**The Joint Conference of the**
**108th Mississippi Valley Technology Teacher Education Conference and the**
**60th Southeastern Technology Education Conference**
Clarion Hotel, Nashville Downtown Stadium, Nashville, TN
November 17 – 18, 2022

## Thursday, November 17, 2022

**9:00 a.m.** Welcome, Introductions and Announcements
**Dr. Michael Daugherty, 8th Life Chair, MVTTEC**
**Dr. Daniel Kelly, President, STEC**

**9:30 a.m.** **SESSION I: Designing, Making and Doing**

Presiding: Dr. David Rouch, Ohio Northern University
Session Chair: Dr. Keith Besterman, Fairfax County Public Schools

**(1) Priming the design process: Activating and characterizing students' critical thinking in design**
This presentation will focus on engaging students in a primer to facilitate the design process using comparative judgement. Design is a central activity of technology and engineering education in K-12 environments, as evidenced by its inclusion in the Standards for Technological and Engineering Literacy. As an instructional innovation—Learning by Evaluating— helps support students' critical thinking and decision making in the design process.

**Presenter:** Andrew Jackson, University of Georgia and Scott Bartholomew, Brigham Young University

**(2) The Digital Storyboard Project**
The *Digital Storytelling* project is a design-based research project which sought to address the immediate need by training current and future teachers in computer science education. Over $10 million in funding was allocated in 2020 by the state of Utah to support Computer Science (CS) Education and the *Utah Computer Science Education Master Plan*. Despite this funding, the vast majority of elementary teachers are not prepared to integrate CS principles into their classes; they need adequate professional development and training.

**Presenter:** Scott Bartholomew, Brigham Young University

**(3) Think and Do: A Phenomenological Investigation into Student Motivation Toward Making and Doing**
The purpose of the study is to develop an understanding of the phenomenon of being motivated towards making and doing in the context of a T&E classroom and what aspects of a making and doing centered course engender such motivation. In the field of technology and engineering education there is a shared, anecdotal narrative related to student motivation. The narrative, summed up, alludes to the idea that some students become more motivated towards academic achievement when the focus of the course is on making and doing rather than didactically delivered content knowledge.

**Presenter:** Justin Egresitz, North Carolina State University

**(4) Making and Doing Survival Skills for Non-traditional Technology Engineering and Design Teachers**
Traditional Technology, Engineering, and Design Educator Preparation Programs (EPPs) fail to meet demands. Despite alternative paths to traditional licensure in North Carolina, there is a net shortage of teachers. When a teacher is hired, the cumulative effect of these deficits creates the likelihood of Technology, Engineering, and Design Programs being facilitated by an alternatively licensed, Beginning Teacher Candidate. This Critical Action Research Project aims to develop effective instructional strategies to support these beginning teachers within the strand of high and low-tech making and doing in Technology, Engineering, and Design Education.

**Presenters:** Steven L. Miller, North Carolina State University and Glenn R. Moore, III, New Hanover High School

**11:30 a.m.** **SESSION II: The Past and the Future of Our Conference**
**Lunch Session - (**lunch provided for members/guests**)**

Presiding: Dr. Paul Post, The Ohio State University
Session Chair: Dr. Richard Seymour, Ball State University

**(5) The Past and Future of the STEC**
Dr. Clark has spent some time researching and reviewing old conference materials from Southeastern Technology Education Conference (STEC). To recognize the 60th anniversary of STEC, Dr. Clark will present the history of Conference and the events that led to a joint conference with the Mississippi Valley Technology Teacher Education Conference (MVTTEC) and discuss a proposal to merge the two organizations for the future. He will also present videos of past STEC leaders sharing the history of STEC.

**Presenter:** Aaron Clark, North Carolina State University

**(6) Proposed Name Change for MVTTEC**
A presentation and discussion of the findings developed by the *MVTTEC Name Change Committee*. Drs. Carter and Erekson will presenting the work of the committee, results of their research, and present a proposed name change of *Mississippi Valley Technology Teacher Education Conference* to *The 1909 Conference* with the tag line of *Advancing Thought, Research, and Practice in Technology and Engineering Education*. Finally, the committee will make a recommendation to the membership.

**Presenters**: Vinson Carter, University of Arkansas; Tom Erekson, Western Illinois University

**12:50 p.m.** **Traditional Conference Group Photo**

**1:00 p.m.** **SESSION III: Digital Tools, Computational Thinking and Robotics**

Presiding: Dr. Tyler Love, Pennsylvania State University - Harrisburg
Session Chair: Dr. Tamecia Jones, North Carolina State University

**(7) From Novice to Designer: A Micro-curriculum for K12 Tech Ed Outreach**

This presentation describes a micro-curriculum and micro research project implemented with high school student interns to see how quickly educators could prepare them to participate in an undergraduate engineering design competition.

**Presenters:** Tamecia Jones, Erik Schettig, Marissa Franzen, and Stephen Miller, North Carolina State University

**(8) Is using a journal within robotics a tool to increase the self-efficacy of female students and broaden participation and appeal in STEM education?**
Throughout my thirteen years as a robotics instructor, I have witnessed robotics ignite a spark and motivate students with excitement, engagement, and motivation to excel beyond their current knowledge. Robotics education increases student performance beyond a traditional classroom by providing experience in a situated context. The engineering journal is a tool to teach the problem-solving process in an authentic, real-world context builds student knowledge and self-efficacy, individual problem-solving process, critical thinking, and computational skills

**Presenter:** Mary Muldowney Jarratt, Virginia Tech

**(9) Programing with Prisoners: The Logistics, Difficulties, Planning, and Promise of Bringing Technology and Engineering Education to Incarcerated Juveniles**
This study details a program designed to bring robotics and programming instruction to incarcerated youth. It details the process through which access to the facility was gained, the steps taken to maintain security measures, safety protocols, and the experiences of the inmates as well as the students who taught them. On any given day, there are approximately 60,000 youth incarcerated in the United States. That is 60,000 students missing family, friends, and educational opportunities. Just entering the criminal justice system sets a student back, on average, half of a school year. The educational opportunities they do have are largely self-paced/computer-based with little or no direct contact with a qualified teacher. The focus is on core, tested subjects while hands-on and project-based courses such as technology education are virtually nonexistent.

**Presenter:** Daniel Kelly, Texas Tech University

**(10) Zero to Hero: How open-source recycling turns trash into educational treasure**
This presentation will share information related to open-source recycling, curricular alignment, and the experience of a regional-comprehensive university. Recycling has come under scrutiny in recent years as the main importer of American recycling has put up a "Green Fence". As the need for plastics recycling solutions have grown, an open-source community has provided a means to promote plastics recycling in a sustainable way. By assigning value to plastic waste, and a means by which to extract that value, this organization provides schematics, equipment, and a method by which communities around the globe can benefit from collecting, sorting, cleaning, and processing plastic waste.

**Presenters:** Dominick Manusos, Millersville University and Kevin Sutton, Appalachian State University

**3:00 p.m.** **SESSION IV: STEM Tools and Practices**

Presiding: Dr. Josh Brown, Illinois State University
Session Chair: Dr. Richard Miller, Ohio Northern University

**(11) Using Crew Resource Management (CRM) and other aviation safety practices to improve lab/shop safety for Technology Education.**
This study will examine the safety programs pioneered by the airlines and will demonstrate how such programs can be applied to the Technology education lab/shop environment to improve the safety and the safety culture of the learning environment. The main areas of focus will be crew resource management, situational awareness, open discourse, ASRS (Aviation Safety Reporting System), and LOSA (Line Operation Safety Audit).

**Presenter:** Michael Walach, University of Montana

**(12) Active Learning in a Hybrid Professional Development Program - A Proposed Study**
Technology and engineering teachers are expected to integrate high-quality and current STEM tools and practices into curricula to provide early effective experiences for students. Even with such an expectation, a number of teachers lack opportunities to improve content knowledge, increase self-efficacy, practice spatial visualization skills, and experience student-centered problem-solving challenges resulting in lower-quality STEM experiences for students. Engaging teachers through professional development to enhance elements of STEM success can lead to instilling students with highly demanded technological and engineering literacy.

**Presenter:** Erik J. Schettig, North Carolina State University

**4:00 p.m.** **SESSION V: MVTTEC Business Meeting**
Presiding: Dr. Michael Daugherty, 8th Life Chair, MVTTEC

1. Report of the Membership Committee
    a. Dr. Vinson Carter, University of Arkansas
2. Consideration of nominations for membership
3. Status of the collaboration
4. Report from the Name Change Committee
5. Logo Contest
6. Outstanding Presentation Award
7. MVTTEC Benefactors
8. Other Business

**5:00 p.m.** **STEC Business Meeting**
Presiding: Dr. Daniel Kelly, President, STEC

1. Report of the Membership Committee
2. Consideration of nominations for membership
3. Other Business

# Friday, November 18, 2022

**8:30 a.m.** **Installation of New MVTTEC Members**

Master of Induction Ceremony: Dr. Aaron Clark, North Carolina State University

**9:00 a.m.** **SESSION VI: Virtual, Hybrid and Online: Lessons Learned**

Presiding: Dr. Andy Klenke, Pittsburg State University
Session Chair: Dr. Kevin Sutton, Appalachian State University

**(13) Using Targeted Online Learner Analytics to Enhance Design-Based Learning**
This study will provide insight into an innovative project developed to provide teachers with valuable data on their students' online learning experiences. In today's post-COVID-19 world, students still experience a significant portion of their learning online. Many projects and design-based learning units require students to research concepts that will assist them with their prototypes. With Chromebooks and laptops at many students' fingertips, teachers are responsible for ensuring students are equipped with research and media literacy skills to verify the students are getting useful and factual information. Targeted Online Learner Analytics (TOLA) is one tool teachers can use to capture the reality of students' research practices and subsequently inform their instructional practices on research.

**Presenter:** Jessica Sain, Virginia Tech

**(14) The Realities of Elementary Design-Based Learning in the Virtual Shift**
This presentation will provide an overview of research conducted during the pandemic to be published in the Fall edition of the Journal of STEM Education: Innovations and Research. The timely study examined the effect of the COVID-19 pandemic on elementary teacher self-efficacy with design-based learning in either blended or online settings. In addition to looking at the status of design-based learning in elementary settings, this study also identified what resources and support elementary teachers need to administer design-based learning in an environment other than the traditional in-person setting. This qualitative study included semi-structured interviews with a sample of four elementary STEM teachers in rural and suburban school settings with a large range of experience in STEM education. The findings of the research revealed a dip, or temporary decrease in all four teachers' self-efficacy in design-based learning at the beginning of the virtual shift elicited by the COVID-19 pandemic.

**Presenters:** Jessica Sain, Virginia Tech; Bradley Bowen, Virginia Tech

**(15) What we confirmed about teaching CTE online in rural schools: The case of the NIMM Project**
This study examined the outcome of the NSF ATE Northwest Intermountain Metal Manufacturing (NIMM) project in North Central Idaho and Southeast Washington. Twenty-two school districts participated over a period of three years. These schools struggle to provide access to CTE programs due to geographic challenges, limited school resources, insufficient population density, and lack of CTE teachers. Within the larger context of the growing manufacturing industry in the region, and the lack of students with entry-level manufacturing skills to gain employment in these industries, it becomes necessary to implement two introductory manufacturing programs, Mechanical CADD technician and Electro-mechanical technician.

**Presenters:** Raymond A. Dixon, University of Idaho; Dr. Farjahan Shawon, Carolina University

**(16) The Value of Early Field Experiences in Teacher Preparation**
This study examines the relationship between a preservice teacher's early field experiences and their ratings given by their cooperating teachers during student teaching. Educator preparation programs have long been tasked with providing a quality education to future teachers as they prepare them for the P-12 classroom. Part of this preparation happens in the field, in P-12 classrooms, where preservice teachers observe and interact with student and professional teachers in a setting similar to their future classroom. These early field experiences, which help prepare them to first student teach, then to teach as a profession, are a required part of educator preparation program accreditation. This research will investigate how changes in the educational environment related to the Covid-19 pandemic closure of schools created opportunities to assess the effectiveness of early field experiences.

**Presenter:** Byron McKay, Pittsburg State University

**11:30** **SESSION VII: Graduate Student Research Poster Session**

Presiding: Dr. Todd Kelley, Purdue University
Session Chair: Dr. Vinson Carter, University of Arkansas

**Graduate Student Research Poster Session**
This is a research poster session for graduate students. It is designed to allow graduate students to share completed research and research in progress in a low-pressure environment. Participants will display posters and discuss the research with conference members and guests.

- ABC's of Integrated STEM Education. Leah Cheek, University of Arkansas
- Partnering Together for the Future: Industry-Connected STEM Outreach. Jennifer Blackburn, Purdue University
- Design & Innovation Education: What can we do to Influence Transdisciplinary Undergraduate Learning? Rebecca Martinez, Purdue University
- Transforming High School Around Industry-driven Design Challenges and Its Influence on Learning. Deana Lucas, Purdue University

**12:30 p.m.** **SESSION VIII: ITEEA update and Future of the JTE**
**Lunch Session - (**lunch provided for MVTTEC/STEC members/guests**)**

Presiding: Dr. Bradley Bowen

**Update from the ITEEA**
ITEEA new member benefits, changes to 2023 ITEEA conference programming, and new grant projects will be highlighted.

**Presenter:** Kelly Dooley, ITEEA

**The Future of the Journal of Technology Education**
The CTETE committee of ITEEA has an ongoing discussion related to the future of the *Journal of Technology Education*. At the last executive meeting, the Committee decided to bring their discussion to the key people that should be contributing to that conversation at the MVTTEC/STEC Conference. As a member of that Committee, Dr. Shumway will lead a discussion during this structured environment.

**Presenter:** Steven Shumway, CTETE President, Brigham Young University

**1:30 p.m.** **SESSION IX: STEM in Differing Economic/Cultural Environments**

Presiding: Dr. Paul Camick, Georgia Department of Education
Session Chair: Dr. Geoff Wright, Brigham Young University

**(17) Mutually Beneficial School-Industry Partnerships: Comparing in Urban, Suburban and Rural Settings**
STEM industry partners should play a major role in improving the K-12 student experience. Industry engagement with schools takes on a variety of forms like providing career day speakers, philanthropic giving, or student mentoring. A key challenge in this work, however, is creating *mutually beneficial partnerships* which meet the needs of both school and industry partners. This research asked two questions: (1) What systems enable students to experience mutually beneficial STEM industry partnerships? (2) How do those systems vary across educational settings (urban, rural, and suburban)? This research study presents three cases selected because they have mutually beneficial, STEM-Industry partnerships in distinct settings.

**Presenter:** Anthony M. Perry, Massachusetts Institute of Technology

**(18) Integrating STEM Education through Place-Based Education to reach under represented populations living in rural United States: TRAILS 2.0**
TRAILS 2.0 was funded for scale-up of TRAILS. The new TRAILS 2.0 project will address the needs of diverse populations in rural school settings. TRAILS is seeking to help underserved, underrepresented students living in rural America. Public schools in rural settings serve one-third of all students in American (Williams, 2010; U.S. Department of Education, 2010-2011). However, little attention is given to prepare these youth for careers in STEM education and to a lack in programs to improve rural science education (Avery, 2013).

**Presenters:** J. Geoff Knowles, Bryan College; Jung Han, Purdue University; Todd Kelley, Purdue University

**(19) Does Technology Enhance Rural High School Students' STEM Motivation? A Multilevel Modeling Analysis**
This study investigated if gender, classroom subject, and classroom technology use influence on students' attitudes toward STEM. The study was conducted in the context of an integrated STEM project, TRAILS, and a total of 597 high school science students and engineering technology education (ETE) students participated. Multilevel modeling was used to analyze student-level (gender) and classroom-level (subject, degree of teacher perception of technology use in the classrooms) predictors. The results show that male students showed a higher level of STEM attitudes than female students, which is in accordance with the gender discrepancy in STEM careers and academic higher degrees documented in the previous literature.

**Presenters:** Jung Han, Purdue University; Todd Kelley, Purdue University; J. Geoff Knowles, Bryan College

**3:30 p.m.** **Joint Conference Business Discussion**

**4:00 p.m.** **Conference Awards Program**

Presiding: Dr. Michael Daugherty, 8th Life Chair

Session Chair: Dr. Kevin Howell, Epsilon Pi Tau

During this session, members and guests will vote to select the *Epsilon Pi Tau Outstanding Conference Presentation Award* recipient and that award will be presented by *Epsilon Pi Tau*. Following this presentation, the *Technical Foundation of America* will present the *Outstanding Publication Award*—which was determined prior to the start of the conference.

**4:30 p.m. Report from the Conference Pollution Committee**

Presiding: Dr. Kevin Sutton, Appalachian State University

Although not officially connected to the STEC Pollution Committee, Dr. Sutton will share the infractions from the 2022 joint meeting of the MVTTEC and STEC. All members and guests should remember that you can and will be fined for attempting to ascertain the names of members of the Pollution Committee.

**4:50 p.m. Conference Adjournment**

Presiding: Dr. Michael Daugherty, 8th Life Chair, MVTTEC
Dr. Bradley Bowen, Incoming President, STEC