

2019 HI-TEC Poster Sessions

Better the Planet Through Building Energy Efficiency

Learn about how Valencia College has developed Florida's first Energy Management and Controls Technology AS degree, which prepares students to become highly trained technicians operating and maintaining technologically complex, "high performance" buildings. Degree, lab, and industry partnership development; K-12, female, and veteran student community outreach; and Valencia student learning experiences in our building automation system controls lab and in student industry internships will be covered. With a focus on emerging energy research and innovations related to commercial building energy efficiency training, expect to take home a variety of ideas to implement in your community and learning institution.

Deb Hall, Valencia College, Orlando, FL

Convergence Technology Students Present New Perspectives and Share Projects

Student representatives from schools in the CTC's nationwide Convergence College Network (CCN) community of practice will provide an overview of recent research, learning projects, and career opportunities in the information communications technology space.

Mark Dempsey, National Convergence Technology Center (CTC), Frisco, TX

Bioscience Technician Expansion Project Year One

The Bioscience Technician Expansion Grant's design will assist North Central Ohio's workforce in filling a void in the biotechnology field. This area is seeing an increased demand in technician-level jobs. The grant allows students to be enrolled in evening classes while beginning their employment in the field. The grant has three main components: (1) alteration of course materials to facilitate a "one night for one class" teaching model, (2) a close relationship with our community partners in business and education to assist in identifying prospective adult students, and (3) a look toward the future and sustainability that involves targeting career center and high school student populations. The hybrid course materials, when completed, will be available to other institutions.

Justin Tickhill, Jason Tucker, North Central State College, Mansfield, OH

Results of the Bioscience Industry Fellowship Program-NSF ATE Grant #1304010

The National Center for the Biotechnology Workforce (NCBW) of Forsyth Tech has to date had approximately 55 fellows—community college or HS instructors and several veterans, representing multiple states—come to Winston-Salem, NC, to do a three-week or one-month program. Fellows participated in boot camps at three community colleges with hands-on lab experiences and shadowed workers in multiple departments at a dozen industrial/university hosting facilities with the aim and purpose of visiting many of our key NC bioscience assets and demystifying the bioscience industry. This session reports on our data and conclusions over a six-year period.

Russ Read, Forsyth Tech, Winston-Salem, NC

BETA Skills: Skills for Biomedical Emerging Technology Applications

The project (NSF ATE DUE #1800909) represents advanced technological education pertaining to “convergent technology platforms” supporting product research, development, and/or manufacturing at the interface between biomedical devices and tissue engineering. Objectives are to (1) define BETA core skills for national use by educators, researchers and employers; and (2) connect BETA competencies to the emergence of technician-specialists with a new, higher-level set of specialized core skills. The project is national in scope and involves multiple sites across the country. This session will present an update.

Russ Read, Forsyth Tech, Winston-Salem, NC

Creating Technical Scholars (CTS)

Eastern Shore Community College’s Creating Technical Scholars Project brings together local high-tech employers, school districts, and four-year institutions to create flexible career pathways beginning in high school and potentially culminating in a bachelor of applied science degree, with an emphasis on recruiting and retaining underrepresented populations.

Chevelle Mason, Eastern Shore Community College, Melfa, VA

Using Historical Sanborn Maps in GIST

Discovering the history of cities and towns by using Sanborn Fire Insurance Maps will be visualized. This poster will show historical maps and describe features on the maps (such as building materials and water sources) and how they can be used in urban planning. The process of creating vector surfaces and shapes using open-source geospatial software will be explored.

Vince DiNoto, National Geospatial Technology Center of Excellence, Jefferson Community and Technical College, Louisville, KY

Pathways to “and through” a Vacuum Technician Curriculum

Vacuum technicians fill the critical role of maintaining complex equipment used in the semiconductor, solar, and defense industries. Normandale provides one of the few vacuum technology education programs in the United States. Pathways to the program have broadened through partnerships with industry and academic institutions. A telepresence delivery model provides a pathway for students and incumbent workers around the country to take classes in real time while practicing hands-on with a Vacuum Equipment Trainer system. The initial Foundations class includes a concept inventory that helps students chart a pathway through the vacuum technology curriculum for rapid entry into the workplace.

Nancy Louwagie, Normandale Community College, Bloomington, MN

Documenting the Prevalence of Antibiotic Resistance in the Environment

Engaging Students from Classrooms and Camps to College and Advanced Technological Careers is an NSF-funded project designed to increase the STEM interest and skills attainment of underrepresented and socioeconomically disadvantaged high school students. The focus is on engaging middle and high school STEM teachers and their students using innovative activities to introduce students to careers as technicians. One of the innovative activities is the Prevalence of Antibiotic Resistance in the Environment (PARE) project, where community college students worked with regional high school students. The high school students collected soil samples, and the college students served as their laboratory technicians. They processed the samples and photographed the results. The data was analyzed by the high school students and then submitted to Tuft University's national database.

Ashely Johnson and Amanda Gregg, Northwestern Connecticut Community College, Winsted, CT

Assessing Educational Pathways for Manufacturing in NW Florida: Study Progress to Date

Building on prior research on career pathways in information technologies (IT), this NSF ATE targeted research project investigates the alignment of curriculum, employer needs, and new employee experience in advanced manufacturing (AM) and tests the usefulness of tools and processes developed to assess that alignment in rural institutions. In this session, we will share research results to date, directions for future work, and implications.

Marcia A. Mardis, Florida State University, Tallahassee, FL; **David Bouvin**, Chipola College, Marianna, FL

Deepen Learning, Maximize Investment, AND Stimulate the Local Economy? A Study of CXO Models and Business Incubators

Contractual relationships between colleges and industry utilize campus facilities and student workers to conduct industry-provided projects. AC2, an NSF ATE regional center, recently surveyed the national biotech education community to better understand how CXO models—CSOs, CROs, and CMOs (contract service, research, and manufacturing organizations) and business incubators—are being implemented and how they can be replicated to maximize infrastructure investment, deepen student learning, and stimulate local economies. Visit our poster session to learn more about these innovative partnerships and to add your experiences to our growing community of practice.

Carole Twichell, AC2, Collin College, Plano, TX; **Abbe Kesterson**, Bluegrass Community and Technical College, Lexington, KY; **Bridgette Kirkpatrick**, Collin College, Plano, TX

Working Partners Research Project: How Do YOU Initiate and Maintain Industry Partnerships?

The Working Partners Research Project collects and examines data on industry partnerships across the NSF ATE community. While investigating the most frequent challenges, implementations, and impacts associated with the eight partnership models commonly used by this group, it became evident that a need existed for information and tools to support the initiation and healthy management of these partnerships. Join us for this poster session to learn more about the suggestions we've collected for starting and sustaining these relationships and add your tips and best practices to our collection.

Mary Slowinski, Bellevue College, Bellevue, WA; **Rachael Bower**, ATE Central, Madison, WI

College-Company Collaborative Projects Provide Real-World Experience for Biotechnology Students

Research project internships performed in collaboration with local biotechnology companies provide real-world experience for community college students and generate valuable data for industry initiatives. Skills and knowledge from coursework are reinforced as students carry out collaborative research, guided by faculty and company scientists. Data generation, analysis, and reporting lead to increased communication skills, confidence, and workforce readiness. The logistics of the college-company collaboration internship model will be outlined, and research projects will be showcased and presented by students.

Maggie Bryans, Hetal Doshi, Northeast Biomufacturing Center and Collaborative (NBC2), Montgomery County Community College, Blue Bell, PA

Micro Bi-Morph Cantilever: Understanding Micro Sensors and Actuators

Come see how the bi-morph cantilever can be used to teach a wide range of STEM and technical concepts used in the rapidly emerging field of the Internet of Everything. This poster will include micro-fabrication processes, electro mechanical characterization, and how micro sensors and actuators work. Attendees will receive access to free online educational materials to take these concepts back to the classroom.

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

Incorporating Microscopy and Genomics into the Histotechnician Curriculum

The Merritt College Histotechnician Program pioneered a new approach to infusing cutting-edge technology into the established curriculum of a regulated field. Integrated curriculum pathways allowed students to receive hands-on training not only in the required histotechnology techniques, but also in the two main growth areas in the field: fluorescence microscopy and genomics. The confluence of two established programs, the Merritt Microscopy Program and the Merritt Genomics Program, with the Merritt Histotechnician Program provided a valuable opportunity to prepare multifaceted, cross-trained technicians who are qualified for a variety of career pathways in the rapidly evolving fields of biomedical research, biotech, and clinical diagnostics. We present examples of imaging projects that underscore the value of integrating related disciplines.

Candy Mintz, Bio-Link Next Generation National ATE Center for Biotechnology and Life Sciences, Merritt College, Oakland, CA

Providing High School Students with Professional and Technical Skills for Careers in STEM

Data shows that industry is seeking employees who have not only the essential technology skills for a position but also the professional skills that will make them reliable leaders in their companies. The Engineering Technology Challenge (ETC) ATE Project teaches high school students professional skills that put them ahead of peers in this category when they enter college. ETC focuses on the recruitment of underrepresented populations in STEM disciplines and the continuous review and modification of curriculum to address the needs of participants.

Mehrdad Faezi, Engineering Technology Challenge, Manchester Community College, Manchester, CT; **Karen Wosczyzna-Birch**, Regional Center for Next Generation Manufacturing (RCNGM), Farmington, CT; **John Birch**, Engineering Technology Challenge, Farmington, CT; **Eric Flynn**, Gateway Community College, New Haven, CT

Student-Developed Educational Kits for Teaching Advanced DNA Sequencing Concepts

The Support Center for Microsystems Education (SCME) produces and disseminates educational materials centered on micro electrical and mechanical systems (MEMS). A collaboration between SCME and Lone Star College (LSC) has focused on BioMEMS and their life science applications. Modern DNA sequencing platforms exemplify the rapidly evolving BioMEMS technology sector. LSC Biotechnology faculty and students are developing an educational kit that simulates first-, second-, and third-generation sequencing technologies. Moreover, LSC faculty are beta testing curriculum and student research opportunities centered on the cutting-edge Nanopore DNA sequencing platform.

Daniel Kainer, **Paola Olivo**, SCME/Lone Star College, Conroe, TX

Examining Diffusion of Innovation Through an ATE Project Case Study

As a part of the Robotics Awake ATE project, the evaluation team, working with the project team, is conducting a case study to examine the role that community colleges and their industry partners play in the diffusion of innovation. While diffusion of innovation theory's origins span multiple disciplines, Everett Rogers' book (1962) provides the guiding framework for this investigation. Through surveys of and conversations with community college representatives and industry, we examine the role that community colleges can play in helping to accelerate the adoption of new technologies (specifically, collaborative robotics).

Evelyn Brown, Robotics Awake (with Wake Technical Community College in Raleigh, NC), NC State University, Industry Expansion Solutions, Raleigh, NC. *Coauthors:* **John Dorris**, Industry Expansion Solutions, NC State University, Raleigh, NC; **Michael E. Moore**, Wake Technical Community College, Cary, NC

Promoting Active-Learning Strategies in Two-year, Hispanic-Serving Institutions Through Collaborative Professional Development for STEM Faculty and Graduate Students

Research has demonstrated that active-learning environments foster increased student success in undergraduate STEM courses. Propagation of these evidence-based teaching and learning strategies benefits from sound faculty professional development. In this project, science faculty members from two-year, Hispanic-serving institutions (2Y-HSIs) and graduate students from a research university participated jointly in professional development activities and collaborated in designing, implementing, and assessing elements of active learning in science courses offered at the 2Y-HSIs. This comprehensive professional development program commenced with a three-day workshop on course transformation via backward design and subsequent establishment of a community of practice among the participants and project leadership.

David R. Brown, Foundation for California Community Colleges, Sacramento, CA; **Stacey Brydges**, Department of Chemistry and Biochemistry, and Mathematics and Science Education, University of California, San Diego, La Jolla, CA; **Stanley M. Lo**, Department of Cell and Developmental Biology, and Mathematics and Science Education, University of California, San Diego, La Jolla, CA; **Maya E. Denton**, Department of Mechanical Engineering, University of Texas at Austin, Austin, TX; **Nicole A. Suarez, Song Wang**, Joint Program in Mathematics and Science Education, San Diego State University, San Diego, CA, and University of California, San Diego, La Jolla, CA; **Maura J. Borrego**, Department of Mechanical Engineering and Center for Engineering Education, University of Texas at Austin, Austin, TX