

**Pasadena City College Laser Technology Program**  
**Industrial and Academic Affiliates Meeting**  
**Wednesday, 5 February 2020**

Industrial advisors in attendance

- Brian Olejniczak, Rob Campbell, and Joel Stanley of Lawrence Livermore National Laboratory National Ignition Facility (Livermore, CA)
- Nicolaus Lambert of Precision Optical (Costa Mesa, CA)
- Robert Canales of Alcon (Lake Forest, CA)
- Desiré Whitmore of the Exploratorium (San Francisco, CA)
- Tara Eby, Bill Perkins, and Erik Stover of Trioptics USA (Rancho Cucamonga, CA)
- Dave Hunnicutt and Bill Hageman of On-Trak Photonics (Irvine, CA)
- Jim VanKouwenberg of Optimax (Rochester, NY)
- Alex Halterman and Jeremy Gustin of Quartus Engineering (San Diego, CA)
- Hari Tagat of Edmund Optics (Barrington, NJ)
- Neil Jayswal of Agilent Technologies (La Jolla, CA)

Academic partners in attendance

- Stephanie Bostwick of Lake Washington Institute of Technology (Seattle, Washington)
- Trent Berg of Gallatin College at Montana State University (Bozeman, Montana)
- Judy Irwin of Spokane Community College (Spokane, Washington)
- Alexis Vogt of Monroe Community College (Rochester, New York)
- Frank Reed and Michael Shay of Indian Hills Community College (Ottumwa, Iowa)
- Andrés Días of Universidad Ana G. Méndez, Puerto Rico Photonics Institute (San Juan, PR)

Discussion Notes

- Status was reported about the Irvine Valley College (IVC) Laser Technology Program, along with the rationale for its discontinuance
  - Administrative and marketing support for Laser Technology at IVC has been unreliable for many years, even though the program has been NSF funded since 2013 and has graduated over 150 students from its courses, over 93% of whom are working in a technical field related to optics
  - The creation of an Associate of Science (AS) Program at IVC was not supported after multiple attempts since 2012, including those of full-time Laser Tech faculty serving on the IVC curriculum committee
  - IVC administration was not willing to hire another full-time tenure-track Laser Tech faculty member upon the departure of the last full-time Laser Tech faculty member
  - Discontinuance of the IVC Laser Technology Program has formally begun, and the task force leading this effort has, to date, advised the IVC academic senate to discontinue the Laser Tech program; the senate's vote is in March 2020
  - The discontinuance process is required to allow the IVC district the option to allow transfer of the Laser Tech equipment to another college within California
  - The final semester of Laser Technology instruction at IVC is underway

**Pasadena City College Laser Technology Program**  
**Industrial and Academic Affiliates Meeting**  
**Wednesday, 5 February 2020**

- Status was reported about the creation of a Laser Technology Program at Pasadena City College (PCC)
  - Laser Tech courses have already been approved by the PCC curriculum committee, along with a low-unit certificate composed of these courses (these courses mimic those taught successfully at IVC, and are based on NSF/OP-TEC Skill Standards derived from industrial feedback)
    - *Fundamentals of Light and Lasers*
    - *Optical Devices*
    - *Quality Assurance of Precision Optics*
    - *Metrology of Optical Systems*
  - An AS Laser Technology Degree and certificate of achievement have already been approved by the PCC curriculum committee including these Laser Tech courses, the following electronics technology courses, and general electives
    - *Electronics*
    - *Analog Devices and Circuits or Microcontrollers and Embedded Design*
  - PCC has allocated laboratory and instructional space for the Laser Technology Program on their Northwest Campus, and has begun renovations of this space
  - PCC has sought funds to move physically the IVC Laser Tech equipment to PCC
  - PCC has created contract education opportunities for companies in Laser Technology, which will be first implemented in last February 2020
  - The creation of these courses, along with these additional courses was strongly supported by those in attendance
    - *Cameras, Detectors, and Radiometry*  
*(curricula ready; this has been taught at IVC)*
    - *Optical Assembly: mounting and bonding components to create systems*
    - *Biophotonics*
    - *Optomechanical and Electrical Integration*
  - Given the courses suggested by those in attendance, it was noted that it may be desirable to create someday not just a Laser Technology Program with electronics courses, but one with mechanical technology, engineering, or robotics technology courses (this may vary given the current, local industry needs)
- The Laser Tech program at San Jose City College was discussed
  - The presentation by Coherent representatives at the SPIE industry-needs-technicians meeting (held 4 February 2020) revealed that this program as very narrowly tailored to the needs of the company Coherent; its curricula are not based on broader industry input or any diverse skill standards
  - It was not made clear if this was an AS Degree program or a certificate program
  - The program may be very useful to a narrow range of laser companies, but its graduates have not been sought to the industry representatives in attendance

**Pasadena City College Laser Technology Program**  
**Industrial and Academic Affiliates Meeting**  
**Wednesday, 5 February 2020**

- Status was reported of ongoing NSF ATE grant to develop technician-level curricula into open educational resources (OER), the OPAL-TEC (Optics, Photonics, And Lasers Technical Education Curriculum) Development Project, which is funded via IVC
  - Curricula in an open, modular, easily sharable formats were indicated to be very desirable by all colleges and industries in attendance, because they could then choose how to structure local curricula to meet local industry needs
    - For instance, it was noted that although Rochester is an optics manufacturing hub, and the optics technician-training program at Monroe Community College focuses on precision optics manufacturing, there exist quite a few companies in Rochester engaged in work that requires broader technician-level skills, including those taught in a laser technology program (but not necessarily in a precision optics curriculum); the opposite scenario was observed in the Bozeman region, where most companies are laser-based, and few manufacture the precision optics that manipulate their lasers
    - Companies and academics in regions with established expertise in a certain technical area can enhance and refine that curricula, and then share it in regions developing that area of technical proficiency
  - The Laser Tech courses to be converted into OER are the same as those taught at IVC and to be taught at PCC; they are those which were initially developed based on NSF Laser Tech and Precision Optics Tech Skill Standards, as compiled by OP-TEC; Gallatin, Spokane, and LWIT have all taught the first course as well
    - *Fundamentals of Light and Lasers*
    - *Optical Devices*
    - *Quality Assurance of Precision Optics*
    - *Metrology of Optical Systems*
  - The first course has some OER already developed, and this will be shared with and tested by Spokane and Gallatin Colleges, in reports funded by the OPAL-TEC grant
  - Creation of OER for the other three courses is underway, and will continue for the three-year duration of the OPAL-TEC grant
  - Non-OER curricula (teaching materials, lab exercises, quizzes, and exams) for all four courses have been shared with all colleges in attendance
    - These teaching materials will be tested by all colleges in attendance, to various degrees; Front Range Community College already taught and provided some feedback on the *Metrology of Optical Systems* course
    - These teaching materials supplement the published NSF/OP-TEC curricula and other open resources (MIT OpenCourseWare, Creative Commons, etc.) for the creation of this Laser Tech OER
  - The use of technical kits comprised of industrial-grade hardware to teach these courses at new and growing colleges was suggested, as the kits have been developed and procured by the faculty from Indian Hills
    - An equipment list for these kits will be shared with those in attendance
    - Creation of OER around the use of these kits will be considered; this may assist with distance learning efforts

**Pasadena City College Laser Technology Program**  
**Industrial and Academic Affiliates Meeting**  
**Wednesday, 5 February 2020**

- Competitive salaries were discussed for laser technicians with two-year AS degrees
  - All industrial representatives in attendance agreed that AS Degreed employees would be most well-educated and supported for competitive employment opportunities
  - Graduates with certificates may be eligible for promotion, but graduates with AS Degrees require much less negotiation with administration to offer competitive salaries
  - Starting salaries ranged from \$20 to \$30 hourly (plus health benefits, paid overtime, and paid time off)
  - Mid-career technicians were noted to be making nearly \$50 hourly (plus health benefits, paid overtime, and paid time off)

# Welcome!

Pasadena City College Laser Technology Program  
 Industrial and Academic Affiliates Meeting  
 Wednesday, 5 February 2020



Please Sign In

Name	Affiliation	Email Address
Tara Eby	Trioptics	tara.eby@trioptics-usa.com
Bill Perkins	TRIOPTICS	bill.perkins@trioptics-usa.com
Robert Canales	Alcon	robert.canales@alcon.com
Rob Campbell	LLNH	campbell34@llnl.gov
Joel Stanley	LLNL	stanley9@llnl.gov
ALEXANDER HALTERMAN	QUARTUS ENGINEERING	ALEX.HALTERMAN@QUARTUS.COM
JEREMY GUSTIN	QUARTUS ENGINEERING	JEREMY.GUSTIN@QUARTUS.COM
Bill Hageman	On-Trak	whh@on-trak.com
Dave Haggart	On-Trak	dave@on-trak.com
JIM VANKOUWERBERG	MCC OPTIMAX	JVANK@OPTIMAXSI.COM
DESIRE WHITMORE	EXPLORATORIUM, EX-OPAL-TEC	desire.whitmore@exploratorium.edu
Andrés Díaz	Ana G. Mendez University	adiazg@uagm.edu
Nicolas Lambert	Precision Optical	nlambert@precisionoptical.com
MICHAEL SHAY	INDIAN HILLS	michael.shay@indianhills.edu
FRANK REED	Community College	frank.reed@indianhills.edu

# Welcome!

Pasadena City College Laser Technology Program  
 Industrial and Academic Affiliates Meeting  
 Wednesday, 5 February 2020



Please Sign In

Name	Affiliation	Email Address
Judy IRWIN	Spokane Community College	JUDY.IRWIN @ SCC.SPokane.edu
Brian Olejniczak	Lawrence Livermore National Laboratory	Olejniczak I @ LLNL.gov
HARI TAGAT	Edmund Optics	htagat @ edmundoptics.com
NEIL JAYSWAL	Agilent Technologies	Neil.Jayswal @ agilent.com