2020 HI-TEC Sessions in Time Slots

Wednesday, July 29, 10:15–11:00

S1

Connecting to the NEXUS Using IIOT Sensors

Do you know what the Industrial Internet of Things (IIoT) is? Do you want to learn more? Or how to teach related concepts? If so, this is the workshop for you. IIoT deploys data collection and analysis in industrial settings. Sensors populate a web-based database, which facilitates decision-making and thus enhances productivity, safety, and efficiency. Using industrial sensors, attendees will experience a variety of hands-on activities and draw conclusions as to how these activities apply to real-world problems. Activities will involve deployment of sensors in simulated environments related to lean manufacturing, preventive maintenance, and just-in-time inventory. Attendees can sign out Nexus kits for their own classrooms.

Lyndsie Gibbs, **Mike Guericke**, Metropolitan Community College, Omaha, NE

S100

College Collaboration to Create a Grants Program and Portfolio

Grant applications and management are challenging for smaller colleges with limited resources. This presentation will explore an innovative partnership approach to applying for and managing grants. This collaboration with Columbus State Community College has resulted in awards to Marion Technical College totaling over $1.3 million and current grant applications totaling over $3.5 million.

Shane Kirby, Columbus State Community College, Columbus, OH; **Bob Haas**, Marion Technical College, Marion, OH

S12

Industry Impressions: The Work of the Future and Its Impact on the Technician Workforce

This industry panel will engage community college, university, and high school educators and administrators in a discussion of the ongoing transformation of the workplace at the human-technology interface. Panelists from multiple business sectors will describe new technologies their companies are implementing (or planning to implement) and how they will impact technician education.

Ann-Claire Anderson, CORD, Waco, TX; **Marilyn Barger**, Florida Advanced Technological Education Center (FLATE), Tampa, FL

S26

Increase Student Engagement and Equity in Your Classroom Using Active Learning

Do you want to make sure you are engaging all students? Do you want to include instructional activities that encourage student participation in your classroom? Attend this session for information on project-based learning, flipped classrooms, and other methods that engage students and create more equitable learning environments. The presenters will provide examples used in their own classrooms, show how they were developed, and share successes. Attendees will leave with tips and free resources that will help them implement active learning strategies in their classes.

Jim Sullivan, **Pamela Silvers**, **Rachael Tipton**, Skilled Workers Get Jobs, Asheville-Buncombe Technical Community College, Asheville, NC

S31

Engaging Business to Predict the Future

As technology evolves at an ever-faster pace, education programs must keep up to make sure graduates are workforce ready. The NSF project titled *IT Skill Standards 2020 and Beyond* employs the BILT model to engage IT employers in predicting the future and developing "future-proofed" skill standards. This process started with 90+ "thought leader" CIOs across the nation identifying the top IT job clusters. From there, multiple cluster groups are convening one by one to standardize entry-level tasks, knowledge, skills, and abilities. Learn more about strategies for leading your business experts in keeping your program ahead of the curve.

Ann Beheler, National Convergence Technology Center (CTC), Frisco, TX

S40

Feeding the Female Cybersecurity Educational Pathway with High School Partnerships

Introducing female high school students to the field of cybersecurity and its career opportunities is crucial to filling workforce pipelines in the years to come. This session will present the results of a collaboration between a two-year community college in Colorado and its partner high schools in implementing events focused on unmasking the field of cybersecurity to its female students. The deployment, successes, and lessons learned from these events will be explored, along with their ability to engage high school females in summer programs focused on strengthening their interest in the field.

Nina Amey, Arapahoe Community College, Littleton, CO; **Bill Gilmore**, Littleton Public Schools, Littleton, CO

S28

Developing Course-Based Undergraduate Research Experiences to Enhance Biotechnology Workforce Skills

The InnovATEBIO National Biotechnology Center, in collaboration with the Community College Undergraduate Research Initiative (CCURI), has developed an initiative that will help community college faculty develop and incorporate undergraduate research experiences into their biotechnology programs. This collaboration will focus on sourcing research projects from industry partners as a way to enhance the development of workforce skills. Examples of this educational model will be presented.

James Hewlett, InnovATEBIO National Biotechnology Center, Finger Lakes Community College, Webster, NY; **Linnea Fletcher**, InnovATEBIO National Biotechnology Center, Austin Community College, Austin, TX

S99

Using Nanotechnology As a Pathway to Promote Underrepresented Minority Students in STEM Fields

A nation flourishes to the extent that it utilizes all of its resources in pursuing the full potential of its citizens. To provide the workforce necessary for today's technology-driven economy, the USA must draw significant numbers of STEM professionals from its underrepresented minority (URM) population. This session will describe a model in which universities, community colleges, and industry partners collaborate in utilizing nanotechnology as a pathway to enable URM students to apply their full talent to scientific, engineering, and technological fields, thereby meeting the growing demands of high-tech industries.

Atilla Ozgur Cakmak, The Pennsylvania State University, University Park, PA; **Robert Ehrmann**, Nanotechnology Applications and Career Knowledge Support Center (NACK), University Park, PA; **Thomas Stoudt**, Tidewater Community College, Virginia Beach, VA

Wednesday, July 29, 11:15–Noon

S11

Pathway to Success: NSF ATE Funding Options and Mentor-Connect Proposal Development Assistance

Find a pathway to success with your first or second proposal, or even a resubmission of a proposal that was not initially funded. The National Science Foundation-funded Mentor-Connect project is a proven strategy for preparing competitive proposals. Attendees will learn from NSF's lead ATE program officer about available funding options and, from Mentor-Connect, will learn about free mentoring and technical assistance throughout the proposal preparation and funding process. The funding rate for proposals from Mentor-Connect colleges is 73 percent (cohorts 1-6), with 86 percent of the 144 participating colleges to date submitting proposals (cohorts 1-7).

Elaine Craft, Mentor-Connect: Leadership Development and Outreach for ATE, Florence-Darlington Technical College, Florence, SC; **V. Celeste Carter**, National Science Foundation, Alexandria, VA

S14

Dual Credit High School Photonics Fundamentals Course

This session will cover the steps involved in creating and conducting a dual-credit online/hybrid photonics (lasers and optics) fundamentals high school course. Topics will include ways to inform high school administrators, students, and teachers that build enthusiasm for the opportunities in the laser and optics industry. The presenter will discuss course and lab development and how the course helps to meet the main objective of increasing the supply of lasers and optics technicians.

Frank Reed, Indian Hills Community College, Ottumwa, IA

S6

The Revolutionary Effects of Emerging Technology on the Future of Society and Industry

Attendees will get an overview of the digital age and the revolutionary effects of technologies such as blockchain, artificial intelligence, the Internet of Things, cloud computing, and biotechnology on humanity's social, medical, economic, and political existence.

Tanya Knight, **Rae Rawley**, Peninsula College, Port Angeles, WA

S32

ATE Program PI Survival Guide

This interactive session is designed for ATE PIs and co-PIs entering the second or third year of their grants. The session will provide guidance in project management that will help them thrive in the ATE program and community. Experienced ATE PIs will share tips, best practices, and lessons learned. Topics will include: troubleshooting common challenges, budget implementation, personnel changes, engaging administrators and other colleagues, navigating grant guidelines and documents such as the PAPPG, preparing annual reports, and understanding NSF expectations for ATE awards.

Mel Cossette, National Resource Center for Materials Technology Education (MatEd), Lynnwood, WA; **Osa Brand**, Mentor-Connect: Leadership Development and Outreach for ATE, Florence, SC; **Pamela Silvers**, Skilled Workers Get Jobs, Asheville-Buncombe Technical Community College, Asheville, NC; **Louise Petruzzella**, Shoreline Community College, Shoreline, WA; **Karen Wosczyna-Birch**, Regional Center for Next Generation Manufacturing (RCNGM), Farmington, CT; **Thomas Tubon**, Madison Area Technical College, Madison, WI

S48

Modeling SCME Microcantilever Using Solidworks

This presentation will show how to model SCME microcantilevers in support of MEMS education. The resonant mode of vibration of various cantilever beams supplied in the SCME microcantilever kits will be evaluated to see how the resonant mode of vibration of a cantilever beam is influenced by mass, modules of elasticity, and beam dimensions using the 3D CAD software Solidworks.

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

S5

Generative Design in the Additive Manufacturing Ecosystem

This session will cover how to utilize artificial intelligence tools and cloud computing power to design components for a Kara learning machine. Participants will learn to develop a generative design using the Fusion 360 design software suite and manufacture the design using a metal 3D printer.

Mahmood Lahroodi, **Hans Mikelson**, DREAM (Developing Resources for Enhancing Additive Manufacturing), Chippewa Valley Technical College, Eau Claire, WI

S52

Certification Pilot Program: Establishing Educators' Qualifications to Teach Emerging Technologies

New and emerging technology programs are needed by today's workforce, but often they are so recent that educators do not have academic credentials aligned with the new technology. This has been the case for areas in geospatial technology such as geographic information systems, remote sensing, and unmanned aerial systems (UAS). College and state systems often mandate program and course content, making it difficult for faculty to offer emerging technologies. In many manufacturing programs, students and faculty members can establish their qualifications by acquiring certifications in specific technologies. The GeoTech Center is piloting a program designed to provide educators from high schools, colleges, and universities a Geospatial Technology Educator Certification (GSTEdC). This presentation will present the background for the development of the GSTEdC program, what the pilot included, and the outcomes for the educators completing the pilot GSTEdC pathway.

Ann Johnson, National Geospatial Center of Excellence (GeoTech), Rathdrum, ID

S85

Coding an Apprenticeship Model for the IT Industry

In 2013 Columbus State Community College enhanced its modern manufacturing program by implementing a successful earn-and-learn model. That pilot laid the groundwork for expanding experiential-learning opportunities into other programs and industries, including information technology. The presenters will discuss how the differences between industries impact their work and the best practices they've discovered along the way.

Moderator: **Stephanie Schuler**, Columbus State Community College, Columbus, OH. *Panelists:* **Larry McWherter**, **Dave Cofer**, **Tara Sheffer**, Columbus State Community College, Columbus, OH

Wednesday, July 29, 1:15–2:00

S104

Asynchronous Micro Fabrication Online Short Course Series

Learn how to access and leverage the Support Center for Microsystems Education's series of online short courses to enhance emerging technology classes and/or support new programs in micro-nano technology. New this year is a set of courses designed to help students and educators understand how small devices such as micro sensors are fabricated in a clean room. This will be an interactive presentation – bring your laptop to test drive our system and explore not only the MEMS Fabrication series but also the BioMEMS and MEMS Foundations courses.

Matthias Pleil, **Pallavi Sharma**, Support Center for Microsystems Education (SCME), University of New Mexico, Albuquerque, NM

S16

Belonging, Mental Health, Coco Puffs, and Uber: How to Create a Diverse Pipeline That Succeeds

It is not easy to create a diverse STEM student pipeline. It takes institutional and community commitment, hard work, culture changes, and lots of love, but that is the mission of community colleges. Community colleges are agents of change whose goal should be to lift their communities' socio-economic status. This session will review nontraditional best practices initiated by RCNET and Laser-TEC that have become institutionalized at Indian River State College and led to successful applications for other grants such as DOL Youth Build. Topics will include mental health, feeling accepted, and real-time monitoring.

Kevin Cooper, Regional Center for Nuclear Education and Training (RCNET), Fort Pierce, FL; **Shannon Wood**, **Chrys Panayiotou**, LaserTEC, Fort Pierce, FL

S22

Employability Skills and Their Application to Project Management: Developing the IT Workforce

Workflow skills are the nontechnical skills necessary for success in the workplace. These include working in teams, collaboration, problem solving, verbal communication, written communication, dependability/work ethic, and planning/organizing for IT project management. This session will outline the Trello/Kanban workflow process utilized in an IT hardware upgrade project for two labs at Wharton County Junior College and the resulting lessons learned by stakeholders of the project.

J.B. Groves, Wharton County Junior College, Richmond, TX

S33

Increasing the Student Biotech Pipeline: From Classroom to Career

This presentation will focus on how the Los Angeles Mission College biotechnology program formed partnerships with high schools (through dual enrollment and summer workshops), worksource centers, and industry partners. Activities involved students in project-based learning, poster exhibitions, field trips, speakers, and externships leading to employment.

Chander Arora, Los Angeles Mission College, Sylmar, CA

S70

Best Practices in Female Recruitment for Advanced Manufacturing Education and Careers

Women are sorely underrepresented in manufacturing college programs and careers. For example, only 6 percent of graduates from Minnesota State Advanced Manufacturing Center of Excellence manufacturing programs are female. In response to this underrepresentation, colleges and centers throughout Minnesota have hosted women's youth outreach events. Additionally, the Minnesota State Advanced Manufacturing Center of Excellence and *Dream It. Do It. Minnesota* have established a Female Manufacturing Scholarship Program. These two major initiatives encourage women to pursue education and career paths in manufacturing. In this session the presenters will share best practices from these outreach events, benefits of the scholarship program, and impact on women in manufacturing in the state of Minnesota.

Michael Lund, Bemidji State University, Bemidji, MN; **Jaimee Meyer**, Minnesota State Advanced Manufacturing Center of Excellence, Bemidji, MN

S51

Data-Driven Proposals: Using ATE Survey Findings in Your Next ATE Proposal

This session will be a must-attend for anyone thinking about submitting a proposal to the National Science Foundation's Advanced Technological Education (ATE) program or anyone interested in seeing findings from the most recent annual ATE Survey. The presenters will highlight findings from the 2019 annual ATE survey to provide session attendees with a general grounding in ATE activities. They will also discuss how survey findings can be used to help guide ATE proposals. Attendees will leave the session with a better understanding of ATE grantees' work and how their potential ATE proposals may supplement or otherwise fit into this landscape.

Valerie Marshall, **Lyssa Wilson Becho**, EvaluATE, Kalamazoo, MI

S57

Trends in Mechatronics, Automation, and Industry 4.0 Technician Education

This session will host an open discussion with a panel of experienced mechatronics educators about what new technical skills their industry partners need from program graduates. The panel will respond to questions about what aspects of Industry 4.0 are already being implemented in their industry partner facilities and what is "coming soon." Attendees will learn from the mechatronics, automated manufacturing, and Industry 4.0 technician education community and share their own best practices, tips and tricks, and daring challenges that can help us all keep up with or even get ahead of the work of the future for technicians.

Marilyn Barger, Florida Advanced Technological Education Center (FLATE), Tampa, FL; **Andy Roberson**, Gadsden State Community College, Gadsden, AL; **Eric Breeder**, Charlottesville, VA; **Kenneth Floyd**, Front Range Community College, Westminster, CO

S71

Automating Alabama's Future: Producing Advanced Automation Technicians

This session will examine the shortage of the skilled technical workforce in two fields (automotive and manufacturing and aerospace and aviation) that are booming in Alabama. Six out of ten open-skilled manufacturing jobs are going unfilled due to talent shortages. Gadsden State is taking the initiative in addressing this shortage through expansions in certification in robotics and mechatronics. Gadsden State is meeting the demand of companies such as Honda, Mercedes-Benz, Hyundai, and others moving into Alabama. *Automating Alabama's Future* is a two-year project designed to fill the skills gap and develop advanced manufacturing certificates that will focus on advanced industrial applications.

Andy Robertson, Gadsden State Community College, Anniston, AL

Wednesday, July 29, 2:15–3:00

S23

Introduction to Bitcoins, Blockchains, and Smart Contracts

This session will introduce participants to Bitcoins, blockchains, and programming of smart contracts using Ethereum blockchains and the Solidity programming language. Cryptocurrencies such as Bitcoins use blockchains and smart contracts to enforce transactions. The presenter will give attendees the tools 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

S36

How ATE PIs at HSIs Engage Hispanic Students in Technician Programs

Learn how ATE PIs at two-year Hispanic serving institutions (HSI) are recruiting and retaining Hispanic students in technician programs to increase the diversity of ATE and the STEM workforce. Panelists will share challenges and tips for engaging Hispanic and other underrepresented students while creating inclusive STEM learning environments where all students are treated as motivated learners and made to feel welcome. The moderator, an experienced Hispanic PI who runs an ATE Center, will lead the panel discussion and field audience questions. Relevant resources for engaging Hispanic students will also be shared and discussed.

Cynthia Pickering, SFAz Center for STEM at Arizona State University, Scottsdale, AZ; **Mel Cossette**, National Resource Center for Materials Technology Education, Edmonds Community College, Lynnwood, WA; **Chander Arora**, Los Angeles Mission College, Sylmar, CA; **Ronnie Brannon**, Palo Alto College, San Antonio, TX; **Diego Tibaquira**, Miami Dade College Eduardo J. Padrón Campus, Miami, FL

S65

Professional Assessment: How We Look at the Soft Skills at NCSC

The assessment committee at North Central State College has been tasked by community partners with developing the professional skills base of its student population. To this end, the committee is investigating the power of self-assessment in the development of these skills. Twelve attributes were characterized, defined, and validated by the community partners and faculty at NCSC. This presentation will give participants an opportunity to utilize this rubric and provide feedback on how and where these skills are being assessed.

Justin Tickhill, North Central State College, Mansfield, OH

S93

Broadening ATE Impact: Pathways and Tools for Supporting Dissemination and Outreach

Join ATE community experts to learn about resources, tools, strategies, and pathways that will help you share your work, connect with new audiences, and broaden your outreach and impact. Whether you're a first-time applicant for an ATE grant or a seasoned expert, this session will help you discover new and interesting ways to plan for outreach. Panelists from ATE projects and centers that offer resources and support for educators and staff will lead roundtable discussions and share ideas and tools for managing, disseminating, and getting the word out about your valuable materials and activities. Attend this session to learn how to reach out with newsletters, publications, teaching technicians.org, Twitter, Facebook, videos, webinars, and more.

Rachael Bower, ATE Central, Madison, WI; **Marilyn Barger**, Florida Advanced Technological Education Center (FLATE), Tampa, FL; **Anthony Manupelli**, Pellet Productions, Reading, MA: **Mary Slowinski**, Working Partners Project, Bellevue, WA; **Michael Lesiecki**, Luka Partners, Phoenix, AZ; **Rick Roberts**, SCATE Center of Excellence, Florence, SC; **Emma Leeburg**, EvaluATE, Kalamazoo, MI

S72

Building the Pipeline Through College in the High School

This session will present a working model for initiating and developing a program designed to build the pipeline for the associate degree in mechatronics. Through the introduction of key concepts and hands-on experiences, high school students learn about mechatronics and gain an advantage in transitioning to college.

Patricia Thompson, **Jeffery Thomas**, Community College of Allegheny County, Oakdale, PA

S80

Enhancing Student Learning With Immersive Hands-on Workshops

Last summer, Ivy Tech offered a MEMS 101 Engineering Technology class that was preceded by a weeklong trip to the Manufacturing Training and Technology Center (MTTC) cleanroom at the University of New Mexico. Working with the Support Center for Microsystems Education (SCME), students spent the week fabricating and testing pressure sensors in a cleanroom environment. This provided students with hands-on experience they could refer to during an eight-week course in which they focused on MEMS fabrication more in-depth. This session will present how the workshop enhanced the student experience and share the curriculum developed and lessons learned.

Cait Cramer, **Andrew Bell**, Ivy Tech Community College, Fort Wayne, IN; **Matthias Pleil**, Support Center for Microsystems Education (SCME), University of New Mexico, Albuquerque, NM

S87

The Cloudification of Curricula

We asked employers of IT professionals what they look for in job candidates. The overwhelming answer was cloud computing literacy. So we launched a cloud literacy initiative, partnering Columbus State and Northern Virginia community colleges with Amazon Web Services. In this session, see how we're "cloudifying" our curricula by injecting AWS-specific content into courses, from enhancing syllabi to redesigning classes.

David Nowak, Columbus State Community College, Columbus, OH

S89

Innovative Resources for Teaching and Assessment of Cybersecurity and Other STEM Courses

Brookdale Community College's E-MATE project and Moraine Valley Community College's CSSIA Center have collaborated to develop two innovative new resources. One is a series of web-based interactive explainers in networking, electronics, security, and other STEM disciplines. The other is a capture the flag (CtF) game modeled on the classic Risk game. Presenters will demonstrate interactives, distribute flash drives with the content, and conclude with a demo of the CtF environment. Participants will walk away with interactive content they can immediately integrate into their classes and programs and opportunities to use the CtF to assess their students.

Michael Qaissaunee, E-MATE 2.0, Brookdale Community College, Lincroft, NJ; **John Sands**, National Center for Systems Security and Information Assurance (CSSIA), Palos Hills, IL

Wednesday, July 29, 3:45–4:30

S103

Productivity Toolkit: Three Free Resources for Scheduling, Design, and Project Management

If you find yourself thinking, "There has to be a better way to do this," then this session is for you. The presenter will demonstrate three free web-based tools that streamline processes and have a variety of applications: Calendly for scheduling, Canva for design, and Trello for project management. From social media to student engagement, collaborative projects to one-on-one meetings, you'll take away tips and tricks for enhancing your work.

Tara Sheffer, Columbus State Community College, Columbus, OH

S25

Engage Your Students with Creative Data Visualization projects

Looking for engaging programming projects for students? Rather than coding solutions to isolated, abstract problems, do you want to embed exercises in a wider and even interdisciplinary context? If so, you'll be interested as we show and discuss examples of students coding their own infographics, interactive visualizations, and simulations. Working from data they collect, or from web-based data sources, students can use almost any programming language, leveraging beginner-to-intermediate skills to produce informative, graphical solutions. Examples from introductory to advanced, in languages ranging from Java and Python to Linux shell scripts, will be shown and discussed.

Gerald Reed, Valencia College, Orlando, FL

S30

Explicit Messaging: Tips for Tailoring Presentations to Specific Audiences

You have information to share but your presentation is "blah" and doesn't excite your audience. People are checking texts, leaving, or otherwise not engaged. This presentation will share ideas for tailoring your presentation to your audience with tips on topics such as clarifying your message, modifying content to the given time slot, and determining key takeaways. Learn how to share useful information in an effective way and to "wow" rather than bore. Sometimes less is more.

Pamela Silvers, Skilled Workers Get Jobs, Asheville-Buncombe Technical Community College, Asheville, NC; **Elaine Craft**, Mentor-Connect: Leadership Development and Outreach for ATE, Florence-Darlington Technical College, Florence, SC; **Emma Leeburg**, EvaluATE, Kalamazoo, MI

S2

Professional Society Partnerships: Ensuring Student Success

Weld-Ed has established a consortium of education and industry partners, developed a series of professional development courses, completed welding industry research, and improved the ability of instructors to deliver course content. The key to ensuring industry acceptance of students entering the workforce is the validation of the education and training by industry professional organizations. This session will describe the development of STEM student learning objectives (SLO) through partnerships with professional societies such as the American Society for Non-Destructive Testing. The presenter will provide information about the DACUM process and conversion of data into SLOs.

Rick Polanin, National Center for Welding Education and Training (Weld-Ed), Metamora, IL

S39

I Want It Tomorrow! Automation Technologies Improving the Supply Chain

This presentation will survey modern tools that support warehousing and distribution centers. Attendees will come away with an understanding of how automation has changed the industry and how networked devices are influencing modern material handling. Learning objectives will include discussion of wireless devices that collect and transfer information for data analysis; comparisons of traditional security issues associated with networked environments versus IoT devices; and identification of emerging technologies such as drones, vertical solutions, and the underground logistics used in automated warehousing.

Bob Sompolski, National Center for Supply Chain Automation, Oakton Community College, Des Plaines, IL; **Ned Young**, **Beverly Hilderbrand**, National Center for Supply Chain Automation, Sinclair Community College, Dayton, OH

S41

Engaging K-12 Educators in Technology Instruction

Wondering how to engage K-12 educators with your content? This session will discuss best practices in instructional design for K-12 educators. The session will focus on pedagogy that can increase K-12 engagement while decreasing anxiety educators may feel about unfamiliar technologies. The presenters will also discuss strategies for addressing and troubleshooting obstacles that keep K-12 educators from engaging in technology instruction, including financial obstacles, time management, lack of familiarity with emerging technologies, and evaluation. Attendees will learn about supports that can be the final push to get K-12 educators involved in their center's content.

Mary Ann Nickloy, **Kelly Fahrenkopf**, **Elaine Garrett**, Northeast Advanced Technological Education Center (NEATEC), Suny Polytechnic Institute, Albany, NY

S66

Engaging the Future Technical Workforce by Focusing on Careers

According to the National Academies, approximately 3.4 million skilled technical jobs will go unfilled in 2022. To address this need, we must make students, parents, and teachers aware that a wide variety of technical careers exist, help students understand that these careers are attainable, provide tools to facilitate career exploration, and show how working in these careers can support students' personal goals and align with their values. Since the launch of Biotech-Careers.org, almost 1.5 million students, teachers, and professionals have visited the site. The presenters will show how Biotech-Careers.org can be a model for raising awareness, illustrating career pathways, supporting exploration, and demonstrating relevance.

Sandra Porter, **Todd Smith**, Digital World Biology LLC, Seattle, WA

S8

Working Technicians Tell Their Stories

This session will provide an opportunity for working technicians to share their experiences in attending community and technical college programs that prepared them for their positions. Technicians will speak from a "fishbowl" setting with the audience observing. Members of the audience will be invited to ask questions and will learn the "fishbowl technique," which is frequently used in industry.

Greg Kepner, MentorLinks, Ottumwa, IA

Thursday, July 30, 8:15–9:00

S107

Certified Technician-Supply Chain Automation: From Collaborative Concept to Development and Delivery

Developing an industry-validated, nationally portable ANSI/ISO-accredited certification is a long and challenging process. The National Center for Supply Chain Automation, in collaboration with industry partners, the Manufacturing Skills Standards Council, and Amatrol, played a vital role in the development of a stackable certification for automation technicians. Learn about the role of each partner, challenges that were overcome, the certificate program design, and the Skill Boss-Logistics training and skills assessment invention that both teaches and validates 100 hands-on skills. Attendees will gain an understanding of the certification development process. Takeaways will include Certification Skill Standards, invention comprehensive assessment data, and the development MOU.

Steve Harrington, National Center for Supply Chain Automation, Norco, CA; **Neil Reddy**, Manufacturing Skills Standards Council, Alexandria, VA; **Kent Powell**, Amatrol, Jeffersonville, IN

S53

Bridging Gaps in Advanced Manufacturing Training for Veterans and Other Nontraditional Student Groups Using Inexpensive Portable DC/PLC Trainers

Transitioning veterans represent a critical—and underutilized—resource for the skilled technical workforce. NEATEC has developed a Transitioning Soldier Training Program wherein, several times a year, transitioning soldiers at the U.S. Army's Fort Drum (90 miles from our campus) receive training to prepare them for the advanced manufacturing workplace. The 72-hour hands-on Advanced Manufacturing Technician "boot camp" taught near Fort Drum requires substantial creativity and resourcefulness to make it both instructive and cost-effective. We have recently added basic DC and control circuits content and an intro to PLCs into this training program to better prepare for transitioning to work with the mechatronics systems utilized in industry. This session will demonstrate the trainer developed for this program, share activities, review "lessons learned," and provide attendees with curricular content and strategies for taking their training on the road to nontraditional student stakeholder groups. Full schematics and parts lists for the compact control circuits/PLC trainer will be made available through a sign-up sheet.

Kate Alcott, NEATEC, SUNY Polytechnic Institute, Utica, NY; **Robert Decker**, Northeast Advanced Technological Education Center (NEATEC), Mohawk Valley Community College, Utica, NY

S24

Increasing Equity in STEM and CTE with OER

This presentation will focus on using open education resources (OER) in STEM and CTE courses as a way of promoting equity by reducing costs for learning materials.

Esperanza Zenon, River Parishes Community College, Gonzales, LA

S29

Remote Delivery of Hands-on IT Courses Using Zoom

Northark is in its second year of providing IT/networking classes to remote students using Zoom technology to synchronously deliver courses taught on the main campus. Other supports at the remote site include lab assistants, dedicated equipment, and virtual labs. The presenters will share the details of the technology, equipment, costs, what is working, and what should be improved.

Laura Berry, **Rick Williams**, North Arkansas College, Harrison, AR

S34

Evalu-what? A Crash Course on Evaluation

Required to have an evaluation of your grant? Never worked with an evaluator before? Not even sure what evaluation is? This presentation is a crash course for people who might be nervous, skeptical, or hesitant about engaging in evaluation. Attendees will learn what evaluation is, how evaluation can improve their projects, and why they should be excited about evaluation. Evaluation should be more than just another box to check. Attendees will receive resources on how to get started with their evaluations and tips for writing evaluation plans and selecting evaluators.

Lyssa Wilson Becho, EvaluATE, Western Michigan University, Kalamazoo, MI

S44

Strategies for Advancing Technician Education at Two-Year Hispanic Serving Institutions (HSI)

Already serving 56 percent of Latin(x) postsecondary students, two-year HSIs can now access help in addressing the opportunities and challenges encountered in serving Latin(x) students in advanced technological education programs. The HSI ATE Hub provides curated resources and specialized faculty assistance in developing grant proposals and increasing the internal capacity of two-year HSIs to advance technician education. This session will highlight a sample resource that emphasizes culturally sensitive instruction to help close achievement gaps for Latin(x) students and a survey tool for helping faculty hone in on what constitutes a learning environment that is both academically rigorous and culturally balanced.

Elaine Craft, HSI ATE Hub - Diversifying the ATE Program with Hispanic Serving Institutions Using Culturally Inclusive Mentoring and ATE Resources, Florence, SC; **Cynthia Pickering**, SFAz (Science Foundation Arizona) Center for STEM at Arizona State University, Tempe, AZ

S68

Re-envisioning Dual-Enrollment Recruitment Strategies

In October of 2019, the InnovATEBIO National Biotechnology Center was established with support from the NSF's Advanced Technology Education (ATE) program. One of the center's many initiatives is to facilitate the creation of stronger links between secondary schools and community colleges, with the goal of supporting student recruitment and growing educational programs that prepare students for the skilled technical workforce. This session will report on a pilot program that seeks to upend traditional dual-enrollment models with a new "intentional recruitment" strategy that identifies two-year-college-bound high school students. The presenters will demonstrate a cross-disciplinary model that increases the likelihood that these dual-enrollment students will matriculate into their programs upon graduation.

Kristen Wolslegel, **Michael Fuller**, InnovATEBIO National Biotechnology Education Center, Bay Area Bioscience Education Community & City College of San Francisco, South San Francisco, CA

S76

Online Simulation and Visualization Tools for Enhancing Student Learning of Nanotechnology

Visualization and simulation at the nanoscale coupled with measurements enhance students' understanding of the material world at the smallest levels of matter where intuition and textbook examples alone are not enough. The purpose of this presentation is to discuss the use of free online visualization and simulation tools to teach nanotechnology. Professors can use these tools to enhance student learning of complex concepts at nanoscale without buying expensive equipment. These tools include 21 RAIN (remote access instruments in nanotechnology) nodes for accessing visualization instruments and 500+ simulation tools at nanoHUB that enable students to simulate and understand nanotechnology concepts.

Ahmed Khan, Fulbright / World Learning Inc, Washington DC; **Sala Qazi**, SUNY Polytechnic Institute, Utica, NY; **Atilla Ozgur Cakmak**, Penn State University, State College, PA

Thursday, July 30, 9:15–10:00

S106

A New Model for College Partnerships With Local Businesses Using SBIR/STTR Grants

Thirteen federal agencies currently have dedicated funding for small business innovation research/small business technology transfer (SBIR/STTR). These agencies typically publish requests for proposals (RFP) with the intent to help small businesses conduct research and development. This session is intended to inform the audience about how these opportunities can be leveraged with community college programs to drive local small business development while providing real-life training for students.

James Guenther, Crescent City Biotechnology Consultants, Metairie, LA; **John Brownell**, Brownell & Associates, Metairie, LA

S27

Unique Industry Partnerships Provide Benefits for Students, Community, Institution, and Industry

In this session we will outline how an industry partnership with OnSyte has benefited the college, community, our students, and the company. OnSyte Performance has developed a cost-effective residential wastewater treatment system that can replace septic systems or provide systems that would allow residential or commercial development in areas that would otherwise be undeveloped. The formation of the partnership, the unique role of the college foundation, the curricular impact, the community impact, and the technology behind the OnSyte system will be presented.

Alan Zube, Florida State College, Jacksonville, FL; **Scott Forrester**, OnSyte Performance, Tallahassee, FL

S35

Undergraduate Research to Promote Student Engagement in Technical Education

Undergraduate research is a high-impact practice that can be utilized in student recruitment and success. It has had an especially positive influence on minority student engagement in STEM. In this session, two-year college faculty and students will describe their experiences in utilizing a research program within STEM courses, as well as in hypothesis-driven authentic research experiences.

Jared Ashcroft, Pasadena City College, Pasadena, CA

S54

Spatial Perspectives: Redesigning Geospatial Education

Portland Community College secured NSF funding to launch its associate of applied science in geomatics and certificate in unoccupied aerial systems through its Enhancing Geographic Information Science Technology Education (eGIST) initiative. This session will explore the approaches PCC is using to align curriculum to industry needs, enhance student engagement, create a relationship-based advising model for student retention, and develop local community partners to provide opportunities for student internships and work-based experiences. The presenter will cover lessons learned in the first year as well as directions for future work.

Christine Friedle, Portland Community College, Portland, OR

S74

Lidar Technology and Its Diverse Applications

Light detection and ranging (Lidar) uses laser beams and the scattered reflections from objects to determine the distances between the laser sources and the objects. With Lidar we can accurately map shorelines, rivers and lakes, and ancient sites; monitor the health of agricultural crops; analyze the content of prescription drugs; detect illegal drugs; create 3D maps of spaces; assist in the navigation of self-driving cars, planes, and boats; and much more. Attendees will learn the basic principles of the construction and operation of different kinds of Lidar systems, see a demonstration of a Lidar system, and receive pointers on selecting systems for purchase.

Anca Sala, Baker College, Flint, MI; **Chrys Panayiotou**, LaserTec, Indian River State College, Fort Pierce, FL

S78

Community College Student Decision Making About Information Technology Programs and Careers

How do students decide among the many community college pathways? What most impacts student decision-making and ultimately student retention and success? Rutgers University and Ivy Tech Community College are conducting an NSF-funded research project on factors that motivate students to enter information technology programs and careers. The presenters will share findings on student decision making, what drives these decisions, and how institutional policies and practices impact them. Attendees will learn about the presenters' findings, share thoughts, and gain insights on how to advise students in an ever-growing, ever-changing field.

Michelle Van Noy, Education and Employment Research Center, Rutgers, Piscataway, NJ; **Matthew Cloud**, Ivy Tech Community College, Lake County Campus, Gary, IN

S79

Fueling Economic Development with STEM Partnerships: Synergy Between Industry and Education

Partnerships between the STLCC Center for Plant and Life Sciences and the bioscience start-up community are fueling economic development in the St. Louis region. Utilizing a unique model that took the STLCC Center off campus and directly into the start-up industry, companies are growing and jobs are being created.

Elizabeth Boedeker, St. Louis Community College Center for Plant and Life Sciences, St. Louis, MO

S81

Measuring Success of Virtual Reality Pre-Training for Nanotechnology Instrumentation

How well do virtual reality simulations prepare students to carry out experiments on real equipment of the complexity encountered in nanotechnology laboratories? This session will present the impacts of using VR to teach students the operational steps involved in using an RF sputter deposition machine, an electron microscope, and a photolithography lab—when followed by completion of the same experiment on the real apparatus. Student attitudes toward, confidence with, and understanding of the real machines after VR training will be assessed.

Paul Weber, Utah Valley University, Orem, UT

Thursday, July 30, 10:30–11:15

S42

Industry Engagement and Evaluation in Advanced Manufacturing and Engineering Technologies

This session will present a framework for industry engagement and evaluation in advanced manufacturing (AM) and engineering technologies (ET), giving special emphasis to interactions with AM stakeholders. For the purposes of assessing educational pathways for manufacturing in rural communities, stakeholders consist of employers, educators, and recent graduates. Techniques that enhance interactions include the development of questionnaires for in-person interviews; leveraging learning management systems (LMS) for video recordings during interviews; using YouTube functionality to organize transcriptions; storing and sharing files using Google Drive; and triangulating data with obtained research and via a developed body of knowledge. The session will include demonstrations.

Marcia Mardis, **Faye Jones**, Florida State University, Tallahassee, FL; **David Bouvin**, **Ben Bridges**, Chipola College, Marianna, FL

S47

The Micro Nano Technology Education Center: A Collaborative ATE National Center

The new Micro Nano Technology Education Center (MNT-EC) is a new addition to the community of national centers of excellence made possible by the NSF ATE program. Focusing on the MNT-EC, this presentation will cover the steps involved in formulating the diverse team of educators required to build an ATE center and will invite questions on creating and applying for ATE center grants.

Jared Ashcroft, Pasadena City College, Pasadena, CA; **Greg Kepner**, MentorLinks, Ottumwa, IA; **Mel Cossette**, National Resource Center for Materials Technology Education (MatEd), Lynnwood, WA; **Neda Habibi**, Northwest Vista College, San Antonio, TX

S75

Free Tools for Recruiting, Training, and Retaining the Next Generation of Cybersecurity Professionals

According to $(ISC)^2$, 1.8 million cybersecurity jobs will be available by 2022. Filling those jobs would require hiring 63 qualified cybersecurity professionals every hour between 2019 and 2022. How do organizations train and find the next generation of cybersecurity professionals? The Cybersecurity and Infrastructure Security Agency (CISA) offers free resources that can help in recruiting, educating, and retaining qualified professionals. Join this discussion on how CISA is focusing on workforce diversity; best practices for serving underrepresented groups such as women, persons with disabilities, persons of color, and veterans; and helping employers understand the NICE Cybersecurity Workforce Framework.

Latasha McCord, Department of Homeland Security, Cybersecurity and Infrastructure Security Agency, Washington, DC

S49

Using Technology to Address the United Nations Sustainable Development Goals: Awareness and Equality

This presentation will emphasize the world around us and use spatial technology to address the United Nations Sustainable Development Goals (SDG). The material presented will speak especially to educators and their students about issues associated with poverty, equity, diversity, education, climate change, and sustainable cities. From an educational perspective, students will increase technology skills, develop problem-solving skills, and gain awareness of global issues. Using a free software package, a step-by-step exercise will be presented. Attendees will leave with technology-based, problem-centered exercises that can be used in their areas of expertise.

Richard Schultz, National GeoTech Center of Excellence, Arlington Heights, IL; **Joseph Kerski**, Esri, Chicago, IL

S50

NSF Funding Opportunities of Interest to Two-Year Institutions

The session will provide an overview of NSF programs of interest to two-year institutions. The main focus will be on programs in the Division of Undergraduate Education, but other programs will also be highlighted. Program and policy updates will be presented. The session will allow time for participants to ask questions.

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

S64

Technician Education in Germany: Lessons Learned from a Recent Visit

The German Dual Educational System is the envy of the world in technician education. It is what we call the apprenticeship system here in the United States. During our recent trip to Germany we visited the Federal Department of Vocational Education, which has overseen 330 apprenticeship programs since 1919. We visited a photonics technical school established by industry within the dual system to train the workforce for three optics/photonics companies. We also visited Trumpf Inc., a major high-power laser manufacturer that has its own technician training program. The three different approaches to technician education will be described along with lessons learned.

Chrys Panayiotou, **Mo Hasanovic**, LaserTec, Indian River State College, Fort Pierce, FL; **Gary Beasley**, LaserTec, Central Carolina Community College, Lillington, NC

S82

Building a CSO or Incubator at Your School: Trailblazers Share Their Stories

Campus-based incubators and contract service organizations (CSO) make use of campus facilities and student skills that benefit individuals, organizations, and even regional economies. A study of community college CSOs and incubators, undertaken by the AC2 Bio-Link Regional Center, captured the stories, strategies, and best practices of those achieving successes using this model. InnovATE Bio, the National Center for Biotechnology Education, has published the study findings, which will be made available to attendees. A panel of contributors will share stories and the elements they found critical for success. Come ask questions and learn how to adopt this model at your institution.

Abbe Kesterson, InnovATE Bio, Austin Community College, Lexington, KY; **Linnea Fletcher**, InnovATE Bio, Austin Community College, Austin, TX

S95

Details of a New Internet of Things (IoT) Certificate

This session will overview a recently developed technical certificate offered in the rapidly emerging area of the Internet of Things (IoT). Springfield Technical Community College now offers a one-year certificate addressing the skills needed by IoT field technicians. Development of this certificate has been a primary goal of the NSF-funded Internet of Things Education Project. Details of the content of the courses and associated labs will be discussed and demonstrated. How this certificate can be integrated into a community college information technology, networking, or electrical/electronics curriculum will also be discussed.

Gary Mullett, Springfield Technical Community College, Springfield, MA

Thursday, July 30, 11:30–12:15

S55

Two-Tier Vacuum Technology Learning System for Semiconductor and Nanotech Manufacturing Tech Training

This three-part program consists of (1) an overview of the vacuum, RF, and plasma technology skills required of technicians in the nanotech and semiconductor industries and the resultant design learning system suitable for community college and technical high school curricula as well as for incumbent worker training; (2) an overview (including live demo) of the assembled trainers and the vacuum, RF, and plasma technology content and lab activities involved in using our trainers; and (3) a review of the initial implementation of this system with community college and high school students and incumbent semiconductor technicians.

Robert Geer, **Abe Michelen**, **Robert Decker**, **Stephen Stewart**, Northeast Advanced Technological Education Center (NEATEC), SUNY Polytechnic Institute, Utica, NY

S61

Enhancing Classroom Experiences Through Spiraling Curriculum

Through a grant, we reviewed classes aligned to industry certification objectives that were found to be redundant. Using a spiraling curriculum we took these redundancies and created an in-depth curriculum for IT degrees. In this session, we will discuss the framework we used and provide an outcome matrix that other institutions can implement.

Eric Renegar, **Kyle Jones**, **John Neff**, Sinclair Community College, Dayton, OH

S63

Impact of the iNoVATE Network Enterprise Administration Certification on Underrepresented Students

Participants will learn the impacts of a Network Enterprise Administration Certificate (iNoVATE-x) program on underrepresented students' workforce readiness. iNoVATE-x increased access to technology education for students in Florida. The curriculum focuses on hardware configuration, server configuration, server administration, and the problem-solving skills needed to operate a modern data center. Approximately 150 students enrolled in iNoVATE-x courses, of whom 43.70 percent identified as members of underrepresented populations. Students who completed iNoVATE-x had increased knowledge and perceptions of their problem-solving abilities and are now eligible for high-wage positions such as computer network architect, computer programmer, systems analyst, and network and computer systems administrator.

Angelicque Tucker Blackmon, iNoVATE-x, Innovative Learning Center, LLC, Atlanta, GA; **Ernest Friend**, iNoVATE-x, Florida State College, Jacksonville, FL

S69

Building Connections between Education and Industry

Northwestern Connecticut Community College is working with the Torrington School District and area manufacturers to introduce middle and high school students and their teachers to technical skills and technical careers. This collaborative effort involves providing STEM activities for students, introducing students and teachers to technical industries, and providing math tutoring for students. The presenters will share how they structured their program and how they engaged teachers, students, and industry. The impact of this activity on the teachers and students will be addressed by one of the high school teachers in the program.

Sharon Gusky, Northwestern Connecticut Community College, Winsted, CT; **Douglas Mooney**, Northwestern Connecticut Community College, Winsted, CT; **Christine Gamari**, Torrington High School, Torrington, CT

S7

Project Update for Cyber Up! Digital Forensics and Incident Response

Cyber Up! focuses on the development of curriculum for teaching the cybersecurity knowledge and skills involved in digital forensics and incident response (DFIR). These skills must be deployable in real-time and are dynamically linked to changing situations during cyberattacks. First-year activities include cybersecurity workforce frameworks used to develop six course outlines, a certificate of achievement, and an AS degree in DFIR. An advisory board provided information about in-demand job skills for industry and government work roles to ensure that the courses meet current industry needs. The presentation will cover grant activities completed, along with activities planned for the next two years.

Tobi West, Coastline College, Garden Grove, CA; **Anna Carlin**, Fullerton College, Fullerton, CA

S77

Learning Abroad, Learning Together: How Successful International Professional Development Works

CREATE's Energy Storage Project was initially tasked with gathering knowledge on energy storage and education. Recognizing that model programs in this area have been pioneered and established in Germany, CREATE organized an educator study tour to learn about these technologies and related workforce preparation. The evidence-based collaborative learning model that CREATE developed supports educators in gathering and preserving knowledge and facilitates the collaborative knowledge-building of the participant cohort. This session will describe the model, present outcomes and impacts of participant involvement, and provide recommendations for crafting educator professional development, especially where international travel is involved.

Mary Slowinski, CREATE Energy Storage Project, Madison, WI; **Gabrielle Temple**, **Ken Walz**, Center for Renewable Energy Advanced Technological Education (CREATE), Madison, WI

S86

Digital Transformation: Sustainable Partnerships for Industry 4.0 Workforce Development

Digital transformation entails Industry 4.0 skills such as advanced automation, machine vision, data science, artificial intelligence, and edge computing. A discussion of industry projects illustrates the challenges and opportunities that are part of this transformation. The projects are as follows: (1) Partnership with a business to do metrological measurements using a collaborative robot that picks and places objectives. (2) Partnership with the school's game programming degree, creating augmented virtual reality apps to help student visualize training for electric arc-flash hazards. (3) Showing how to analyze big analog data at the edge facilitating distributed control and predictive maintenance.

Sam Samanta, Finger Lakes Community College, Victor, NY

S91

Initiating and Maintaining Successful Industry Partnerships: An Invitation to Collaborate

The Working Partners Research Project has been capturing the ATE community's core practices and key factors for successful industry partnerships since 2015. Results include community-vetted partnership models, mini case studies, a partnership assessment rubric, and an online toolkit. The Engaging Educators/Strengthening Practice project—also known as the Working Partners Workshops—will utilize this research to develop educator workshops that will result in participant action plans as well as collaborative cohort support for initiating and sustaining individual goals. Come share your wants and needs so we can best serve you.

Mary Slowinski, Bellevue College, Seattle, WA; **Rachael Bower**, University of Wisconsin, Madison, WI

Thursday, July 30, 1:45–2:30

S17

Helping to Close Cybersecurity Workforce Needs

This session will share Orange Technical College's High School Cybersecurity program for grade 9-12 students. Students will complete high school with diplomas, three IT industry certifications, an AS degree in applied cybersecurity, and job experience in cybersecurity. Participants will learn how to develop this four-year cybersecurity program of study with the help of stakeholders.

Cap Jadonath, **Peggy Wilster**, Orange Technical College, Winter Park, FL

S38

Helping Deaf and Hard-of-Hearing Students Develop Nontangible Skills for the STEM Workplace

Nontangible (soft) skills are often overlooked in STEM education in spite of their recognized importance in the workplace. According to surveys and interviews of employers that hired our technical students, employer feedback was generally positive from a technical perspective, but soft skills needed improvement. The authors resolved much of this workplace problem through the development of a capstone project-based course that helped students develop the much needed soft skills.

James Mallory, **David Lawrence**, Rochester Institute of Technology/National Technical Institute for the Deaf, Rochester, NY

S58

Using Social Network Analysis to Evaluate the Development of Professional Connectivity

The success of initiatives aimed at the development of our skilled technical workforce increasingly depends on the continual growth and strengthening of professional interpersonal connections such as those between education and industry professionals. Social network analysis (SNA) provides a useful methodology for evaluating and describing the structure and development of interpersonal connections within these contexts. Attendees will learn the foundational concepts of SNA and practical guidelines for capturing the survey data necessary to conduct the SNA. The session will also include a demonstration of open-source software for running analyses and generating graphical illustrations of the network.

Mike FitzGerald, **Lana Rucks**, The Rucks Group, Dayton, OH; **Emma Anne Leeburg**, EvaluATE, Kalamazoo, MI

S67

Low-Cost Thermal Evaporation System at Rough Vacuum for Lift-off and Nanotechnology Education

In this fast-paced session, we will demonstrate the construction and operation of an affordable thermal evaporation system built from off-the-shelf parts at rough vacuum (10 – 50mT). If you have a chemistry/physics department at your school, you can probably borrow many of the items or you can build a system from scratch for far less money than purchasing a turnkey system.

Tony Klejna, **Rich Hill**, SUNY Erie, Williamsville, NY

S73

Partnering with Manufacturing USA Institutes

Created to foster partnerships among industry, education, government, and other stakeholders in advanced manufacturing technology, Manufacturing USA Institutes are valuable partners for community colleges. Because technological innovation and workforce development are key objectives of the institutes, NSF ATE grantees can benefit from participating in Manufacturing USA initiatives. This session will explore several ways the Next Generation Manufacturing Center has partnered with Manufacturing USA Institutes. Attendees will learn about the institutes, how to partner with them, and the benefits of partnering.

Karen Woscyzna-Birch, **Wendy Robicheau**, Regional Center for Next Generation Manufacturing (RCNGM), Farmington, CT; **John Birch**, The Birch Group, Farmington, CT; **Eric Flynn**, Gateway Community College, New Haven, CT

S84

Teaching Internet of Things Security Using Raspberry Pi's

Ask IoT device manufactures about security and they will give you a quizzical look. That's right … very few security features are built into IoT devices. Security issues currently being discussed include security protocol standards, update and patch management, infrastructure protection, and user awareness. Recommended techniques for helping with IoT security include protecting the network where the IoT devices are connected using "tried and true" network infrastructure security such as VPNs, VLANs, RADIUS servers, and firewalls. This session will demonstrate how to use Raspberry Pi's as security appliances.

Bill Saichek, Orange Coast College, Costa Mesa, CA

S94

Enhancing Student Professional Skills and Understanding Through Interactive Virtual Laboratories

This hands-on session will present an innovative technology-rich blended learning environment for biomanufacturing education and professional skills training developed in collaboration with biopharma companies. Virtual laboratories enable students to perform authentic online experiments using digital copies of actual equipment, study pertinent theoretical subjects, and develop troubleshooting skills. Making students comfortable with equipment and process workflow and boosting their job-related understanding prior to hands-on practice dramatically enhances their performance at college labs and during on-site training. Participants will learn how to adapt virtual labs and associated resources and integrate them with their own curricula.

Bruce Van Dyke, Quincy College, Quincy, MA; **Yakov Cherner**, ATeL – Advanced Tools for e-Learning

S96

Building the Skilled Technical Workforce: A Role for Private Colleges Too?

Rapid change, disruption, and convergence present challenges and opportunities within the current and future skilled technical workforce (STW). Building the STW will require broad-based efforts that offer multiple educational pathways in close coordination with industry stakeholders. Could private colleges and universities play a role? Dordt University, a small private institution in Sioux Center, Iowa, believes that advanced technological education is part of its mission. In this session, attendees will have the opportunity to learn about and discuss Dordt's Pro-Tech initiative and how private colleges can help to meet STW needs.

Joel Sikkema, **Tim Floen**, **Dale Vos**, Dordt University, Sioux Center, IA

Thursday, July 30, 2:45–3:30

S101

The Biotechnician Assistant Credentialing Exam: A Model for Postsecondary Testing Centers

The Biotechnician Assistant Credentialing Exam (BACE) was approved in 2012 as an industry-recognized credential meeting the criteria for Florida's Career and Professional Education Act's funding list. Arizona, Arkansas, Maryland, and South Carolina added the BACE to similar lists, and another fourteen states and Brazil are piloting it. Overseen by a national advisory board, the BACE documents mastery of knowledge and skill sets valued by industry when hiring for technician-level positions. We invite you to learn how the BACE has been incorporated into Valencia College's Biotechnology Program, and the model by which credential earners serve as proctors for secondary program testing.

Susan Ingersoll, Valencia College, Orlando, FL; **Tamara Mandell**, University of Florida, Biotility, Gainesville, FL

S102

Get Creative with K-12 Outreach Strategies

With new apprenticeship opportunities embedded in two programs across six majors and three industries, Columbus State Community College takes a strategic approach to student recruitment. We engage with students and teachers in the region's K-12 schools, offering immersive events and summer camps, plus professional development for educators. By including industry partners in outreach efforts, we're combining career exploration elements with intentional curricular pathway alignment. The outcome produces strategic pipelines of students into our programs. We'll explore outreach strategies and boots-on-the-ground recruitment.

Moderator: **Karen Kyle**, Columbus State Community College, Columbus, OH. *Panelists:* **Jeremy Banta**, **Sarah Rainwater**, **Alli Dayhuff**, Columbus State Community College, Columbus, OH

S37

LASER-TEC Case Study: Building and Leveraging Supportive Industry Partnerships

Though job growth in technical fields is on the increase, finding, establishing, and leveraging industry partners is a struggle for some technical educational programs. This presentation will explore successful approaches to locating industry partners, establishing a strong win-win connection with them, and leveraging their knowledge and resources to drive the growth and continued improvement of your technical educational program. Industry partnership pitfalls to avoid and overcome will also be discussed. Strategies for building and maintaining dynamic, supportive partnerships through the Laser Program Advisers will be shared.

Gary Beasley, LaserTec, Central Carolina Community College, Lillington, NC; **Chrys Panayiotou**, LaserTec, Indian River State College, Fort Pierce, FL

S4

Win-Win-Win Community Build

It all started with an enormous gift. BASF Corporation disassembled a working distillation unit and delivered it to River Parishes Community College (RPCC). Engaging our business and industry partners in this "community build" of the Process Equipment Training (PET) Plant has developed partnerships and resources beyond our expectations. This is a value proposition. We regard our region's industry as both clients and partners in helping educate and train their future employees. We use a "begin with the end in mind" approach by asking, "What are your specific performance expectations?" Then, together, we create a solution for success in fulfilling that need. Every interaction has grown into a win-win-win benefit for our partners and RPCC.

John Sluder, River Parishes Community College, Gonzales, LA

S60

Cybersecurity Curriculum Development: Integrating Hands-on Experience and Industry Certifications

Attendees will learn tips for increasing the number of underrepresented minorities entering the cybersecurity workforce by developing the capacity to support and implement a pathway for underrepresented minority (URM), first-time in college (FTIC), and nontraditional (NT) students. The pathway provides affordable access to a state-approved one-year college credit certificate (CCC) and/or an associate in science degree in cybersecurity.

Diego Tibaquira, Miami Dade College, Miami, FL

S90

Contextualizing Math in Skilled Trades: A Collaborative Among Rural Arizona Community Colleges

A panel of CTE and math faculty from across Arizona will present their work in contextualizing math in welding, automotive, and other CTE disciplines. Each college is working to implement solutions that meet local needs and challenges. The consortium shares resources, data, approaches, and outcomes to avoid duplication of effort and improve efficiency. Models include contextualizing examples in technical math courses and embedding math credits directly into CTE courses. Attendees will be able to ask questions and gain advice from those who are currently working to solve math barriers to CTE course and degree completion.

Caroline VanIngen-Dunn, SFAz Center for STEM at Arizona State University, Scottsdale, AZ; **Jeffrey Bunkelmann**, Central Arizona College, Coolidge, AZ; **Reetika Dhawan**, Arizona Western College, Yuma, AZ; **Stephen Eaton**, Mohave Community College, Colorado City, AZ; **Bobby Alvarado**, Arizona Western College, Yuma, AZ

S92

Engaging IoT Activities

This hands-on session will give participants the opportunity to experience and discuss Internet of Things (IoT)-related activities. The session will demonstrate free classroom tools and content for students and faculty. The presenters will provide a syllabus and plan for implementation of these activities in a typical classroom.

John Sands, National Center for Systems Security and Information Assurance (CSSIA), Palos Hills, IL; **Mike Qaissaunee**, E-MATE 2.0, Brookdale Community College, Lincroft, NJ

S62

2:45-5:00pm (Extended Session) The Art of Negotiation: Self-Advocacy 101

Successful negotiation – in both one-on-one and group settings – often plays a critical role in advancing educational, career, and programmatic objectives, yet few people have training in effectively managing these interactions. This workshop will present practical and effective strategies for negotiating in the classroom, professional settings, and other environments. Topics will include identifying short- and long-term negotiation goals, key elements of a successful negotiation (e.g., negotiation styles, anchoring the zone, and handling difficult conversations and people), the importance of active listening, and appreciating different viewpoints.

Geraldine Richmond, University of Oregon, Eugene, OR; **Roger Ebbage**, Lane Community College, Eugene, OR

Thursday, July 30, 3:45–4:30

S108

Workforce for Biomanufacturing: Core Competencies and the Role of Public-Private Partnerships

The rapid advancement of cell and tissue manufacturing demands highly skilled technicians who have the requisite skills, knowledge, and abilities. This session will highlight our NSF ATE Coordination Network for Cell and Tissue Manufacturing and efforts to strengthen the national workforce infrastructure by engaging government agencies, industry partners, community-based organizations, and educators. In this session, we will review and discuss the core competencies needed to work in the industry. Which of these competencies are addressed through current educational programming and where can improvements be made? We will also discuss the role of public-private partnerships in developing this technical workforce.

Thomas Tubon, **Jeanette Mowery**, **Lisa Seidman**, InnovATEBIO National Center / Consortium for the Advanced Manufacturing of Cell and Tissue Based-Products (Coordination Network), Madison, WI

S15

Successful Scaling: Strategies for Expanding the Capacity and Impact of Your Program

The National CTC has successfully scaled two programs from limited local implementation to broad national scope: the "BILT model," which formalizes curriculum co-leadership between business and educators, and the "community of practice," in which a network of college faculty members regularly share know-how. In this case study discussion, attendees will understand how lessons learned from scaling these programs can be applied to maximize the reach and capacity of their own colleges' projects and programs while minimizing impact on staff and budget. This session will provide scaling strategies that can work with any technical discipline.

Ann Beheler, National Convergence Technology Center (CTC), Frisco, TX

S45

Enlightened Education: Implementing Solar Engineering Design to Energize School Facilities

This session will explore the potential for universities, colleges, and K-12 schools to implement solar electric infrastructure projects on their campuses that provide learning environments and instructional opportunities for students. A recent case study of a 1.85 MWdc photovoltaic system at Madison Area Technical College—the largest solar rooftop installation in the state of Wisconsin—will be presented. That system has several unique features designed to facilitate public access, provide students with hands-on interaction with the system, and compare and contrast different types of solar equipment. Madison College completed a solar roadmap to prioritize and sequence investment in solar across the multiple buildings and campus locations operated by the college. The featured installation was the first phase of that plan. A ten-step guide on how to create a solar roadmap will be shared so that other schools can learn from Madison College's experience and replicate the process.

Ken Walz, **Joel Shoemaker**, Center for Renewable Energy Advanced Technological Education (CREATE), Madison, WI

S9

Expand your Program Into Biomedical: Pathways in Medical Manufacturing and Medical Device Security

Looking for ideas for a new pathway in engineering technology? Come discuss the possibilities of expanding your existing engineering or biomedical program with new pathways in medical device repair, manufacturing, and medical device security. Participants will be provided with content such as course outlines, college credit certificate documentation, badging ideas, course activities, high school outreach activities, and instructional videos.

Brian Bell, **Lara Sharp**, St. Petersburg College, Tarpon Springs, FL

S98

Engaging Industry: Promoting Equity, Access, and Inclusivity for Increased Retention and Productivity

Recruiting, training, supervising, and retaining employees for technical jobs are critical for industry. Integration of newcomers into the workplace so that they can achieve desired performance goals and work well with others is facilitated through good mentoring and supervision. Work-based learning provides an excellent opportunity for those overseeing student interns to develop these professional mentoring skills. CCSF representatives will share their experiences in partnering with the second largest employer in San Francisco to develop a mentor training program specifically focused on promoting equity, access, and inclusivity for a more diverse workforce. Come discuss strategies for improving work-based learning outcomes for nontraditional STEM students.

Karen Leung, **James Lewis**, City College of San Francisco, San Francisco, CA

S3

What Is ABET Engineering Technology Accreditation and How Can It Benefit Two-Year Programs?

ABET accreditation is based on successfully meeting a set of assessment-driven criteria that most programs already meet. Yet, few two-year programs are ABET accredited. At times, the lack of program evaluators leads to having university professors review two-year programs. Session attendees will learn about the benefits to students and the institution and why industry is involved in ABET. This interactive session will provide information on the ABET accreditation process and how you can get involved. Topics will include definitions, what is a PEV, and how to assemble an accreditation team. The presenters are long-time ABET evaluators and ABET commissioners.

Mel Cossette, National Resource Center for Materials Technology Education (MatEd), Edmond, WA; **Thomas Singer**, Sinclair Community College, Dayton, OH

S62

2:45-5:00pm (Extended Session) The Art of Negotiation: Self-Advocacy 101 - Cont'l from 2:45

Successful negotiation – in both one-on-one and group settings – often plays a critical role in advancing educational, career, and programmatic objectives, yet few people have training in effectively managing these interactions. This workshop will present practical and effective strategies for negotiating in the classroom, professional settings, and other environments. Topics will include identifying short- and long-term negotiation goals, key elements of a successful negotiation (e.g., negotiation styles, anchoring the zone, and handling difficult conversations and people), the importance of active listening, and appreciating different viewpoints.

Geraldine Richmond, University of Oregon, Eugene, OR; **Roger Ebbage**, Lane Community College, Eugene, OR