

**2026 Mid-Atlantic Regional Conference
of the
Association for Science Teacher Education
October 9-10, 2026**

(with preconference event, evening of Oct. 8)



**Canaan Valley Resort State Park
Davis, West Virginia**

Conference Overview

16 oral presentations, 7 posters, and 4 experiential sessions

(Paper presentation sessions are 20 minutes, 15 minutes for presenting & 5 additional minutes for questions; poster session is 45 minutes; and the experiential sessions are 45 minutes each; all papers and poster sessions will be in the TBD)

Thursday, October 8

(Optional Pre-Conference Experience)

8:30-10:00 pm	Evening Stargazing	Resort Lobby
6:00 – 8:00 pm	Registration Desk Open <i>Volunteers:</i>	Lobby

Friday, October 9

7:00 – 8:15 am	Registration Desk Open <i>Volunteers:</i>	Hawthorne/Birch
7:00 – 8:15 am	Breakfast	Hickory
8:20 – 8:30 am	Welcome & Introductions	Hawthorne/Birch
8:30 – 9:50 am	Paper Presentation Session 1 <i>Moderator:</i>	Hawthorne/Birch
10-minute break		
10:00 – 10:45 am	Experiential Session 1	Hawthorne/Birch
10-minute break		
10:55 – 12:15 pm	Paper Presentation Session 2 <i>Moderator:</i>	Hawthorne/Birch
12:15 – 1:15 pm	Lunch <i>(Poster Session 1 Set-up)</i>	Hickory
1:15 – 2:00 pm	Poster Session	Hawthorne/Birch
10-minute break		
2:10 – 3:30 pm	Paper Presentation Session 3 <i>Moderator:</i>	Hawthorne/Birch

<i>10-minute break</i>		
3:40 – 4:25 pm	Experiential Session 2	Hawthorne/Birch
<i>Adjourn</i>		
6:00 – 7:30 pm	Dinner	Hickory
7:30 – 10:00 pm	Social	Cabins

Saturday, October 10

7:00 – 8:15 am	Registration Desk Open	
7:00 – 8:15 am	Breakfast	Hickory
8:30 -- 9:15 am	Experiential Session 3	Hawthorne/Birch
9:15am – 10:35 am	Paper Presentation Session 4 <i>Moderator:</i>	Hawthorne/Birch
<i>10-minute Break</i>		
10:45 – 11:30 am	Business Meeting	Hawthorne/Birch

(Optional Post-Conference Experience)

1:00 – 3:00 pm	Field Trip- Natural History of Canaan Valley	Meet in Lobby
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Friday, October 9th

Paper Presentation Session 1: *Current Research & Issues in STEM Education*

1. The Impact of Mentoring Experiences on Program Completion and Career Expectations Among Graduate STEM Students

Margaret Blanchard (North Carolina State University) & Ana-Maria Topliceanu (Augusta University)

2. From Mandates to Practice: Why Engineering Integration Falls Short

Kristie Gutierrez (Old Dominion), Pilar Pazos (Old Dominion University), Danielle Rhemer (Old Dominion University), Jennifer Kidd (Old Dominion University), Walt Heinecke (University of Virginia), Stacie Ringleb (Old Dominion University), Krishnanand Kaipa (Old Dominion University) & Orlando Ayala (Old Dominion University)

3. Workforce integrated STEM: Lessons learned from year one TCHIP Fellows

Christine Hirst Bernhardt (NOVA SySTEMic) & Elizabeth Edmondson (Virginia Commonwealth University)

4. Developing and piloting a research framework for a Noyce RESS program

Stephanie Philipp (University of Tennessee - Chattanooga) & Raga Ahmed (University of Tennessee at Chattanooga)

Experiential Session 1

The epidemic that didn't have to happen: Learning from Indigenous Science Knowledge in teacher education

Lenora Crabtree (University of North Carolina Charlotte), Debbie French (Wake Forest University)

Paper Presentation Session 2: *Exploring Elementary Curriculum*

1. From Isolation to Inquiry: Designing Online Science Methods Courses to Model SEPs and Boost Teacher Confidence

Debbie French (Wake Forest University) & Brad Rhew, Guilford County Schools

2. Investigating learning about the ethical treatment of animals in elementary science methods

Mark Enfield, Elon University

3. Using Generative AI to Plan Elementary 5E lessons

Leslie Bradbury (Appalachian State University); Rachel Wilson (Appalachian State University), YeJun Bae (Appalachian State University), Vicente Handa (Appalachian State University) & Rachel Askew (Appalachian State University)

4. *Exploring How Children Use Their Everyday Thinking to Construct Scientific Explanations of the Natural World*

Ashley N. Kookan (Glenville State University)

Poster Session

- 1. Navigating Graduate STEM Education: Student Perspectives on Mentoring, Peer, and Departmental Support**
Ana-Maria Topliceanu (Augusta University), Karen M. Collier (Augusta University)
- 2. Perceptions regarding burnout and self-efficacy in early career science teachers and their mentors**
Robbie Higdon (James Madison University), Angela Webb (James Madison University)
- 3. Learning by Leading: An On-Campus Science Field Trip as an Approximation of Practice**
Lillian Bentley (William and Mary) & Alexis Rutt (James Madison University)
- 4. Small Scale, Big Solutions: Exploring Size, Soil, and Sound Through Nanoscience**
Endiga Holdness (North Carolina State University)
- 5. Promoting Elementary Teacher Instruction of Earth and Space Science Through ELA**
Josh Revels (Fairmont State University), Deb Hemler (Fairmont State University), Angela McKeen (Fairmont State University) & Marcie Raol (Fairmont State University)
- 6. Computational Thinking Across the Elementary Curriculum: Science and Beyond**
Melanie Blanton (Radford University)
- 7. The Perception of STEM Transfer Students in University Research Laboratories**
Toluwalase Salako (North Carolina State University) & Margaret Blanchard (North Carolina State University)
- 8. Developing the Ecological Systems Implementer Survey**
Bradley Lanier (University of Cincinnati)

Paper Presentation Session 3: *Collaborations in Science Learning*

- 1. On the development of an interdisciplinary secondary science education major**
Ronald S Hermann (Towson University) & Sarah Haines (Towson University)
- 2. How I Learned to Conduct Research: Exploring How Students Gain Skills Through Undergraduate Research Experience**
Jeanette Juran (North Carolina State) & Meg Blanchard (North Carolina State)
- 3. Supporting Secondary Science Teachers in Multilingual Classrooms: A Collaborative Professional Learning Approach**
Alexis Rutt (James Madison University)
- 4. From STEM to STEAM to E-STREAM? Exploring Teachers' Sensemaking Across Programs and Disciplines**
Dr. Chelsea McClure (Notre Dame of Maryland University)

Experiential Session 2

Integrating CS into Elementary Science Methods through Adaptable Robots

Jennifer L. Maeng (University of Virginia), Kim Wilkens (University of Virginia), Jennifer L. Chiu (University of Virginia)

Saturday, October 10th

Experiential Session 3

Taking science methods to the meadow

Andrew Gilbert; Elizabeth Brown, George Mason University

Paper Presentation Session 4: *Exploring Environmental Science Education*

1. Teachers use of a Co-Design Process to develop Health Profession Lessons

Elizabeth Edmondson (Virginia Commonwealth University)

2. Exploring Connection, Observation, and Growth Through Nature Journaling: Reflections from Preservice Teachers

Sarah Haines (Towson University)

3. Exploring Environmental Justice through Water Filtration

Karen Collier (Augusta University), Wayne Hickman (Augusta University), Juan Walker (University of South Carolina Aiken), and Ana-Maria Topliceanu (Augusta University)

Optional Field Trip: *The Natural History of Canaan Valley*

Deb Hemler (Fairmont State College), Edwin Michael (West Virginia University)

Presentation Abstracts

(in alphabetical order by first author's last name)

Using MagicSchool as a Learning Tool to Support Multilingual Learners

Lillian Bentley, William and Mary

In this interactive session, science teacher educators will be introduced to the Rithm Project as a framework for facilitating discussions about the ethical use of artificial intelligence in science education. Participants will then explore an interactive chatbot developed with MagicSchool that incorporates prompts and instructional scaffolds to support multilingual learners. The chatbot promotes scientific understanding through a biology case study on hemophilia B, although its parameters can be adapted for any science topic. It provides sentence stems, academic vocabulary support, and structured guidance to help students develop interview protocols for interacting with AI. The chatbot also incorporates culturally and linguistically responsive design features intended to reduce Western and English-centric biases commonly embedded in large language models. The session will conclude with a discussion of how this tool can be integrated into pre-service science teacher education to foster AI literacy, equitable instructional practices, and scientific inquiry, while exploring opportunities to design similar AI-powered chatbots for diverse science learning contexts.

The Impact of Mentoring Experiences on Program Completion and Career Expectations Among Graduate STEM Students

*Meg Blanchard, North Carolina State University;
Ana-Maria Topliceanu, North Carolina State University*

Graduate STEM programs in the United States continue to attract increasing numbers of students. Despite this growth, student attrition remains a persistent concern. Mentoring is an important factor in supporting graduate student development; however, research identifying specific mentoring practices that effectively promote student success remains limited. To address this gap, the Mentoring Experiences of Graduate Students Survey was designed and validated using responses from 280 STEM graduate students attending a public research university. Exploratory factor analysis was conducted to evaluate the instrument's reliability and construct validity. Results supported a 38-item, five-factor model encompassing psychosocial support, program completion, research and writing support, career expectations, and career support. The study revealed significant differences in students' perceptions of mentoring experiences and expected outcomes based on gender, stage in the program, and citizenship status. Recommendations are provided to enhance mentoring practices, with emphasis on psychosocial support, research and writing development, and career-related guidance.

Computational Thinking Across the Elementary Curriculum: Science and Beyond

Melanie Blanton, Radford University

As computational thinking (CT) becomes increasingly emphasized in K–12 education, elementary teachers are challenged to identify meaningful opportunities for CT integration across the curriculum. This poster presents initial findings from K–5 teachers participating in a multi-year CT integration professional development. Teachers worked collaboratively to develop grade-level curriculum maps that identified opportunities for CT integration across content areas, drew on reflections from prior-year implementation, and addressed gaps in when and where CT instruction occurred so that students' CT development was planned intentionally across the school year. Findings support existing research about teachers conceptualizing CT primarily as a problem-solving process, and also highlighted teacher realizations that CT could be integrated at varying levels of instructional intensity, from brief CT moments to fully integrated lessons. Despite the growing emphasis on CT, reflected in standards such as NGSS, science was not the content area associated with the greatest number of CT integration opportunities.

Workforce integrated STEM: Lessons learned from year one TCHIP Fellows

Christine Hirst Bernhardt (NOVA SySTEMic);

Elizabeth Edmondson (Virginia Commonwealth University)

The Chips and Science Act authorized historic investments to scale innovative approaches to equip the next-generation STEM workforce in semiconductor manufacturing, including education. Yet, most investments target higher education and returning-to-work populations, neglecting the upstream preparation during middle years, when critical opportunities for STEM interest and engagement occur. The TCHIP Fellowship addresses this gap by supporting Master Teacher Fellows to design semiconductor-integrated lessons for physical science courses. Notably, this approach reverses the common one-way flow of STEM->CTE by integrating CTE into core science instruction. During year 1, three Fellows with distinct technical backgrounds developed 5E lessons. Through framework analysis and cross-case comparison, we examined how Fellows experienced the development of expertise, leadership and workforce-STEM integration. Preliminary findings from one case reveal uneven but incremental development across constructs, while specific structures (feedback and co-design) emerged as catalysts for growth. This study has implications for workforce-aligned STEM and professional learning design.

Using Generative AI to Plan Elementary 5E lessons

Leslie Bradbury, Appalachian State University;

Rachel Wilson, Appalachian State University;

YeJun Bae, Appalachian State University;

Vicente Handa, Appalachian State University;

Rachel Askew, Appalachian State University

We integrated generative AI (genAI) into an elementary science methods course as preservice elementary teachers (PSETs) designed and taught 5E lessons (Bybee, 2016). The study asked: How did PSETs use genAI in lesson planning, and what limitations did they identify? Grounded in UNESCO's (2024) AI Competency framework, we emphasized a human-centered mindset and foundational AI understanding. Data came from two rounds of student reflections. PSETs reported using genAI to generate background information, brainstorm 5E lesson activities, and develop instructional and assessment questions. Despite these benefits, they emphasized the importance of teacher decision-making in shaping final lesson plans. Participants often revised or rejected AI-generated content rather than adopting it verbatim. They also highlighted the need to consider their specific students, emphasizing that knowledge of learners was critical for evaluating genAI outputs. This study informs science education by illustrating current uses of genAI and prompting reflection on its role in teacher preparation.

Exploring Environmental Justice through Water Filtration

Karen Collier, Augusta University;

Wayne Hickman, Augusta University;

Juan Walker, University of South Carolina Aiken;

Ana-Maria Topliceanu, Augusta University

Water in many areas is contaminated by manufacturers, negatively affecting individuals' health. The areas stricken with greater water pollution tend to have higher rates of poverty, lower levels of education, and a more prominent population of underserved racial and ethnic groups. These factors highlight concerns about environmental justice, as those with less power bear a greater share of the burden. The activities in this presentation are designed around per- and polyfluoroalkyl substances (PFAS) pollution in southeastern North Carolina (N.C.). Sixty middle-school-aged students engaged in an inquiry-based water-filtration activity and opportunities to analyze primary documents related to residential PFAS testing. Thirty elementary-age students engaged in a similar water-filtration activity, a culturally relevant book about water quality, and an environmental micro-drama through shadow-puppet theater. These activities emphasize the importance of linking real-world issues to formal classroom instruction, thereby creating opportunities to inform families about critical environmental issues that impact their lives.

The epidemic that didn't have to happen: Learning from Indigenous Science Knowledge in teacher education

*Lenora Crabtree, University of North Carolina Charlotte;
Debbie French, Wake Forest University*

Who determines what counts as scientific knowledge, and what happens when valuable expertise is dismissed? This experiential session invites participants to investigate an epidemic in the Southeastern United States shaped by systemic inequities and the marginalization of Indigenous Science Knowledge. Utilizing the Mill Mothers' Lament instructional case study (Crabtree & Stephan, 2020, 2023), attendees will analyze historical research and public health data to examine how place, power, and identity shape scientific decision-making. The case highlights Indigenous knowledge systems and cultural practices central to many communities, particularly families connected to southern Mexico and Central America. Together, we will consider how justice-oriented teacher education can recognize and build upon knowledge often overlooked in science education. This case has been implemented in science methods, K–12 professional development, and interdisciplinary preservice teacher education settings. Attendees will receive full access to all materials for use in their own contexts.

Teachers use of a Co-Design Process to develop Health Profession Lessons

Elizabeth Edmondson, Virginia Commonwealth University

This presentation will share the results of a study on teacher implementation of a design-driven co-design process as part of the grant, Pathways for Authentic Teaching of Health Sciences funded by NIH SEPA, working with teachers to better implement health sciences and professions lessons. This presentation describes the process of implementing DDCC into a multi-year program. We will share the results to two research questions: RQ1: What factors influence the implementation of DDCC?, and RQ2: To what extent is the use of DDCC associated with changes in teacher knowledge, efficacy, and instructional practice? from multiple cohorts of teachers. We would like to share how DDCC helped build capacity for teachers to develop, test, and revise lessons that incorporated new content and instructional approaches.

Investigating learning about the ethical treatment of animals in elementary science methods

Mark Enfield, Elon University

This presentation focuses on an investigation of implementation of a project in a teacher education course focused on instructional methods, the ethical treatment of animals and integration of indigenous worldviews, while also learning principles of Next Generation science teaching and learning. The project builds on a literature review a decade of Science and Children magazine. Only a small percentage of identified articles focused on use of live animals in instruction and of those very few considered the ethical implications and/or teaching children about ethical treatment of animals. Concurrently, in focusing on diversity in science learning, the project recognized that indigenous worldviews offer a useful perspective on ethical treatment of animals.

This presentation will share about the development of a module that integrates instructional methods, cultural perspectives, elementary life-science concepts, and ethical treatment of animals. The presentation will share activities that have been done and some initial thoughts about implementation.

Taking science methods to the meadow

Andrew Gilbert, George Mason University;

Elizabeth Brown, George Mason University

This experiential session will get MAASTE members outdoors to demonstrate the possibilities that outdoor education approaches offer science and STEM methods educators. The presentation is designed to immerse science teacher educators in powerful practices that can be done in nearly any outdoor context. During the presentation, attendees will head outside to take on differing nature journaling challenges that utilize specific pedagogical frameworks to support the acquisition of content and process related science standards. This will set the stage for our wondering and noticing to tap into the uniquely human process of discovery through disciplined noticing. A feature of this approach is to build both professor and preservice teacher joy as they emotionally engage with the questions and the beauty of the outdoors. The goal is to demonstrate the potential of outdoor education principles in the teaching of traditional science/STEM methods.

From Mandates to Practice: Why Engineering Integration Falls Short

Kristie Gutierrez, Old Dominion University

Pilar Pazos, Old Dominion University;

Danielle Rhemer, Old Dominion University;

Jennifer Kidd, Old Dominion University;

Walt Heinecke, University of Virginia;

Stacie Ringleb, Old Dominion University;

Krishnanand Kaipa, Old Dominion University;

Orlando Ayala, Old Dominion University

The integration of engineering into PK–6 classrooms is a central objective of national science standards; however, systemic barriers continue to limit the consistent implementation. Prior efforts to prepare preservice and in-service teachers have enhanced their competence and motivation, but have yielded limited classroom enactment, suggesting that teacher preparation alone is insufficient. This study examines the broader systemic factors shaping engineering integration. A systems analysis was conducted within one urban U.S. school district. Data sources included interviews, focus groups, surveys, and classroom observations with teachers, administrators, and state leaders, complemented by secondary analysis of standards and policy documents, as well as expert review. In this presentation, three key systemic themes will be explored: (1) shifting state agendas and external mandates undermine the prioritization of engineering, (2) inconsistent leadership communication weakens translation of standards into practice, and (3) resource constraints and limited infrastructure restrict implementation.

Exploring Connection, Observation, and Growth Through Nature Journaling: Reflections from Preservice Teachers

Sarah Haines, Towson University

The Nature Journal Project engaged thirty-two preservice teachers in a life science course. Over a semester, participants observed a single tree and nearby natural phenomena through sketches, photographs, and reflective writing. The assignment aimed to foster environmental literacy, mindfulness, and pedagogical insight by encouraging sustained attention to the living world. Students completed weekly journals and end-of-semester self-assessments. A thematic analysis of reflections identified recurring patterns of affective, cognitive, and pedagogical growth. Five themes emerged: affective connection, observation and mindfulness, emotional wellbeing, pedagogical insight, and challenges with associated strategies. Findings highlight the value of embedding sustained, place-based reflection into teacher education and demonstrate how educators can support future teachers in both knowing and feeling science.

On the development of an interdisciplinary secondary science education major

Ronald S Hermann, Towson University;

Sarah Haines, Towson University

In this session we discuss the opportunities, challenges, and complex process of developing an interdisciplinary science education major to replace existing discipline-specific secondary science education majors. Due to nationwide declining enrollment in teacher education programs, the adoption of the Blueprint for Maryland's Future, and shifting trends in science education, a need exists to restructure secondary science education into a modular, more sustainable degree program to bolster recruitment efforts. Further, reports indicate that only 36% of new science teachers teach solely in their specialization area (Nixon, Luft, & Ross, 2017). The proposed interdisciplinary science education major would provide broader science coursework to prepare teachers for the reality of teaching out of field while still providing a depth of content in the initial science field of licensure. We report on the multi-year process to explore developing an interdisciplinary science education major that involved key internal and external stakeholders that received mixed feedback.

Promoting Elementary Teacher Instruction of Earth and Space Science Through ELA

Deb Hemler, Fairmont State University;

Josh Revels, Fairmont State University;

Angela McKeen, Fairmont State University;

Marcie Raol, Fairmont State University

Given current priorities of West Virginia administrators for teaching reading and mathematics in elementary classrooms, science is often overlooked or relegated to alternating sessions with social studies once a week. This weeklong professional development workshop engages a team of six teachers in each grade (K-5), in writing and reading literacy in the context of Earth and space science (ESS). Teachers received training on the three dimensions of Next Generation Science Standards (NGSS), nature of science, constructivist teaching strategies, writing in science, and targeted standards and activity-based content sessions. Each grade-level team developed a unit using two provided science-themed trade books, presenting at the end of the workshop. This poster evaluates four years of data including teacher ESS content gains, improved self-efficacy in teaching science, literacy self-assessment, and comfort level in mining the NGSS ESS science standards that deliver standards-based instruction using science trade books.

Perceptions regarding burnout and self-efficacy in early career science teachers and their mentors

Robbie Higdon, James Madison University;

Angela Webb, James Madison University

This initiative sought to identify perceptions regarding burnout and self-efficacy for early career science teachers (ECTs) who had a mentor from outside their school division during their first year in a 6th-12th grade public school classroom. At the conclusion of the initiative, all participants (mentors and mentees) were invited to complete the Maslach Burnout Inventory (Maslach, Jackson, & Leiter, 2018) which evaluated perceptions of depersonalization, emotional exhaustion, and personal accomplishment as well as the Teachers Sense of Self-Efficacy Scale (Tschannen-Moran, & Hoy, 2001). Responses were received from 8 out of 12 participants who indicated low perceptions of the three constructs measured by the burnout inventory as well as high perceptions of self-efficacy. These data were compared with notes taken during virtual PLCs and participant email communication to identify factors that may be contributing to the noted responses. These findings can be used to identify needed supports to retain ECTs.

Small Scale, Big Solutions: Exploring Size, Soil, and Sound Through Nanoscience

Endiga Holdness, North Carolina State University

This interactive presentation showcases three classroom-ready middle grades science lessons developed through the Research Experiences for Teachers (RET) and Research Triangle Nanotechnology Network (RTNN) summer program. Participants will explore engaging, standards-aligned activities that make nanoscience and engineering accessible through authentic, hands-on investigations. Lessons include modeling atomic structure and Bohr models to understand the nanoscale, conducting a community-based soil investigation that examines legacy phosphorus and its environmental impacts through laboratory soil analysis, and designing interdigital transducers (IDTs) to investigate how surface acoustic wave (SAW) technology powers everyday devices such as smartphones and touchscreens. Presenters will share implementation strategies, student learning experiences, and classroom resources that integrate engineering design, environmental science, and real-world STEM applications. Attendees will leave with practical instructional materials, adaptable lesson ideas, and strategies for fostering scientific inquiry, problem-solving, and student engagement while connecting cutting-edge research to meaningful middle grades science instruction.

How I Learned to Conduct Research: Exploring How Students Gain Skills Through Undergraduate Research Experience

Jeanette Juran, North Carolina State;

Meg Blanchard, North Carolina State

This qualitative case study investigates the skill development of fifteen undergraduate fellows who were engaged in authentic research in four university labs. The study investigated how participants described the development of their research skills, and what aspects of the program they associated with their development. Rogoff's sociocultural theory of community participation framed the study. Data from students' field notes, check-in calls, reflections, program activities, and interviews were analyzed using qualitative content analysis based on codes from the Undergraduate Research Student Self-Assessment (URSS). Initial findings show that over 65% of the participants discussed "understanding the theory and concepts guiding my research project" and over half described "conducting observations in the lab or field." Findings suggest that the most valuable program activities were working independently with mentor support and building foundational knowledge were the most beneficial to their skill development. Recommendations for future URE programs will be shared.

Exploring How Children Use Their Everyday Thinking to Construct Scientific Explanations of the Natural World

Ashley N. Kookan (Glenville State University)

This qualitative grounded theory study examines how children's thinking across multiple related contexts surrounding a single Earth and Space Science disciplinary core idea provides a foundation for learning in science classrooms. While prior research has documented the ideas children express within specific science learning contexts, less is known about how children connect experiences across multiple everyday contexts to construct deeper conceptual understandings of scientific phenomena. Addressing this gap is important because research has consistently shown that children's everyday thinking—both in and out of school—serves as a productive resource for meaningful science learning. By describing and explaining patterns in children's thinking across contexts, this study offers new insights into how everyday experiences can support the development of scientific understanding.

Developing the Ecological Systems Implementer Survey

Bradley Lanier, University of Cincinnati

There is a call from researchers to take an ecological approach to policy development and implementation. One step towards supporting that call is creating a reliable and valid measurement instrument based on the Ecological Systems Theory (EST) framework. The purpose of this chapter is to lay out the development plans for an implementation survey instrument measuring the ecological implementation quality level of a leader in growing and developing an individual learner. Specifically, this survey measures how well a leader builds quality supportive interactions for a new teacher induction program at the three nested levels within the exosystem: the mesosystem, microsystem, and individual learner. To accurately model how a leader implements an induction program, an EST-adapted framework called the Ecological Systems Exosystem Implementer (ESEI) framework is used as the foundation for building the Ecological Systems Exosystem Implementer Survey Instrument and its constructs.

Integrating CS into Elementary Science Methods through Adaptable Robots

Jennifer L. Maeng, University of Virginia;

Kim Wilkens, University of Virginia);

Jennifer L. Chiu, University of Virginia

Most states have adopted K-12 computer science (CS) standards and several, including Virginia, explicitly encourage CS integration into core content in the elementary grades. However, many teachers and teacher candidates have little or no formal experience with CS. To support elementary education candidates' confidence, knowledge, and skills integrating CS into science content instruction, we designed a series of activities for our elementary science methods course. In these activities elementary candidates consider their initial ideas about CS integration, we model CS-integrated science instruction through a series of scaffolded unplugged and plugged activities that incorporate adaptable robots, and have them reflect on how they can incorporate what they learned in their future classrooms. The modeled activities were co-designed by in-service elementary teachers as part of an NSF-funded project. In this session, we will model the activities we use and share teacher candidate reflections on CS-integration in elementary settings following the activities.

From STEM to STEAM to E-STREAM? Exploring Teachers' Sensemaking Across Programs and Disciplines

Chelsea McClure, Notre Dame of Maryland University

This presentation will highlight research from a four-day professional learning lab focused on experiential learning around E-STREAM concepts. E-STREAM encompasses environmental education, science, technology, reading, engineering, art, and math. This approach is put forward to support systems thinking in an increasingly complex world and to shift away from the compartmentalization of topics, skills, or teaching strategies within a single discipline. This study explores how teachers engage in sensemaking as they interpret, construct meaning, and adapt E-STREAM practice for integration into their own instructional environment. Fourteen currently enrolled undergraduate or master's students in elementary, middle, or high school teacher education programs were participants in the E-STREAM professional learning lab. Through a qualitative study supported by descriptive statistics, findings from participants' pre- and post-questionnaires, lesson artifacts, and written reflections will be shared. These findings provide insight into areas of interest, confidence, attitudes, and how participants are sensemaking around E-STREAM concepts, as well as recommendations around supporting E-STREAM integration.

Developing and piloting a research framework for a Noyce RESS program

Stephanie Philipp (University of Tennessee - Chattanooga);

Raga Ahmed (University of Tennessee at Chattanooga)

As co-PI of a new Noyce Research Experiences in STEM Settings (RESS) program and two prior Research Experiences for Teachers (RET) programs, I have explored ways to assess the impact of teacher research experiences (TREs) on participating science teachers and their secondary students. This session describes how a recent literature review (Lindley et al., 2026) informed the development of a mixed-methods research framework that examines both teacher professional growth and student outcomes associated with TRE participation. The research design includes measures of changes in teachers' STEM knowledge, instructional practices, and research self-efficacy, along with impacts on student engagement and achievement. Currently being piloted during the program's first year, the framework will be refined and fully implemented in years two and three. Attendees will gain practical insights for designing and evaluating TRE research in STEM teacher education.

From Isolation to Inquiry: Designing Online Science Methods Courses to Model SEPs and Boost Teacher Confidence

Brad Rhew, Guilford County Schools;

Debbie French, Wake Forest University

With fewer than 35% of elementary teachers feeling prepared to teach science, building preservice teacher self-efficacy is vital for future student success. This study investigated how undergraduate elementary candidates develop science teaching confidence and positive attitudes within an online science methods course. Data sources included surveys (STEBI-B, PETAS-S), reflections, focus groups, and instructor interviews to track self-efficacy shifts and evaluate course effectiveness. Key findings emphasize that active engagement—grounded in Bandura’s self-efficacy and Kolb’s experiential learning—drives confidence. Specifically, structured peer interaction, video-based teaching feedback loops, and modeled Next Generation Science Standards (NGSS) Science and Engineering Practices (SEPs) are critical for overcoming online learning constraints. Participants will explore practical, high-impact strategies from the study—including micro-investigation simulations and peer discourse protocols—designed to transition virtual methods courses from isolated environments into collaborative, NGSS-aligned learning spaces that effectively prepare future science educators. AI considerations in an online science methods class will be discussed.

Supporting Secondary Science Teachers in Multilingual Classrooms: A Collaborative Professional Learning Approach

Alexis Rutt, James Madison University

As the linguistic diversity of United States science classrooms grows (National Center for Education Statistics, 2024), more science teachers will have the opportunity to work with multilingual learners (MLs). Yet, many secondary science teachers are unprepared to teach in linguistically diverse classrooms (National Academies of Sciences, Engineering, and Medicine, 2018), and professional learning for teaching this population is uncommon (Rotermund et al., 2017) and can feel disconnected from the realities of teachers’ instructional contexts. This paper presentation describes how one K-12 Science Coordinator and a science teacher educator worked together to collaboratively develop and implement a sustained, targeted professional learning series informed by the teaching contexts and experiences of nine secondary science teachers from a linguistically diverse school district. Results address teachers’ perspectives on and understanding of effective instruction for MLs and their instructional outcomes. Implications for designing responsive professional learning opportunities for teaching multilingual learners will be discussed.

The Perception of STEM Transfer Students in University Research Laboratories

Toluwalase Salako, North Carolina State University;
Margaret Blanchard, North Carolina State University

This study will explore the research and mentoring experiences of community college transfer students in STEM research labs at a four-year research-intensive institution. Grounded in Situated Expectancy Value Theory (SEVT) and the Motivational Theory of Role Modeling, this study will analyze their experiences through a multi-case study design. Focusing on six lab cases, the study investigates how students describe changes in their learning and skill development through their lab experiences. What supports and barriers do they encounter in the lab? What motivated their attendance and participation? How do mentors describe their roles and experiences with the mentees? Data from skill survey, card sorts and semi-structured interviews with mentees, written reflections, semi-structured interviews with mentors, and lab observations will be collected and analyzed using initial deductive (SEVT and Role modeling constructs) and inductive coding. This is from my dissertation proposal, and data collection would begin in the Fall following institutional approval.

Navigating Graduate STEM Education: Student Perspectives on Mentoring, Peer, and Departmental Support

Ana-Maria Topliceanu (Augusta University);
Karen M. Collier (Augusta University)

Although prior research has demonstrated the importance of mentoring, peer support, and departmental support for graduate STEM student success, these areas have often been examined independently. Limited qualitative research has explored how graduate STEM students experience and make meaning of multiple forms of support. Also, little is known about how they perceive the mentoring, peer, departmental, and college support available to them. This qualitative study addresses these gaps and examines graduate STEM students' perceptions of support. The study involved interviews with nine domestic and international graduate STEM students at a public R2 university in the southeastern United States. Data were analyzed using Chandler et al.'s (2011) ecological systems theory. The findings highlighted the central role of the microsystem and ontological system compared to the macrosystem. Recommendations are provided to enhance mentoring, peer, departmental, and institutional support for graduate STEM students.
