

2020 HI-TEC Preconference Workshops, Special Interest Groups, and Tours

(Attendees may register for one or two half-day preconference events “or” a full-day SIG)

WORKSHOPS: Monday 7/27 8:30–4:30

IT and Cybersecurity Special Interest Group: Best Practices, Workforce Perspectives, Future Trends, and Curriculum Update

IT/cybersecurity educators and industry experts will connect during this “mini-conference” to discuss essential strategies that ensure students are “workforce ready.” The SIG will include educator presentations, virtual lab demonstrations, industry panels, and group activities on cutting-edge technical topics (cloud, AI, data science, Internet of Things) and pedagogical topics (working with business councils, integrating employability skills into the classroom). The SIG will also provide a forum for educators to report on details of their programs to encourage cross-institutional collaborations.

Ann Beheler, Collin College, Frisco, TX

Micro Nano Technology Education Special Interest Group (MNTeSIG)

Our mission is to foster collaboration between educators at all levels, industry, and agencies for relentless improvement of the micro and nano technology workforce. The 2020 MNTeSIG meeting will build on the success of the 2019 HI-TEC event as well as ongoing MNTeSIG online meetings (www.mntesig.net). Participants will collaborate in sharing ideas to strengthen and augment workforce development programs through educational and industry partnerships for tomorrow’s micro and nano technology workforce.

Matthias Pleil, University of New Mexico, Albuquerque, NM; **Robert Ehrmann**, Nanotechnology Applications and Career Knowledge Network (NACK) Support Center, University Park, PA; **Jared Ashcroft**, Pasadena City College

Fiber Optics for Beginners

This workshop is intended for instructors who want to learn more about the practical aspects of fiber optics so they can create and/or enhance courses with the latest technologies impacting the termination, connecting, and testing of fiber optic networks. In addition to learning about the theory of fiber operation, participants will terminate a single-mode fiber with the Corning Unicam System, create and test fusion splices, and use an OTDR for signal tracing and troubleshooting. Fiber-to-the-home, passive optical networks, and distributed antenna systems (DAS) will also be covered.

Chrysanthos Panayiotou, Indian River State College, Fort Pierce, FL

WORKSHOPS: Monday 7/27 8:30–Noon

Mapping the Technician Education Landscape at Two-Year Institutions

The recent National Science Board's report titled *The Skilled Technical Workforce: Crafting America's Science and Engineering Enterprise* cites the need to address data gaps and data silos so that industry and educational institutions can maximize the effectiveness of programs and initiative. The report names this issue as a systemic challenge to the creation of the vibrant, highly skilled technical workforce the United States needs. The American Society for Engineering Education has begun a two-year project designed to collect relevant data from community college engineering technology programs. This workshop will showcase dashboards and explore with participants directions for this data collection.

Joseph Roy, Ashok Agrawal, American Society for Engineering Education, Washington, DC

Wine Sensory Evaluation for Wine Production Technicians and Wine Enthusiasts

This workshop will help attendees understand the principles of sensory evaluation utilized by wine makers and cellar technicians in the commercial wine-making process. It will also benefit wine enthusiasts who are interested in reaching the advanced levels of appreciation found among wine producers and merchants and enologists, who by the nature of their professions must be able to discern flavors and establish tasting benchmarks. Attendees will be guided through sensory test methods used to assess differences and preferences in wine styles.

Michelle Norgren, Cassandra Clark, Missouri State University, Springfield, MO; **Zoran Ljepovic**, Kent State University–Ashtabula

WORKSHOPS: Monday 7/27 1:00–4:30

NSF Proposal Writing and Mock Panel Review

This workshop will present an overview of NSF programs with a focus on Advanced Technological Education (ATE). The NSF Merit Review process will be explained, and participants will review a proposal that was successfully submitted to ATE. They will compare their ratings with those of the panelists who formally reviewed and rated the proposal. Participants will take away all materials used in the workshop.

V. Celeste Carter, Tom Higgins, Pushpa Ramakrishna, National Science Foundation, Arlington, VA

InnovATEBIO Workshop: Oregon Biotech Day and Microbiome Analysis Using Next Gen Sequencing

This workshop will introduce the new InnovATEBIO National Center for Biotechnology Education. The DNA Learning Center (DNALC), head of one of the hubs in the center, will introduce programs that it uses to teach students while engaging in research using DNA barcoding and metabarcoding—the use of DNA sequences to identify species individually or in mixtures. Participants will learn about these programs and be introduced to the DNALC's approachable online pipeline for metabarcoding analysis. Participants will also be given an overview of biotechnology and STEM education in the state of Oregon, including challenges and barriers.

Linnea Fletcher, Austin Community College, Austin, TX

WORKSHOPS: Tuesday 7/28 8:30–4:30

Laser Safety Officer Training Workshop

Laser safety is a major factor in the design of photonics labs. LASER-TEC has 37 college partners with photonics programs, most of them new and staffed with instructors who have had minimal training on laser safety. This workshop will help to fill this education gap and bring everyone in the Optics and Photonics College Network (OPCN) up to date on laser safety issues. An industry specialist will explain the ANSI standard governing laser safety, legal issues and liabilities of colleges that use lasers in their labs, and why colleges should appoint laser safety officers and create standard operating procedures for students using these labs.

Chrysanthos Panayiotou, Indian River State College, Fort Pierce. FL

Future of Work Special Interest Group (*By invitation only*)

The 2020 Future of Work SIG will build on the activities of the ATE Future of Work SIG held at last year's HI-TEC. The SIG will foster continued connections among industry and education communities interested in preparing technicians for the future of work across the country. It will be an event that promotes sharing ideas and learning from others who educate technicians, staying at the forefront of industry and workforce needs; networking to strengthen and augment workforce development programs through educational partnerships with industry.

Ann-Claire Anderson, Hope Cotner, Mike Lesiecki, Center for Occupational Research and Development (CORD), Waco, TX; **Marilyn Barger, Richard Gilbert**, Florida Advanced Technological Education (FLATE) Center of Excellence, University of South Florida College of Engineering Research

WORKSHOPS: Tuesday 7/28 8:30–Noon

Using Arduino Uno and LabView in Teaching Natural Frequencies of SCME Microcantilevers Kits

Participants will use Arduino Uno microcontrollers and custom LabView software to determine how mass, material type, and dimension influence the resonant mode of vibration of cantilevers beams using the SCME Microcantilevers Kits.

Andrew Bell, Ivy Tech Community College, Fort Wayne, IN

Developing an Impactful Cloud Curriculum for Students and Educators

As cloud technology continues to gain increased market share and employers demand a skilled workforce, schools are increasingly challenged to develop programs of study preparing students for jobs requiring such skills. This how-to workshop will lead participants through the development of cloud-infused classes and plans of study. While focused on Amazon Web Services (AWS), participants will work with one another in several collaborative curriculum development exercises while learning how to take advantage of free resources extended to students and educators by AWS, Microsoft, Google, and IBM. Topics will include effective strategies for developing cloud-focused curriculum, classes, and plans of study.

David Nowak, Columbus State Community College, Columbus, OH

Python: Not Just for AI Anymore—Learn It with Wearable Computing and Microcontrollers

Looking for ways to get students and technicians involved with microcontrollers and sensors, but put off by the complexity of coding in C or C++? Want to engage folks who don't enjoy working with computer hardware? Learn to code model data acquisition applications in Circuit Python, a substantial subset of the Python language specifically tailored to small systems. Circuit Python features easy-to-use data structures and simple syntax. Work with the on-board sensors and LEDs of Circuit Playground Express boards plus conductive yarns and fabrics to develop a simple wearable computing application.

Gerald Reed, Nancy Reed, Valencia College, Orlando, FL

Introduction to Bitcoins, Blockchains, and Smart Contracts

This workshop will introduce participants to bitcoins, blockchains, and smart contracts programmed with Ethereum Blockchains and the Solidity programming language. Cryptocurrencies such as bitcoins use blockchains and smart contracts to enforce transactions. The presenter will provide a module that computer science educators can use to introduce the underlying technology in their classrooms. Participants will receive handouts describing sample programming techniques and worksheets for creating basic smart contracts.

Debasis Bhattacharya, University of Hawaii Maui College, Kahului, HI

WORKSHOPS: Tuesday 7/28 1:00–4:30

Competition Across the Curriculum: Leveraging Competitions for Teaching and Learning

In cybersecurity, individual and team-based competitions are an essential tool for engaging students, reinforcing learning, and building skills and knowledge outside the classroom. The presenters built a “capture the flag” environment using open-source tools and populated with networking and cybersecurity content. Testing with students and faculty has generated great excitement. The goal of this workshop is to increase adoption of competitions in other STEM disciplines. Participants will learn about the environment and use cases and how the environment was built. The presenters will then work with participants in integrating their content, questions, and challenges into the environment.

John Sands, Moraine Valley Community College, Palos Hills, IL; **Michael Qaissaunee**, Brookdale Community College, Lincroft, NJ

ATE Evaluators Workshop: Connect, Share, and Learn

ATE evaluators, come share your evaluation experiences, learn from each other, and connect with fellow ATE evaluators! Twelve evaluators will present their ATE evaluation experiences to help participants discuss challenges and gain insights into others' evaluation techniques. The workshop will also involve networking activities designed to help ATE evaluators get to know each other and identify common points of interest and collaboration opportunities. Attending evaluators will grow their networks of peer ATE evaluators, gain insight into new practices, and group problem solve difficult situations.

Emma Leeburg, Lyssa Wilson Becho, Western Michigan University, Kalamazoo, MI

TOURS: Tuesday /28 (afternoon)

Portland Aerial Tram

1:00–4:00; bus loads at 1:00. Ride an aerial gondola from the Portland WaterFront into the southwest hills high above I-5. Portland's high-tech aerial tram carries doctors and patients from the Willamette River up to OHSU (Oregon Health Sciences University), the state's most innovative hospital. The tram travels over 3000 feet and moves at over 20 miles per hour. Energy is recaptured by each descending gondola to help the next one up the hill. Get a behind-the-scenes look at this marvel of civil engineering technology.

Bullseye Glass

1:00–4:00; bus loads at 1:00. What's almost 2600°F (hot enough to melt steel) and flows like black strap molasses? Molten glass. Come on a tour of Bullseye Glass, Portland's boutique glass manufacturer. See how glass furnaces are made and watch high-tech automated machines anneal glass at precise temperatures and skilled artisans pour glass from glowing crucibles. Glass manufacturing is "high-tech." Precisely calibrated chemical elements are added to glass to impart color and specific properties. You'll also see how Bullseye keeps the glass business environmentally friendly too.

BioTronik/MSEI

12:30–4:30; bus loads at 12:30. (Box lunch and drink provided.) Portland is a "high-tech" town. Come tour BioTronik, a high-tech manufacturer of pacemakers and defibrillators. See how micro and biotechnology are saving lives. BioTronik's state-of-the-art factory includes a "class 10,000" cleanroom and robots that move through the factory delivering parts to technicians. See how pacemakers are tested and verified before they are shipped. Be prepared to dress up in a "bunny suit" (a cleanroom suit) as part of the tour.