112th Meeting of the 1909 Conference: Advancing Thought, Research, and Practice in Technology and Engineering Education
Pear Tree Inn, St. Louis, MO

Thursday, November 12, 2026

9:00 a.m. Welcome, Introductions and Announcements

Aaron Clark, 9th Life Chair, 1909 Conference
Kevin Sutton, Program Chair, 1909 Conference

9:30 a.m. **SESSION I: Special Session: Computer Science and Standards**

Presiding: Kevin Sutton, Appalachian State University

1. **The Road to Tech Careers for Women: A Mixed Methods Research Project Identifying the Motivators and Obstacles for Women Entering the Field from Non-Technical Careers**

   This study addresses long-standing gender gaps in technology representation, advancement, and retention by examining how the rapid diffusion of artificial intelligence (AI) creates prioritized career pivot opportunities for women transitioning from non-technical fields such as education, healthcare, and administration. Grounded in the Kaleidoscope Career Model (KCM) and Grand Career Theory (GCT), the research utilizes a mixed-methods survey of alumni from a women-focused tech workforce re-entry program to evaluate career motivators (including job flexibility, salary potential, and mentorship) alongside systemic barriers. The findings demonstrate that female mentors and peer support networks serve as critical career enablers while limited role models and systemic biases remain key obstacles, offering higher education leaders and industry partners concrete guidance to refine recruitment strategies, training programs, and workplace retention policies.

   Presenter: Geoffrey Wright, Brigham Young University

2. **Follow-Up Study: Technology-Enabled Multidisciplinary Emergency Management Education and Training Using Virtual Reality and Artificial Intelligence**

   This study addresses the need for safe, scalable, and repeatable training environments to build student proficiency across the four core emergency management functions (mitigation, preparedness, response, and recovery) without the logistical and financial constraints of live disaster exercises. Building on initial outcomes, the Community Response Enhancing Education on Disaster (CREED) project expands higher education instruction by integrating Virtual Reality (VR) immersive simulations and Artificial Intelligence (AI) adaptive scenarios for students in Emergency Management and Technology, Journalism and Media Studies, Computer Science, and Health Policy and Management. The follow-up research establishes a scalable experiential learning model with particular potential for Historically Black Colleges and Universities (HBCUs) that strengthens student critical thinking, decision-making under uncertainty, and workforce readiness across high-demand science, technology, engineering, and math (STEM) career pathways.

   Presenters: Jessica Murphy and Marlisa Scott, Jackson State University

3. **Computers and Technology Education - A Systematic Literature Review of Computer Science Education in Technology and Engineering Education Literature**

   This systematic literature review addresses the need to ground technology and engineering education (TEE) in relevant computer science (CS) concepts by examining how the TEE discipline currently operationalizes computing skillsets across its research and practice. Through a content analysis of peer-reviewed articles across three prominent TEE journals, the study evaluates alignment with established computer science education frameworks defined by the Association for Computing Machinery (ACM), the Institute of Electrical and Electronics Engineers (IEEE), and the Association for the Advancement of Artificial Intelligence (AAAI). The findings capture operational trends in CS integration within the discipline, equipping researchers and educators with actionable insights to modernize legacy curricula, improve technical workflows, and advance pedagogical strategies.

   Presenters: Joseph Kaskel, Daniel Kelly and Michael Johnson, North Carolina State University

4. **Enhancing Integrated STEM Learning Through Place-Based Role Models Within Communities of Practice**

   This study addresses the gap in understanding how educators can intentionally integrate local professionals into instruction by examining the specific attributes that make science, technology, engineering, and math (STEM) role models effective in place-based learning environments. Grounded in the National Science Foundation (NSF) funded Purdue Teachers and Researchers Advancing Integrated Lessons in STEM (TRAILS) 2.0 project, the research conducted a qualitative constant comparative analysis of interviews with educators and industry professionals across regional cohorts in Maryland, Colorado, and Hawai‘i. The resulting ROLE Model Framework demonstrates that high-quality role models extend beyond routine career exposure by modeling authentic practices, connecting curriculum to local community challenges, and helping students envision themselves in STEM pathways.

   Presenter: Brent Farrell, Purdue University

5. **Defining Artificial Intelligence and Generative Artificial Intelligence in Education**

   This conceptual paper addresses the blurring of critical distinctions between artificial intelligence (AI) and generative artificial intelligence (GenAI) in educational contexts, where distinct computational mechanisms such as predictive decision tools and content generation systems are frequently conflated. Drawing on technical, instructional, sociotechnical, and ethical perspectives, the authors trace technological developments from symbolic approaches to foundation models and propose an integrated framework structured around five core dimensions: capability, purpose, responsibility, context, and evidence. The study establishes precise operational boundaries distinguishing general educational AI from multimodal GenAI applications, equipping researchers, educators, and policymakers with a clear foundation to evaluate pedagogical interventions, govern ethical risks, and guide evidence-based decisions for technology-supported learning.

   Presenters: Niloufar Bayati, North Carolina State University

11:30 a.m. - 1:30pm Working Lunch and Business Meeting

1909 Conference Business Meeting

Presiding: Aaron Clark, North Carolina State University

1. Update on Reorganization Process
2. Conference Update

3. Membership Update
4. Report from Working Committees
    a. Name change
    b. Bylaws for operation
    c. Positions within the organization
    d. Membership review
5. Finance Update
6. New Business
    a. EPT official sponsorship, Kevin Howell
    b. Future papers at conference
    c. Consideration for new dates starting 2027

1:30 p.m. **SESSION II: Graduate Student Mini Presentation Session**

Presiding: Daniel Kelly, North Carolina State University

6. Thinking Through CAD: A Think-Aloud Investigation of Design Intent in Solid Modeling

This study addresses the inconsistent definition and application of design intent in engineering graphics literature, targeting the need to align computer-aided design (CAD) instruction with the decision-making processes students will use as future professionals. The research employs a concurrent, retrospective, and modified think-aloud approach with novice engineering graphics students modeling in SolidWorks to examine their cognitive reasoning and decision-making patterns directly. The resulting findings establish an empirical basis for CAD instructional practices that support students in developing deliberate and effective modeling practices.

Presenter: Samuel Munzer, North Carolina State University

7. Defining College Engineering Readiness: A Delphi Study Aligning Secondary CTE Education with Postsecondary Expectations

This study addresses high first-year collegiate attrition resulting from misaligned readiness expectations between secondary Career and Technical Education (CTE) programs (which emphasize applied problem-solving, design, and collaboration) and postsecondary engineering coursework that demands greater mathematical rigor, theoretical understanding, and analytical reasoning. Guided by Social Cognitive Career Theory (SCCT), the research utilizes a Delphi methodology with an expert panel of postsecondary engineering faculty and academic advisors to achieve consensus on the knowledge, skills, dispositions, and understandings required for collegiate study. The resulting multidimensional framework establishes clear indicators across academic capacity, conceptual accuracy, and psychosocial adaptability, providing secondary educators and postsecondary programs with an explicit reference point for curricular alignment and student transition.

Presenter: Adam Barlow, Utah State University

8. The Inclusion of Sewing and Textiles in Technology Education

This presentation addresses the traditional exclusion of sewing and textiles from technology and engineering education (TEE), where these subjects are frequently relegated to home economics and family and consumer sciences and subjected to stereotype threat, despite their technical relevance. The session lays out a justification for the inclusion of these topics in the field of TEE by comparing sewing and textiles to traditional TEE topics and aligning

them directly with the Standards for Technological and Engineering Literacy (STEL). The presentation delivers actionable pedagogical strategies for educators to effectively integrate sewing and textile technologies into standard TEE classroom instruction.

Presenter: Lauren Myers, North Carolina State University

9. **Hip-Hop-Inspired Instruction: A Culturally Responsive Curriculum Design for Increasing STEM and STEAM Engagement in High School CTE Classrooms**

   This presentation addresses persistent challenges of student disengagement and underrepresentation in STEM and STEAM pathways within high school Career and Technical Education (CTE) and Project Lead The Way (PLTW) classrooms serving underserved and economically disadvantaged communities. The session introduces a Hip-Hop-Inspired Instruction (HHII) curriculum design that connects engineering principles, design thinking, and digital technologies with culturally relevant elements of Hip-Hop culture through project-based learning without replacing required technical standards. The presentation delivers a practical framework for incorporating HHII into existing CTE and PLTW courses, complete with adaptable project examples and culturally responsive strategies to strengthen student engagement, elevate STEM/STEAM identity, and expand technical career awareness.

   Presenter: Gregory Corbett, North Carolina State University

10. **When History is Distorted: STEM Identity and the Professionals Who Persisted**

    This presentation addresses how science, technology, engineering, and math (STEM) curricula that routinely distort, minimize, or confine Black contributors damage Black students' STEM identity, shape peer and advisor perceptions of institutional fit, and create systemic barriers to long-term persistence. Drawing on a phenomenological case study of Black STEM professionals, the session examines how early curricular distortion impacted participants' sense of belonging and compares how attending a Historically Black College or University (HBCU) versus a predominantly white institution influenced the restoration of that identity. The findings reveal what enables persistence in fields where belonging is not assumed, offering concrete guidance for educators, advisors, and academic institutions to transform institutional culture by making representation central to student support.

    Presenter: Ayanna Bailey, North Carolina State University

11. **From Static to Social: A Replication Study of First-Time Makerspace Engagement**

    This research addresses the need to understand how spatial design features interact with live social dynamics in academic makerspaces, expanding prior study on empty facilities to determine whether spatial engagement strategies function universally or depend on specific institutional environments. Replicating the photovoice methodology from Melo's (2025) study, "From Virtual to Physical: Testing Design Features for First-Time User Engagement in Makerspaces", in a dynamic setting with active makers present, the research applies Bandura's Social Learning Theory (specifically the concept of modeling) by having first-time users document with cameras how the built environment and peer interactions shape their willingness to participate. The study demonstrates how a makerspace's architecture highlights or hides active peer modeling, equipping educators with practical strategies to help first-time users overcome participation thresholds and become active makers.

    Presenter: Kevin Thies, North Carolina State University

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3:45 p.m. **Presentation of Outstanding Publication Award**

Following the graduate student presentation session, the *Technical Foundation of America* will present the *Outstanding Publication Award*—which was determined prior to the start of the conference.

3:45 p.m. **Traditional 1909 Conference Group Photo**

Friday, November 13, 2026

9:00 a.m. **Installation of New 1909 Conference Members**

Master of Induction Ceremony: Jeremy Ernst, Embry-Riddle Aeronautical University

9:30 a.m. **SESSION III: Expanding the Boundaries of T&EE: Contextual Pedagogy, Teacher Readiness, and Systemic Pathways**

Presiding: Leah Cheek, University of Arkansas

12. Jailhouse Pedagogy

This presentation addresses the experience of bringing undergraduate students into secure facilities to teach programming and robotics to youth incarcerated for a crime or awaiting trial and adjudication. Describing a three-year outreach initiative, the authors examine the perceptions and perspectives of these college mentors, featuring first-hand accounts from an undergraduate participant who transitioned onto the research team. The session demonstrates how serving in a secure facility shapes undergraduate mentor perspectives, equipping educators with actionable insights to design community-focused field placements and programming and robotics mentoring initiatives.

Presenters: Daniel Kelly and Lauren Myers, North Carolina State University

13. When Place Becomes Practice: Teacher Enactment of Integrated STEM in Rural Schools

This qualitative multiple-case study addresses how rural science, technology, engineering, and math (STEM) education can move beyond deficit-oriented accounts by examining how educators navigate the challenge of translating locally available resources and expertise into active classroom instruction. Grounded in integrated STEM, place-based learning, and situated learning perspectives, the research analyzes interviews, unit plans, and student artifacts from three rural secondary school teachers in Colorado following their participation in place-based integrated STEM professional development (PD). The findings demonstrate that teacher enactment drives how local knowledge and external expertise are embedded into authentic activities, revealing that resource usability depends on school conditions, activity requirements, and access within communities of practice.

Presenters: Woongbin Park and Todd Kelley, Purdue University

14. Essential Technical/Lab Knowledge and Skills Needed by New Alternatively Certified Technology and Engineering Education Teachers to Effectively Teach in a Laboratory Rich Pre-K 12 Environment: Report of a Consensus Study

This study addresses the challenge of evaluating and preparing alternatively certified technology and engineering education (TEE) teachers who enter lab-rich PreK-12 classrooms from diverse, non-traditional backgrounds without standardized laboratory expertise. Applying the Delphi Technique with the goal of reaching consensus, an expert panel of outstanding engineering and technology teachers identified essential technical knowledge and lab skills, rating each requirement as essential, need-to-know, or nice to know and crosstabulating results by educational level. The resulting framework enables states, school districts, and local administrators to systematically assess new hires and design effective in-service upskilling programs.

Presenter: Thomas Erekson, Western Illinois University

15. Why We Make: A Qualitative Comparison of Student Motivation Toward Making and Doing Across Age Groups

This study investigates high school student motivation toward making and doing to address the need for learner-centered curriculum design that strengthens student engagement and advances technological literacy in technology and engineering education (T&E). Applying a hermeneutic phenomenological methodology through a two-interview set, the authors examine the lived experiences of high school students enrolled in courses taught within a woodworking curriculum in the Northeastern United States and compare structural and textural findings with earlier collegiate and Southeastern regional study data. By gaining an understanding of student motivation across age groups, the study enables T&E professionals to enhance existing secondary or collegiate curricula and develop innovative instruction centered on the motivational features of their courses.

Presenters: Justin Egresitz, Central York School District and Madison Hansen, Millersville University

16. Reimagining Higher Education Through Strategic Affiliation: Building on Institutional Strengths

This analysis addresses persistent higher education challenges surrounding demographic shifts, workforce shortages, enrollment pressures, and regional economic alignment by examining a strategic affiliation between Fort Hays State University, Northwest Kansas Technical College, and North Central Kansas Technical College. Utilizing institutional planning documents, implementation materials, communications, and program-development records, the authors evaluate how cross-institutional collaboration establishes articulated pathways, reverse-transfer options, and shared curriculum across certificate, associate, and bachelor's degree programs. The study demonstrates how strategic organizational integration moves beyond standard transfer practices to reduce curricular barriers, align technical and university education, and expand educational access and regional workforce development while preserving distinct institutional missions.

Presenters: Eric Deneault, Craig Malsam, Randall Jordan, and Kim Stewart, Fort Hays State University

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11:30 **Lunch and Guest Speaker, Partnerships and 21st Century Leadership Academy**

12:30 p.m. **SESSION V: Modernizing T&EE Frameworks: Emerging Technologies, Design Paradigms, and Instructional Tools**

Presiding: Jeremy Ernst, Embry-Riddle Aeronautical University

17. AI as a Think Partner in Elementary Engineering Education

This paper addresses the underrepresentation of engineering in elementary science, technology, engineering, and math (STEM) instruction, where educators frequently feel more comfortable teaching literacy than facilitating open-ended design challenges. The authors explore artificial intelligence (AI) functioning as a collaborative think partner and cognitive scaffold, assisting teachers in developing authentic interdisciplinary challenges while guiding students through brainstorming, questioning, reflection, and iterative thinking. Examining the emerging role of AI-enhanced engineering design as a model for interdisciplinary elementary STEM instruction, the paper demonstrates how this approach supports more reflective, creative, and collaborative learning environments in K–6 classrooms.

Presenters: Vinson Carter, Leah Cheek and Jessica Meacham, University of Arkansas

18. Preparing the Manufacturing Workforce for the Industry 4.0 Transition

This presentation addresses the skills gaps and technical challenges created by the rapid integration of Industry 4.0 technologies, including robotics, automation, artificial intelligence (AI), the Internet of Things (IoT), and cyber-physical systems, into modern manufacturing. The author examines changing educational requirements for technicians, engineers, and production managers, evaluating how higher education institutions and industry partnerships can deliver interdisciplinary preparation through curriculum development, experiential learning, and industry-sponsored projects. The discussion emphasizes that preparing for Industry 4.0 requires developing human capital alongside technological adoption, equipping manufacturers and educators to align training initiatives with emerging industry needs and build an adaptable workforce.

Presenter: Jeremy Agozzino, Ohio Northern University

19. The Role of Engineering Notebooks in Technology and Engineering Education: A Narrative Literature Review Work-in-Progress

This narrative literature review work-in-progress addresses the lack of synthesized research on how engineering notebooks are applied in technology and engineering (T&E) and science, technology, engineering, and math (STEM) classrooms, where they serve as artifacts of design discourse and performance-based assessment. The authors analyze peer-reviewed literature published between 2016 and 2026 through an extraction matrix and thematic analysis to evaluate reported results, implementation challenges, distinct notebook formats, and best practices across K-12 settings. The resulting synthesis provides T&E teacher educators and researchers with a research-informed foundation for integrating engineering notebooks into instruction while identifying critical literature gaps to guide future STEM education research.

Presenters: Erik Schettig and Marissa Franzen, North Carolina State University

20. Engineering Design Prototyping - A New Paradigm?

This presentation addresses the internal confusion and external degradation surrounding the identity and purpose of technology, engineering, and design education (TED), where non-subject-matter experts frequently reduce the discipline to imprecise making and doing activities. To establish disciplinary precision, the author proposes the EDP*2 paradigm, which combines the established engineering design process (EDP) with the newly named Big Five of Engineering Design Prototyping. The resulting framework provides educators with a clear operational identity that distinguishes formal disciplinary instruction from informal maker movement activities while strengthening the long-term direction of the field.

Presenter: Steven Miller, North Carolina State University

2:15 p.m. **Report from the Conference Pollution Committee**

Presiding: **Kevin Sutton**, Appalachian State University

Although not officially connected to the Pollution Committee, Dr. Sutton will share the infractions from the 2026 - 1909 Conference. 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.

Conference Awards Program

Presiding: **Aaron Clark**, North Carolina State University
Kevin Howell, Executive Director, 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*.

Conference Adjournment

Presiding: **Aaron Clark,** 9th Life Chair, 1909 Conference