chrys Panayiotou at 772-462-7621 or cpanayio@irsc.edu.

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.

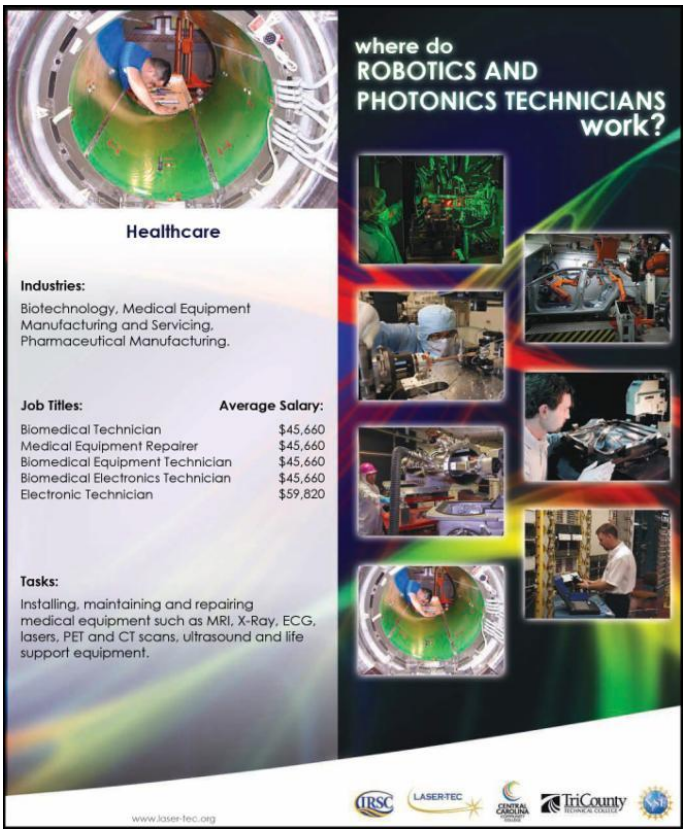
The CCIC is an annual event in its fourth year. It is sponsored by the National Science Foundation (NSF) and the American Association of Community Colleges (AACC).

Teams must submit their ideas before February 14, 2018.

Read More

PACT Alumni Spotlight

Stephen DiStefano first enrolled at Camden County College (CCC) as a physics major. During his Introduction to Mechanics course, professor Leonard Khazan, gave a presentation showcasing the college's photonics department. Dr. Khazan's detailed examples of photonics applications piqued Stephen's interest. He became so fascinated by the science of light that he switched his major to photonics. Stephen found the coursework to be exciting. He recalls, "When I started taking photonics courses, I kept learning more and more about how innovative and cutting-



edge the technology is and how vast the field is growing. Everything I was learning in the program was so interesting, and I saw that photonics is the future of technology."

Stephen graduated from CCC with an associate of applied science degree in laser/electro-optic technology and fiber optic technology. After graduation, Stephen working as an Assistant Physics/Photonics Technician at CCC where he set up physics and photonics labs, organized the laboratories to ensure that they were a safe environment, assisted professors during labs, answered student questions, and fixed and aligned lasers. Stephen says the best part of working as a technician at CCC was explaining to students what photonics is. One experience he is most proud of was guiding a student taking a physics class to join CCC's photonics program.

While working at CCC, Stephen was able to earn a bachelor of science degree in physics through Rowan University in nearby Glassboro, New Jersey. Stephen currently works as an engineer for the defense company BAE Systems inspecting Aegis Combat Radar Systems. The Aegis Combat that are put on naval ships to track and guide missiles.

Read more about Stephen 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

Defense and National Security

Industries:

Department of Defense, Aerospace, Marine Engineering and Naval Architecture, Computer and Information Technology, Research Laboratories, Homeland Security, Department of Energy.

Job Titles:	Average Salary:
Remote Sensing Technician	$44,650
Engineering Technician	$59,820
Electronics Technician	$59,820
Avionics Technician	$56,910
Radar Technician	$44,650
Sonar Technician	$44,650

Tasks:

Building, testing, installing, maintaining and repairing radar, laser, guidance, avionics, surveillance, infra-red, warfare and anti-warfare systems.

Advanced Manufacturing and Automation

Industries:

Automotive, Aircraft, Marine Engineering and Naval Architecture, Food or Chemical Processing Plants, Industrial Machinery, Electronic Systems, Semiconductor, Consumer Electronics.

Job Titles:	Average Salary:
Avionics Technician	$56,910
Photonics Technician	$61,580
Laser Technician	$61,580
Electro-optics Technician	$61,580
Manufacturing Production Technician	$61,580
Assembler	$29,910
Testing Technician	$53,070
Robotics Technician	$53,070

Tasks:

Building, testing, installing, programming, maintaining and repairing robotic and automation systems in industrial manufacturing plants such as automotive, aircraft, industrial machinery, and processing plants such as food and beverage, chemicals, mines, wood and pulp, and others.

This project is supported by National Science Foundation grant DUE-1304628 and Indian River State College.

www.laser-tec.org

Analytical Equipment Manufacturing

Industries:

Pharmaceutical, Biochemical, Forensic Science, Environmental Protection Agencies, Industrial Forensics.

Job Titles:	Average Salary:
Photonics Technician	$61,580
Assembler	$29,910
Engineering Technician	$61,580
Testing Technician	$53,070
Electro-optics Technician	$61,580
Field Service Technician	$54,640

Tasks:

Building, testing, installing, programming, maintaining and repairing analytical instrumentation used in environmental monitoring, biochemistry, medicine, etc. Examples are: spectrophotometers, fluorometers, luminometers, and others.

Laser and Optical Equipment Manufacturing

Industries:

Developers and Manufacturers of Lasers and Laser Systems, Optical Sensors, Imaging Systems, Optical Coatings.

Job Titles:	Average Salary:
Ophthalmic Laboratory Technician	$28,890
Mechanical Technician	$53,070
Laser Technician	$61,580
Engineering Technician	$61,580
Electro-optics Technician	$61,580
Production Technician	$61,580
Alignment and Testing Technician	$53,070

Tasks:

Building, testing, installing, programming, maintaining and repairing laser systems, systems with embedded lasers such as mass spectrometers, Lidars, metal cutting, welding or drilling, telescopes, microscopes, cameras, and other opto-electronic systems.

Sources:
Salaries: Bureau of Labor Statistics 2014 wage data
Job titles: Multiple national employment sites

www.laser-tec.org

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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 prmanager@op-tec.org.

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