



# OPEN Optics and Photonics Education News

Newsletter of the Optics and Photonics College Network

June 2017

## From the Executive Director



In just six short weeks many of us will be attending the HI-TEC Conference in Salt Lake City! This year's conference is loaded with many interesting and useful presentations on a variety of cutting edge topics. In this issue of OPEN, you will find articles highlighting some of these presentations and events. You can review the entire HI-TEC program at <http://www.highimpact-tec.org/conference-schd-at-a-glance>.

The Optics and Photonics College Network (OPCN) annual in-person meetings and events will be held during the HI-TEC preconference period on Monday and Tuesday, July 17-18. On Tuesday, OP-TEC will be sponsoring its 7th annual professional development bus tour for OPCN members and guests to visit local photonics industry sites. OPCN members should make plans to attend all scheduled OPCN events; if you have a colleague or family member attending, think about inviting them to join us for the bus trip on Tuesday.

Also in this issue are interesting highlights from each of the regional photonics education centers, featured articles on recent instructor tools and best practices in website design, and a spotlight on an outstanding alumnus from the Photonics Alumni Council for Technicians.

Whether you are teaching, vacationing, or just relaxing at home, I wish you a wonderful summer!

Dan Hull

## A Conversation with OP-TEC Webmaster Ian Anderson

### The OP-TEC STORE

In this short 5.5 minute interview, OP-TEC webmaster Ian Anderson discusses the OP-TEC online store. Topics include OP-TEC materials, the new OP-TEC store website, materials available, setting up an account, placing an order, security, and payment.

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## Upcoming Events

**6/19/17 - 6/21/17**

Course 1 Faculty Capstone  
Indian Hills Community College

**6/21/17 - 6/23/17**

Course 2 Faculty Capstone  
Indian Hills Community College

**06/25/17 - 06/28/17**

ASEE Annual  
Conference 2017  
Columbus, OH

**7/17/17 - 7/20/17**

HI-TEC 2017  
Salt Lake City, UT

**10/16/17 - 10/19/17**

SPIE Optifab  
Rochester, NY

**10/19/17 - 10/20/17**

National Coalition of Advanced  
Technology Centers (NCATC)  
Fall Conference 2017  
Portland, OR

**10/23/17 - 10/25/17**

ATE PI Conference  
Washington DC



### Pima College is Rebuilding a Photonics Program

Last fall OP-TEC received the disappointing notice that the Laser/Optics program at Pima Community College (Tucson, AZ) would be closing and only courses for second year students would be offered in 2016-17.

Two weeks ago Lazaro Hong reported that the program has been transferred to the Applied Technology Division, under the direction of Dean Greg Wilson. OP-TEC is working with Lazaro and Greg to design a new curriculum, based on the Photonics Systems Technician model, to be integrated into an existing core that also supports electronics, mechatronics and other technical specialties.

Greg and Lazaro will be attending the HI-TEC Conference and participating in all the OPCN preconference activities. They will want to also meet faculty from other photonics colleges to learn successful curriculum, teaching and student recruitment strategies.

Greg and Lazaro will also be working with Desiré Whitmore and Brian Monacelli from Irvine Valley College in the formation of the Western Photonics Cluster.



### 2017 HI-TEC Featured Presentations

The 2017 HI-TEC Conference will be held July 17-20 in Salt Lake City, Utah. The conference always provides great opportunities for educators to learn, network, give presentations, share best practices, and disseminate project resources with other STEM educators.

Here is a list of some of the workshops and sessions OP-TEC, partners, and collaborators will be offering:

#### **Monday, July 17 - 8:30-Noon**

##### Fundamentals of Optics and Photonics Workshop

Frank Reed, Greg Kepner, Midwest Photonics Education Center (MPEC), Ottumwa, IA

#### **Monday, July 17 - 1:00-4:30pm**

##### Successful Student Recruiting Strategies 2017

Dan Hull, Gordon Snyder, National Center for Optics and Photonics Education (OP-TEC), Waco, TX

#### **Wednesday, July 19 - 1:15-2:00pm**

##### Reaching Out to Underrepresented Populations

10/26/17 - 10/27/17

National Career Pathways Network (NCPN) Annual Conference  
Saint Louis, MO

[View Events Webpage](#)

### OPCN Activities at HI-TEC

All OPCN members, colleagues, and educators interested in optics and photonics education are invited to attend the annual in-person meetings of the Optics and Photonics College Network at the HI-TEC Conference in Salt Lake City.

#### Monday, July 17

The first meeting will take place on Monday evening from 6:00-9:00 pm at the Grand America Hotel. The annual meetings bring together faculty and administrators from across the country to network with each other, share best practices, and learn about the hundreds of resources available through the national and regional photonics centers and the professional societies.

To foster connections among colleges, the attending program lead from each college is invited to provide an informational slide for the meeting presentation that shows a snapshot of their program to include at least college name, location, program/department name, contact information of the coordinator and key people, program enrollment, photonics or photonics enabled degrees and certificates offered, and number of graduates with each related degree for school year 2016-2017. Your slide should be emailed to Christine Dossey ([cdossey@op-tec.org](mailto:cdossey@op-tec.org)) by June 26. Program handouts and student recruiting materials are also welcome on-site.

#### Tuesday, July 18

OP-TEC will sponsor the 7th annual professional development bus tour for OPCN members and invited guests on Tuesday. The day will begin at 8:00 am when a

Greg Kepner, Midwest Photonics Education Center (MPEC), Ottumwa, IA

Preparing Technicians for Integrated Photonics Manufacturing

Abraham Michelen, Robert Geer, Northeast Advanced Technological Education Center (NEATEC), Albany, NY; Dan Hull, Gordon Snyder, National Center for Optics and Photonics Education (OP-TEC), Waco, TX

**Wednesday, July 19 - 2:15-3:00pm**

Building Inclusive Technology Communities Through Hackathons

Eva Snyder, South Hadley, MA; Jon Gottfried, Major League Hacking, Brooklyn, NY

**Thursday, July 20 - 9:15-10:00am**

Lasers and Their Applications in Biotechnology and Health Science

Gary Beasley, LASER-TEC, Central Carolina Community College, Lillington, NC; Chrysanthos Panayiotou, LASER-TEC, Indian River State College, Fort Pierce, FL

**Thursday, July 20 - 10:30-11:15am**

Three Centers Preparing 21st-Century Technicians for the New Industrial Revolution

Chrysanthos Panayiotou, Natalia Chekhovskaya Kearney, LASER-TEC, Fort Pierce, FL; Beverly Hilderbrand, Consortium for Alabama Regional Center for Automotive Manufacturing (CARCAM), Gadsden, AL; Danine Alderete-Tomlin, Automotive Manufacturing Technical Education Collaborative (AMTEC), Versailles, KY

**Thursday, July 20 - 11:30-12:15pm**

Spark Girls' Interest in STEM with the "Tech Like a Girl" Initiative

Natalia Chekhovskaya Kearney, Chrysanthos Panayiotou, LASER-TEC, Fort Pierce, FL; Constance Boahn, Central Carolina Community College, Sanford, NC; Mandy Orzechowski, Tri-County Technical College, Pendleton, SC

chartered bus will transport the group 90 minutes north to Logan, Utah. Participants will meet with principal investigators and graduate students at the atmospheric lidar observatory at Utah State University and visit several departments at the Ophir Optics facility, as well as a couple of memorable stops along the way. Many thanks to Brian Monacelli, Jonathan Friedman, and Rob Shroll for helping make these education and industry site visits possible!

The day will also include a second OPCN meeting which will probably take place either on campus at USU or back at the Grand America Hotel upon our return.

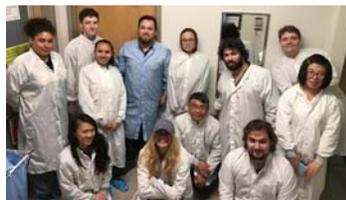
**Tour capacity is limited to 50 people and an advance list of all participants must be provided to our site visit hosts; please take a moment now to email Christine Dossey ([cdossey@op-tec.org](mailto:cdossey@op-tec.org)) (no later than June 26) if you plan to attend, and include the name of any guests you would like to bring along.**

IVC Laser and Photonics Technology Students Visit Alcon



Irvine Valley College Laser and Photonics Technology students recently visited Alcon for a tour of their manufacturing facility in Irvine, CA. An all-day event, the students and Dr. Desiré Whitmore were able to interact with several alumni from the program and learn about what they do in their day-to-day work.

The group got to learn about Alcon's Laser Eye Surgery product offerings, and how these instruments are assembled and tested. They were able to see first-hand all of the hardware, optics, optomechanics, photonics, and electronics, that go into creating these amazing machines, and ask the engineers and technicians direct questions about their work. The tour was led by IVC Photonics alumni, Jeremy Parkinson and his colleague, Miguel Moldonado.



Ready to go onto the manufacturing floor! From left to right: Dr. Desiré Whitmore, Cynthia Huynh, Stefan Forscher, Guadalupe Esparza, Jeremy Parkinson, Kari Black, Emily Sin, David (Roungmin) Shieh, Dror Sapir, Andrew Kirkland, Ben Wilson, Xue Zhang.

Wednesday-Thursday, July 19-20

The HI-TEC general conference will include keynote speakers, luncheons, dozens of presentations, and an exhibit hall where all of the photonics centers and a host of vendors will have displays. See recommended sessions article in this newsletter or the full schedule at <http://www.highimpact-tec.org/conference-schd-at-a-glance>.

Questions about HI-TEC attendance, registration and travel assistance may be directed to your regional center principal investigator or Christine Dossey at OP-TEC ([cdossey@op-tec.org](mailto:cdossey@op-tec.org)).

We are looking forward to a great conference and hope to see you there!

High School Girls attend WE STEM Day at IHCC

SPIE Photonics West



### Women Exploring Science, Technology, Engineering & Math

Fifteen local high school girls visited Indian Hills Community College to attend the 3<sup>rd</sup> annual WE STEM Day (Women Exploring Science, Technology, Engineering & Math Day). Students had the opportunity to do lots of hands-on activities in multiple Advanced Technology Center laboratories. The highlight of the day was a keynote presentation from IHCC's Kim Dreaden. Kim shared her educational pathway in science including a BS degree and an MS degree from the University of Florida. Kim talked about work experiences and her career path from Wildlife Ecologist Technician at the Florida Fish and Wildlife Conservation Commission to Research Specialist at Ajinomoto to Bioprocessing Program Director at IHCC. Kim then worked with the girls in the laboratory on DNA extraction from Kiwi. This hands-on activity included multiple science learning opportunities about biomolecule manipulation, filtration, chemical reactions, and the observation of temperature impacts. When asked how we could make this experience better, one girl simply responded, "More Kim!".

In the laser lab, the girls did some laser engraving, aligned lasers & optics, popped balloons with a laser, viewed a laser light show, and tested a laser security system. Afterward, laser students Katelyn Myers and Monica Greenlief talked about their educational experience and beginning their new STEM careers at laser companies. Participants also performed hands-on activities with robotic "Rule Your Room Kits" and learned about servo motors, LEDs, and sound sensors in the robotics lab.



Pictured are laser students Monica Greenlief (standing far left), Katelyn Myers, (kneeling far left), WE STEM attendees, and Kim Dreaden (far right).

In the automotive lab, the girls built some automobile electrical circuits and learned about switches, current flow, and series/parallel circuits. When asked what she liked best about the experience, one girl responded, "We got to do really fun hands-on activities while learning about STEM careers". This activity was sponsored by IHCC and the Midwest Photonics Education Center (a National Science Foundation Regional Center).

### Professional Development Opportunities



#### Laser and Fiber Optics Professional Development Opportunities

Southeast Regional Center for Laser & Fiber Optics Education strives to help educators stay abreast of new technology development and applications with training for college and high school educators in the areas of photonics, lasers, and fiber optics.

A course in lasers can be added to revive any electronics, engineering

## SPIE. PHOTONICS WEST

### Call for Papers for SPIE Photonics West

Present your work at SPIE Photonics West, the world's largest photonics technologies event. Every year over 20,000 people come to hear the latest research and find the latest devices and systems driving technology markets including state-of-the art biomedical technologies, the Internet of Things, smart manufacturing, displays, autonomous vehicles, communications, and other applications powered by photonics. Abstracts are due by July 17, 2017.

Click [here](#) for more information.

### Ra'ef Mikhail



Ra'ef Mikhail became interested in the physics of light during high school, attempting to measure the speed of light for a science project. He enrolled in the applied engineering program at Camden Community College, where Professor Leonid Khazan introduced a small section on photonics in one of his physics classes. Ra'ef recalls being "completely engrossed" by this brief exposure to photonics. "From that point on," he says, "I strictly pursued a path in optics and photonics."

After earning associate degrees in both fiber optics technology and laser/electro-optic technology at Camden, Ra'ef transferred to the University of Rochester, where he attained a bachelor of science degree in optics. After

technology, manufacturing, or industrial technology program. Lasers are tools that daily transform 21st century industry. Femto-second lasers are used in medicine for non-ablative surgery and in micromachining to make medical stents and drill holes with smaller diameters than the human hair. Lasers attached to robotic arms do the majority of industrial welding, cutting, and drilling on metals or plastics. A course in lasers and their applications can modernize your program and increase your enrollment.

Fiber optics is another technology that has matured and is making its mark in the 21st century. Aside from telecommunications, where the optical fiber has enabled today's Internet with an ever increasing demand for bandwidth, fiber sensors are used in medicine, in structures like bridges, sky-scrapers, and ships to detect the most minute structural changes. In the last five years the fiber laser has taken the industry by storm, replacing older types of lasers because of its lower cost and size, and higher reliability. Adding a course in fiber optics can also modernize your program and increase your enrollment.

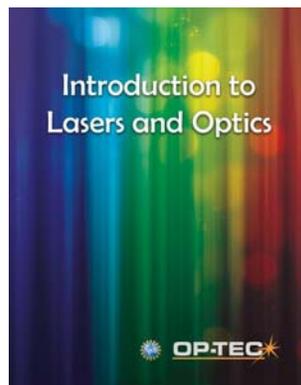
To learn more visit the [LASER-TEC website](#). For any comments or questions, please contact Dr. Chrys Panayioutou at [cpanayio@irsc.edu](mailto:cpanayio@irsc.edu) or 772-462-7621.

### Instructor Resource of the Month

#### **NEW! Introduction to Lasers and Optics: Laboratories and Demonstrations**

The National Center for Optics and Photonics Education (OP-TEC) has devised Introduction to Lasers and Optics as an introductory course book that can be used with students who have limited prior knowledge of lasers, optics, or photonics. This modular course is designed to have no prerequisites, and can be taught for one or two-credits. There are 15 modules that cover topics such as the spectrum of light, laboratory safety, polarization, mirrors and lenses, and more. These modules can be used all-together or faculty can select the appropriate number of modules to fit the desired breadth and depth of study for the course. It introduces the basic principles of light, lasers and laser safety that are needed to study specific types of laser systems. It also provides exposure to the topics that make up the foundation for studying the applications of lasers in telecommunications, electro-optical displays, biomedical equipment, manufacturing/materials processing, defense/homeland security, environmental monitoring, and nanotechnology.

There are seven laboratory demonstrations and activities that support hands-on learning, and illustrate key concepts covered in Introduction to Lasers and Optics. The demonstrations can be performed with the same equipment used in Fundamentals of Light and Lasers. Alternatively, a detailed equipment list is listed in the appendix; schools can purchase equipment that is suitable for high schools and demonstrations at a lower cost, typically less than \$1,500 per lab station. While this equipment is not "industry-grade", it nevertheless supports hands-on learning and real-life demonstrations. The seven demonstrations are Spectrum of Light, The Polarization of Light, Optical Filters, Prisms and Lenses, Interference and Diffraction with a Single Slit, Interference and Diffraction with a Pinhole, and Beam Divergence.



### Photonics Career Video of the Month

Students searching for careers need to understand what they may be

college, Ra'ef continued to pursue photonics research and development as a career at Edmond Optics. He has already had opportunities to work on a variety of sophisticated problems, "from sending a radiometer to space with NASA to protecting our troops with standard-issue sights and night-vision goggles." He now works with groundbreaking applications every day and enjoys being able to use optics and photonics to push past the boundaries of present-day science.

Ra'ef finds the field exciting and advises interested students to "give it a real chance," and specifically, to "look at some applications and real-life scenarios where optics has changed the world."

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

### OPCN Working Groups

The Working Groups 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 Working Group  
**Anca Sala, Chair**  
[anca.sala@baker.edu](mailto:anca.sala@baker.edu)

Student Recruiting Working Group  
Christine Dossey  
[cdossey@op-tec.org](mailto:cdossey@op-tec.org)

Program Assistance Working Group  
**Gary Beasley, Chair**  
[gbeasley@cccc.edu](mailto:gbeasley@cccc.edu)

Equipment Working Group  
**Frank Reed, Chair**  
[frank.reed@indianhills.edu](mailto:frank.reed@indianhills.edu)

doing in the workforce. Students are also motivated and focused when they can identify with a role model and understand why they have to learn certain areas of mathematics, science and technology.

**Adam Loukeh** is an Applications Sales Engineer, TRIOPTICS/Davidson Optronics.



A banner for the 2017 High Impact Technology Exchange Conference. The left side features a cityscape with mountains in the background and the text "2017 HI TEC" with a logo. The right side is a blue box with white text: "HIGH IMPACT TECHNOLOGY EXCHANGE CONFERENCE July 17-20 Salt Lake City, Utah Grand America Hotel". The bottom left is a green box with white text: "Sponsored by a consortium of NSF ATE centers and projects". The bottom right is a blue box with white text: "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 [prmanager@op-tec.org](mailto:prmanager@op-tec.org).

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