2017 Workshops / Site Visits

Monday, July 17 – 8:30-Noon

Designing and Learning C With Arduino: Exploring the Possibilities

In this hands-on workshop, we will introduce you to the capabilities of Arduino and techniques for creating inexpensive and engaging projects while learning C and C++. Learn about a scaffolded teaching approach that is proven to improve flow and keep engagement levels high. Participants will create and investigate projects and learn how to modify programming code to obtain different behaviors from connected devices. Participants will have access to numerous handouts for use with their own projects and classrooms. This session is appropriate to all levels of experience with Arduino.

Karen Wosczyna-Birch, **Eric Flynn**, Regional Center for Next Generation Manufacturing (RCNGM), Farmington, CT; **John Birch**, MET^2, Farmington, CT; **Dorian McIntire**, **Mandy Orzechowski**, Tri-County Technical College, Pendleton, SC

Fundamentals of Optics and Photonics Workshop

Optics is an integral part of life in the 21st century. Photonics is the science and technology of light generation, control, and detection. This workshop will include an explanation of the nature and properties of light and optical system components. Hands-on activities will focus on phenomena such as polarization, refraction, reflection, absorption, diffraction, Snell's Law, and the Law of Malus. Upon completion of the workshop, attendees will have a better understanding of optics and the use of optics and photonics in everyday life.

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

Internet-of-Things New Lab Library

This workshop will provide an opportunity to experience the new IoT lab library created by CSSIA instructors, staff members, and business partners. The labs include consumer and commercial IoT products, technologies, and applications. The workshop will focus on the installation, configuration, and securing of IoT devices and systems. These labs are freely distributed by the CSSIA center. Attendees should bring their own laptops.

John Sands, **Bill Wolfe**, National Center for Systems Security and Information Assurance (CSSIA), Palos Hills, IL

Targeted Genome Editing with CRISPR: Engineering Genetic Changes in Living Systems

The science driving biotechnology innovation and discovery is rapidly changing the landscape of the world we live in and remapping the pathway forward. Our understanding of genetic sequences encoded in our DNA and the recently acquired ability to target modifications in the blueprint of all living things through CRISPR/Cas9 have opened a universe of possibilities in the biotech sector. Genome editing technology holds the key that will unlock new applications in bioenergy, agriculture, food sources, medical therapeutics, and heritable cures for genetic disease. This hands-on session will explore the science behind genome editing using C. elegans and RNA-guided gene-targeting techniques. iPad minis will be provided. Attendees should bring their own laptops.

Elaine Johnson, Next Generation National ATE Center for Biotechnology and Life Sciences (Bio-Link), San Francisco, CA; **Thomas Tubon**, Madison College, Madison, WI; **Sandra Porter**, Digital World Biology, Seattle, WA; **Leslie Blackie**, Laney Community College, Oakland, CA; **Jean Bower**, Salt Lake Community College, Salt Lake City, UT

The Role of Higher Education in Drone Technology and FAA Certification

Unmanned aerial vehicles (UAV), also known as drones, are one of the fastest-growing geospatial technologies for both private and commercial uses. UAVs have the potential to transform entire industries. In the coming years, higher education, in partnership with the Federal Aviation Administration (FAA), will play a significant role in UAV skill certification. Participants in this workshop will take away new knowledge on the specifics and value of integrating drone technology into their geographic information systems (GIS) programs.

Adam Dastrup, **Rodney Jackson**, **Vince DiNoto**, National Geospatial Technology Center of Excellence (GeoTech), Louisville, KY

Monday, July 17 – 1:00-4:30pm

Big Data Visualization and Analytics

Big data visualization and analytics is becoming a standard practice in business today. Data-driven management and decision-making are transforming the landscape of business operation. Data visualization and analytics allows organizations to interact with data to identify trends and gain valuable insights. As IoT and increasing Internet traffic create more data, the ability to understand and present data in a meaningful way will be much in demand. This workshop will provide an opportunity to develop data visualization dashboards using tools such as PowerBI and Tableau. Participants will receive instructions on downloading the required software before the workshop. Attendees should bring their own laptops.

Rajiv Malkan, Lone Star College, Conroe, TX

Critical Issues and Best Practices in Nanotechnology Education *(by invitation only)*

This workshop is a working forum produced by the Nanotechnology Applications and Career Knowledge Support Center (NACK). Participants will identify and rank the most critical challenges faced by technology educators and will learn about effective methods for responding to those challenges. The discussion will cover important issues in and future directions for nanotechnology education. The workshop will be followed by a working dinner that will be open to all interested participants. Attendees should bring their own mobile devices.

Michael Lesiecki, MATEC NetWorks National Resource Center, Phoenix, AZ; **Bob Ehrmann**, Nanotechnology Applications and Career Knowledge Network, (NACK), University Park, PA

Getting Started with the "Raspberry Pi" and Exploring Its Utility in Real-World Engineering Applications

This workshop will cover the use of an amazing little device known as the Raspberry Pi, a credit-card sized computer with incredible capabilities. Attendees will learn how to set up and configure the Raspberry Pi as a small and affordable computer and how to install and use a Linux operating system. Attendees will also learn how to network the Raspberry Pi and to program in Python while gaining hands-on experience with engineering applications such as interfacing the Raspberry Pi with sensors to collect and analyze data for research purposes and product development. The final portion of this workshop will include recommendations and a discussion on how to effectively integrate this useful device into the classroom environment.

Jonathan Ashdown, **Abraham Michelen**, Northeast Advanced Technological Education Center (NEATEC), Troy, NY**; Eric Flynn**, **Karen Wosczyna-Birch**, Regional Center for Next Generation Manufacturing (RCNGM), Farmington, CT; **John Birch**, MET^2, Farmington, CT

Improving your Cybersecurity Curriculum Through Knowledge Units

Knowledge units represent the granular elements of information needed in an information security program. This workshop explores how knowledge units can be used to create curricula for cybersecurity programs, and how instructors can share their curricular experiences through crowd-sourcing. Information on how the NSA/DHS program came to be designated a Center of Academic Excellence in Cyber Defense Education will also be presented. Participants should bring their own laptops or mobile devices.

Art Conklin, University of Houston, Houston, TX

NSF Proposal Writing and Mock Panel Review

This workshop will present an overview of NSF programs of interest to community and technical colleges and four-year institutions. The NSF Merit Review process will be presented, and a panel of principal investigators of current award recipients will discuss their experiences. Participants will review a proposal that was successfully submitted. They will compare their own ratings to those of the panelists who formally reviewed and rated the proposal. Participants will leave with all materials used in the workshop.

Celeste Carter, **Tom Higgins**, National Science Foundation (NSF), Arlington, VA

Successful Student Recruiting Strategies 2017

Enrollment in community college STEM programs depends on the colleges' ability to make prospective students aware of the programs' benefits. Simply posting information about the programs in college catalogs or on websites has not been effective. General college promotions have also shown very limited success. This session will share recruitment best practices such as the use of students as program recruiters, along with web, mobile, and other strategies for attracting potential students. Participants will lay the groundwork for their own personalized recruitment strategies and learn how to build on their current outreach efforts.

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

Tuesday, July 18 – 8:30-Noon

123 of PLCs

This workshop is for educators who are interested in integrating programmable logic controllers (PLC) into their manufacturing and engineering technology programs. PLCs represent the control and communication vehicle for industrial mechatronics systems found in many applications. Using tabletop trainers, participants will learn and practice basic PLC ladder logic programming. This hands-on experience will conclude with a short demonstration of an online PLC applications simulator and discussion of additional applications and scenarios. Attendees should bring their own laptops.

Marilyn Barger, Florida Advanced Technological Education Center for Excellence (FLATE), Tampa, FL; **Richard Gilbert**, University of South Florida, Tampa, FL; **Doug Laven**, South Central College, North Mankato, MN; **Dan Horine**, Virginia Western Community College, Roanoke, VA

BoxIT: A Proven Approach for Engaging Students in Programming and Automation

Need an engaging way to teach programming and a free tool for teaching it? Need a proven method for introducing students to industrial and commercial automation systems (a $100B per year industry)? If so, this interdisciplinary workshop is for you. We will work though the basics of block-based programming using the Sedona programming framework and learn how to employ Boolean operators, mathematical operators, and mathematical comparators to control a commercial automation system. Participants will leave with the materials, knowledge, and software necessary to deliver their own version of this workshop. *No programming experience required.* Attendees should bring their own Windows-based laptops.

Robert Nirenberg, Metropolitan Community College, Omaha, NE

Classroom Laboratory at the Edge of Space: Introducing the Mini-Cube Program

This presentation will introduce aerospace technology and STEM educators to a method for setting up a student-focused "space program" using the Mini-Cube Program. With this STEM project-based learning activity, students have the affordable and challenging opportunity to send experiments and/or technology projects via high-altitude balloon to the "edge of space" (100,000 feet, or approximately 20 miles). Attendees should bring laptops or a mobile device.

Gregory Cecil, National Resource Center for Aerospace Technical Education (SpaceTEC), Cape Canaveral, FL

Creating Micro and Nano Encapsulate for Multiple Disciplines and Applications

Nano encapsulation is finding its way into many disciplines. This workshop brings this exciting new technology to HI-TEC to teach experimental practice and critical thinking. A hands-on activity will demonstrate the physical and chemical processes of encapsulation. We will also discuss the importance of experimental design, evaluating results, modifying methods to create varying results, and researching real-world applications. Participants will create micro and macro capsules to encapsulate dye surrounded by a thin shell or absorbed within a gel. Participants will take home their own nano- and macro-assembled capsules and application ideas.

Kyle Forgette, **Deb Newberry**, Center for Nanotechnology Education (Nano-Link), Rosemount, MN

Micro Nano Technology (MNT) Special Interest Group

The Micro Nano Technology (MNT) SIG will build and foster the micro and nano technology communities across the country. It will be a venue for sharing ideas on technician education, a place to stay on the forefront of industry and workforce needs, and a forum for networking and sharing ideas on ways to strengthen and augment workforce development programs through educational partnerships with industry. Meeting will continue in the afternoon.

Michael Lesiecki, MATEC NetWorks National Resource Center (MATEC Networks), Phoenix, AZ

New, Free, Virtual Labs in IT/Security

This workshop will feature the latest virtual laboratories created in the IT/cybersecurity space. Participants will test-drive the labs and learn about alternative labs that can be used free of charge. Participants will also learn about other free IT/cybersecurity curriculum. Attendees should bring their own laptops.

Ann Beheler, National Convergence Technology Center (CTC), Frisco, TX; **Ernie Friend**, iNoVATE-X, Florida State College, Jacksonville, FL

Tours: Tuesday, July 18 – 1:00-5:00pm

Brigham Young University Research Tour

This tour will highlight five major research labs and projects at Brigham Young University: 1) the Mechanisms Research Lab (https://compliantmechanisms.byu.edu/node), which most recently has been applying the principles of origami to medical devices, furniture, and NASA solar arrays; 2) the IMMERSE lab (http://www.immerse.byu.edu/), which gives undergraduate students intensive experience with engineering research; 3) the Girls Cybersecurity Camp (http://www.heraldextra.com/news/local/education/college/byu/girls-learn-cybersecurity-concepts-through-simulations-at-byu-camp/article_45af9b88-ed88-5f8e-9c7b-a8e7a8cccf6a.html), which is hosted annually in the BYU Cybersecurity Research Lab for girls ages 14–18; 4) the MAGICC Lab (https://magicc.byu.edu/node), which is part of an NSF grant for unmanned aircraft systems (C-UAS); and 5) the BYU vehicle team Capstone project, which includes the BYU Supermileage vehicle, the Mars rover, and the SAE Baja project.

Nu Skin Enterprises Innovation Center Tour

Founded more than 30 years ago, Nu Skin Enterprises develops and distributes premium-quality anti-aging beauty and wellness products around the world. Located at its global headquarters in Provo, Utah, the Nu Skin Innovation Center is home to the company's Global Network Operations Center. Tour participants will see how the center was designed to meet the growing and complexities of Nu Skin's international business, which spans the globe. Participants will also visit Nu Skin's state-of-the-art laboratories.

Thanksgiving Point: A Gem in the Utah Desert

Thanksgiving Point's Museum of Ancient Life is home to one of the world's largest displays of mounted fossils. The museum's thousands of annual guests are drawn especially to the facility's working paleontology lab, which allows guests to see paleontology in action. The property also houses Farm Country (a working farm), a children's museum, and a 55-acre community garden. HI-TEC tour participants will visit the museum and the lab, guided by chief paleontologist Rick Hunter. Participants may also visit Farm Country and will hear from the internal IT group about how they handle Thanksgiving Point's four venues and 500+ employees.