

# 3 Questions

WITH CHRYS PANAYIOTOU



*Photonics Media spoke with Chrys Panayiotou, executive director of LASER-TEC.*

*Headquartered at Indian River State College in Florida, LASER-TEC is the Center for Laser and Fiber Optics Education, founded in 2013 by the National Science Foundation (NSF). It was established to help meet the goals of educating and sourcing domestic talent in the areas of optics and photonics. As a service to students, recent graduates, and prospective employers, Photonics Spectra will run individual profiles of the 36 LASER-TEC colleges throughout 2020 (facing page).*

## **Can you sketch out the synergies that intersected to form LASER-TEC?**

As you know, the field of photonics is relatively new. At the heart of this area is the laser. Even though light and optical technologies existed before the invention of the laser in 1960, the unique properties of laser light are the driving force behind this dynamic industry sector. In the mid-1990s, laser technologies spread in industrial, consumer, military, and other applications, and the need for technicians who could build, install, maintain, and repair laser systems became urgent. In 1996, I became involved with the NSF programs that involved laser technologies.

Initially, a group funded by the U.S. Department of Defense created the educational infrastructure to educate these technicians in the mid-1970s at CORD (Center for Organizational Research and Development), under the leadership of Dan Hull. The group developed textbooks, laboratory manuals, safety procedures, and equipment and supplies for experiments. From 1996 to 2012, I became involved with NSF projects called STEP 1 and STEP 2 (the Scientific and Technological Education in Optics and Photonics), and OP-TEC (the National Center for Optics and Photonics Education). When the OP-TEC program ended its developmental cycle and transitioned into a resource center in 2013, LASER-TEC started as the National Center for Laser-Photonics and Fiber Optics for technician education. We developed new educational materials and updated those created in the past.

The mission of LASER-TEC has been to “develop a sustainable pipeline of qualified laser and fiber optics technicians to meet the industry demand across the nation.” To meet our mission, we reach out to U.S. colleges and encourage and support them as they create photonics programs. We also reach out to K-12 schools to build a pipeline of students who will enter the college programs mentioned earlier.

## **What are the initiative’s short- and long-term goals?**

In the short term, we need to fill the K12-to-college pipeline. Even though advanced technological gadgets surround young people in their daily activities, they take them for granted and do not seem to be curious about how their cellphones, computers, the internet, and myriad other devices are made. We are trying very hard to increase the number of females and minorities entering our field. And, we are trying to educate K-12 teachers and counselors on professional opportunities that exist when a student has laser-photonics education. Long-term goals involve updating existing educational materials and creating new laser-photonics application modules; maintaining and increasing collaboration between industry and photonics educators; and securing the continuation of funding from the NSF, the Department of Defense, and others.

## **High schools can also become affiliates of LASER-TEC. What are some ways you reach younger students?**

Yes, any institution interested in becoming an affiliate — college, middle, or high school — can do that by completing the online form at [www.laser-tec.org/academic.html](http://www.laser-tec.org/academic.html). As part of our outreach program, we have one-day workshops that we offer specifically for K-12 teachers and counselors. The workshops are offered twice a year, fall and spring, at several locations around the country. Workshop participants use a Light and Optics Exploration Kit (LOEK), learn some fundamentals, and are shown how to use the kit (with its 20 lessons and demonstrations) in their classes. Every participant receives one LOEK to take back to the classroom and demonstrate photonics concepts to students. For more information about these workshops, visit [www.laser-tec.org/k-12-teacher-workshops.html](http://www.laser-tec.org/k-12-teacher-workshops.html).

# LASER-TEC College Profile

Indian River State College (IRSC), Fort Pierce, Florida

**For more than** 15 years, IRSC has offered associate-level degree and certificate programs in lasers, photonics, fiber optics, and solar energy. More than 350 technicians have graduated and are working in the laser and photonics industries throughout the U.S. and internationally. Companies that have hired graduates include Northrop Grumman, Lockheed Martin, AT&T, Gooch & Housego, Jenoptik, Laser Components, Rockwell Collins, and L3Harris.

## Programs

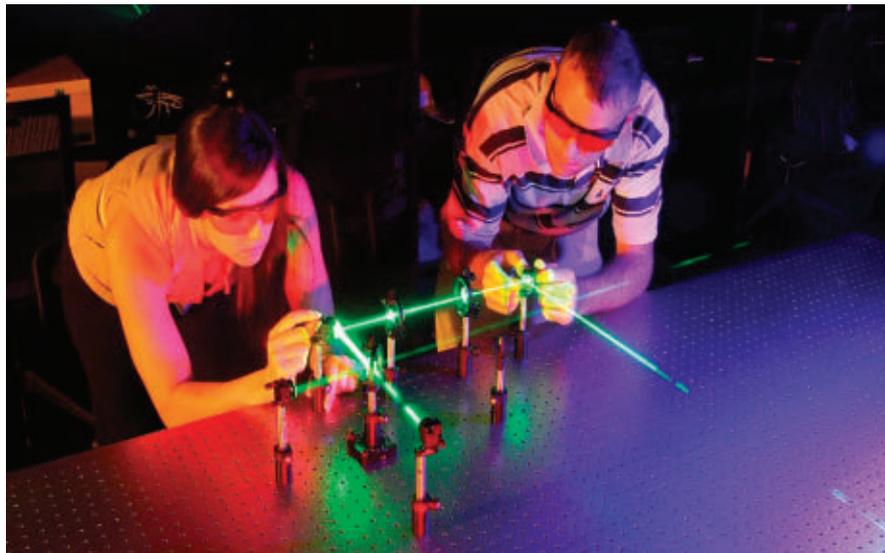
### Photonics and Robotics Associate in Science (AS)

*Two-year program with strong technical core, teaching hands-on training skills in state-of-the-art labs stocked with the latest industrial-grade equipment.*

Technicians receive a solid foundation in electronics, automation, and robotics during the first year. In their second year, they learn photonics, fiber optics, geometrical optics, laser technologies, and photovoltaic systems. Graduates of this program work as technicians for industrial production companies in research and development, and in national labs, field service, and system repair, among others.

#### Skills include learning how to:

- Troubleshoot integrated photonic systems using microscopes, oscilloscopes, pulse generators, power meters, beam analyzers, spectrometers, or energy measurement devices.
- Tune Nd:YAG, HeNe, and CO<sub>2</sub> lasers for maximum power and high-quality beam.
- Align optical systems.
- Perform high-quality fusion splicing for single- and multimode fibers.
- Use an OTDR (optical time-domain reflectometer) to identify problems in fiber optic links.
- Properly clean and maintain precision optics.
- Use optical source and meter to measure the attenuation of optical links.



IRSC photonics program students set up an interferometer.

- Document procedures such as calibration of optical or fiber optic equipment.
- Apply laser safety rules according to ANSI and OSHA standards.
- Compute or record photonic test data.
- Troubleshoot robotic systems, using knowledge of programmable controllers, electronics, circuit analysis, mechanics, sensor or feedback systems, hydraulics, or pneumatics.
- Disassemble and reassemble robots or peripheral equipment to make repairs such as replacement of defective circuit boards, sensors, controllers, encoders, and servomotors.
- Perform preventive or corrective maintenance on robotic systems or components.
- Maintain service records of robotic equipment or automated production systems.
- Install, program, or repair programmable logic controllers (PLCs), robot controllers, end-of-arm tools, or conveyors.
- Program PLCs using ladder logic.
- Program SCADA systems and HMI interfaces.

#### Certificates/Short-Term

*4-, 6-, or 8-month duration*  
Lasers & Photonics  
Solar Energy  
Robotics and Simulation  
Basic Electronics  
Electronic Technology

#### How to recruit from this college:

Come to IRSC to present your company and employment opportunities to students. IRSC will make available, free of charge, a private room to interview interested students. Please see contact information below to make arrangements for a recruiting visit. Graduates are available each December and May.

#### Contact Information:

Mo Hasanovic  
772-462-7743  
mhasanov@irsc.edu  
3209 Virginia Ave., Fort Pierce, FL  
34981

#### Program websites:

[www.laser-tec.org](http://www.laser-tec.org)  
[www.irsc.edu/programs/electronics-engineering-technology.html](http://www.irsc.edu/programs/electronics-engineering-technology.html)