



Welcome to Jenny Wiley State Resort Park  
Prestonsburg, Kentucky  
for the  
Mid-Atlantic  
Association for Science Teacher Education  
Regional Conference  
September 29-30, 2017

# 2017 Mid-Atlantic ASTE Conference Schedule Overview

## Thursday September 28, 2017

*4:00 - 7:00 PM Registration and Dinner on your own*

## Friday September 29, 2017

*7:00 - 9:00 AM Registration (May Lodge Lobby)*

*7:00 - 9:00 AM Breakfast (May Lodge Dining Room)*

Conference Sessions 1-9 will be held in Convention Center Cherokee Room

*9:00 – 10:00 AM*    **Session 1**

*10:00 – 10:20 AM*    Mid-Morning Break

*10:20 – 11:20 AM*    **Session 2**

*11:20 – 11:30 AM*    Session Break

*11:30 – 12:30 PM*    **Session 3**

*12:30 – 1:30 PM*    Lunch (May Lodge Dining Room)

*1:30 – 2:30 PM*    **Session 4**

*2:30 – 2:40 PM*    Session Break

*2:40 – 3:40 PM*    **Session 5**

*3:40 – 4:00 PM*    Mid-afternoon Break/ Set-up Posters

*4:00 – 5:30 PM*    **Session 6/ Poster Presentations**

*6:00 – 8:00 PM*    Dinner in the Conference Center Shawnee Room

*8:00 – 10:00 PM*    MA-ASTE Annual Celebration (KY Cabin)

## Saturday September 30, 2017

*7:00 – 9:00 AM Registration May Lodge Lobby*

*7:00 – 9:00 AM Breakfast (May Lodge Dining Room)*

*9:00 – 10:00 AM*    **Session 7**

*10:00 – 10:20 AM*    Mid-morning Break

*10:20 – 11:20 AM*    **Session 8**

*11:20 – 11:30 AM*    Session Break

*11:30 – 12:30 PM*    **Session 9**

*12:30 – 1:30 PM*    Lunch (May Lodge Dining Room)

*1:30-2:30 PM*    MA-ASTE Business Meeting

# Thursday, September 28, 2017

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4:00 – 7:00 PM      **Registration (May Lodge Lobby)**

# Friday, September 29, 2017

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7:00 – 9:00 AM      **Registration (May Lodge Lobby)**

7:00 – 9:00 AM      Breakfast in the May Lodge Dining Room (use ticket from registration packet)

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**Session 1**      Wilkinson/Stumbo Conference Center Cherokee Room

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9:00 – 9:20 AM      **Transferring Pre-Service Teachers' Understanding of Educational Technology from an Information Technology (IT) Camp to Classroom Practices**

*Presenter: **Scott Gibbons**, University of Cincinnati*

Exposing pre-service teachers to a variety of technologies and then giving them the opportunity to implement technology into a real-world project-based setting with small groups of students can improve the way pre-service teachers view and employ technology when they begin designing lessons for their student teaching and in-service teaching duties. The study examined pre-service teachers' views of educational technology both before and after learning about various forms of technology during a three-week technology camp involving over fifty high school students. The study also concentrated on the ways in which pre-service teachers implemented technology in a small group environment, focusing on project-based learning. The purpose of the study was to better understand how pre-service teachers view educational technology and how those views can change when exposed to a non-subject specific setting with real students.

9:20 – 9:40 AM      **Seesaw: Balance communication and research through a secure social media platform**

*Presenter(s): **Michelle Nugent**; Meg Blanchard, North Carolina State University; Kylie J Hoyle, University of Colorado-Colorado Springs; Kristie S Gutierrez, Old Dominion University; Katie Green, North Carolina State University*

Seesaw is a free, private social media platform that mimics popular apps students use often such as Instagram. It is designed for use in schools and therefore takes several precautions to protect participants' privacy unlike other well-known social media outlets. This tool can be used to enhance group work and learning in STEM classrooms and serves as an avenue for communication between school and home. Seesaw can also

be utilized to collect data for qualitative research endeavors. This presentation will highlight the use of Seesaw in a STEM after school club and describe the positive outcomes of Seesaw along with the obstacles faced. We will also make recommendations as to how Seesaw could be effectively implemented in both classroom and informal science settings.

9:40 – 10:00 AM

**Exploring the maker movement as a promising approach to bolstering engineering identity among underrepresented populations in STEM**

*Presenter: Terri Tinnell, University of Louisville*

Low-income, racial and ethnic minority students are underrepresented amongst high-performing STEM students and it is imperative that all people be literate in science, technology, engineering and math (STEM) (Bybee, 2010; National Science Board, 2014). Moreover, racially and ethnically diverse students marginalized in STEM are also often marginalized in the larger context of their schools and in society (Nieto & Bode, 2012). To respond to these societal and education obstacles, this work-in-progress project aims to present a review of literature that explores the makerspace movement (specifically K-12) and the ways it can diversify the STEM fields, specifically in engineering. Recent literature supports bolstering engineering identity through experiential learning; however, there is a lack of scholarship representing the marginalized STEM learner populations (Papavlasopoulou, et. al, 2017). This research hopes to present aspects of the maker movement that have been shown to bolster engineering identity and offer suggestions to address the marginalized populations within STEM education.

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**10:00 – 10:20 AM**

**Mid-Morning Break**

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**Session 2**

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10:20 – 10:40 AM

**Using arthropods to introduce in-service elementary science teachers to NGSS three-dimensional teaching and learning**

*Presenter(s): Mary K Stapleton; Faith J. Weeks, Towson University*

Three-dimensional teaching and learning, as called for in the Next Generation Science Standards, is a new model for K-12 instruction. We designed a 4-day professional learning workshop for 24 elementary teachers designed to introduce teachers to 3-D instruction while learning how to incorporate arthropods, including insects, millipedes, and crustaceans into curriculum. The focus of this professional development was on increasing teacher understanding of science and engineering practices (SEP), as well as increasing their comfort with these animals and decreasing perceived barriers teachers have in keeping live arthropods in the classroom. During the workshop, teachers developed and will implement and reflect on lessons utilizing insects that engaged students in SEPs. We will report on how the following changed over the

course of the workshop 1) teacher knowledge about 3-D teaching and learning, 2) teacher comfort using arthropods in their classroom, and 3) teacher perception of barriers to using insects in their classrooms.

10:40 – 11:00 AM **Using hands-on experiences with insects to enhance preservice teacher understanding of life sciences**

*Presenter: Faith J Weeks, Towson University*

With more than one million different species described today, insects are the most dominant group of animals on the planet. They can be found on every continent, yet few elementary schools teach about insects and their arthropod cousins spiders, crustaceans, and millipedes. Even fewer use live insects in their classrooms as a way to engage students in hands-on activities and enhance science instruction. This study focused on giving preservice elementary teachers the chance to observe and handle live arthropods, not only to learn about the animals but to also see how to use them in their future science lessons. Results suggest that teacher preparation programs should include live arthropods in their life science courses as these students scored significantly higher on associated exams than students that only observed pictures and videos of arthropods

11:00 – 11:20 AM **Paper Cancelled**

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**11:00 – 11:25 AM Session Break**

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### **Session 3**

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11:30 – 11:50 AM **Integrating Inclusive Science Content and Pedagogy in a Dual General and Special Education Middle Childhood Licensure Program**

*Presenter(s): Christopher L. Atchison; Stephen D. Kroeger; Emilie M. Camp; Holly A. Johnson; Susan A. Gregson, University of Cincinnati*

Increasingly diverse middle school classrooms present challenges for early career teachers as they work to support all students. Evidence in the literature suggests that these early career teachers may not be fully prepared to address the diverse learning needs of all students. This presentation will discuss Ohio's dual licensure program in science and special education and discuss specific strategies, challenges, and implications for future practice that other science teacher preparation programs around the Mid-Atlantic region may find useful. Faculty from the University of Cincinnati's Middle Childhood, Literacy, and Special Education programs collaborated on the integration of core content and pedagogical knowledge of middle childhood teachers with the essential

content and pedagogy of intervention specialists serving all students, including those with high incidence learning needs.

**11:50 – 12:10 PM Atypical approaches to computational thinking education**

*Presenter(s): Vance J Kite; Soonhye Park, North Carolina State University*

Beginning with Seymour Papert's work in the 1980s and gaining significant momentum following Jeanette Wing's 2006 article, Computational Thinking, scholars have promoted CT as a literacy as critical to 21st century success as reading and math. Although academics and industry leaders argue for integrating CT into school curriculum, best practices for accomplishing this goal have yet to be identified. We conducted a critical literature review of 37 computational thinking studies to identify successful strategies for CT integration. Results indicate that coding-focused and robotics-centric activities are frequently and successfully employed to research CT development. Fewer studies, however, have attempted unique implementations of CT instruction. Innovative approaches identified include game and simulation development, social-justice-based app creation, "making", and poem generator construction. Many of these atypical strategies have been shown to be effective for engaging demographics traditionally underrepresented in the sciences. Based on our analysis, we suggest that teachers must employ a variety of strategies to assist diverse student populations in the development of CT.

**12:10 – 12:30 PM Daily Homework: A Study-Skills Strategy**

*Presenter: Robert W Arts, University of Pikeville*

Often times in science courses homework problems are assigned in block sets that represent content throughout a particular topic. Students are encouraged to look over these problems following each lecture as a study aid for the material presented. More often than not, students wait until the due date for these problems sets to begin their attempts; resulting in a flurry of questions and concerns. This presentation will focus on the switch from these homework blocks to smaller daily assignments that represent content from an individual lecture. Logistical information about the assignments, a compare and contrast of block homework scores to those of daily homework scores for the same student group, and student feedback will be a part of the presentation.

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**12:30 – 1:30 PM LUNCH in the May Lodge Dining Room (use ticket from Registration Packet)**

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## Session 4

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1:30 – 1:50 PM

### **Mindfulness Education for Pre-Service Teachers in Appalachia**

*Presenter: Aimee L Govett, Alison Barton, East Tennessee State University*

Our goal in the Master of Arts in Teaching Program at East Tennessee State University is to prepare effective teachers who will bring out the potential of their future students. This is difficult when teacher candidates themselves are under such stress that it affects their performance and professional motivation. Mindfulness, emerging as a powerful factor in increasing learning and focus, is introduced in EDFN 5420. The focus of this course is to build relationships and community among participating students, a relevant factor for retention and completion in college. Thirty years ago, mindfulness-based stress reduction (MBSR) was shown to reduce psychological and physical stress-related symptoms. (Robins et al 2011; Greenland 2010, pg 23) More recently, a few other studies explained the purpose of mindfulness-based programs for pre-service teachers and novice teachers to ease stress and reduce burnout. (Hue and Lau 2015; Roeser et al 2013; Gavish and Friedman 2010; Friedman 2000).

1:50 – 2:10 PM

### **Science Museum & University Collaborations: Summer Field Experience**

*Presenter(s): Karen E Irving; Wahyu Setioko, Ohio State University*

This study investigated how a science museum informal teaching experience changes preservice science teachers' communication skills. Video recordings, field observations, individual interviews, and focus group discussions documented changes in the teachers' performances when presenting science to visitors as well as to investigate elements of the experience that contributed to these changes and teachers' learning. Communication skills' analysis focused on verbal language dimensions and teaching style dimensions. The experience influenced the teachers to provide contextual examples in explaining science, to communicate more effectively using fewer filler words, to adjust the amount of technical words based on visitors' characteristics, to engage visitors with more constructive open-ended questions and more elaborative feedback, and to use more Initiation-Response-Follow up (IRF) patterns at the end of the experience. The dynamic nature of their interactions with museum visitors, the informal learning environment, and support from museum educators contributed the most to the teachers' growth.

2:10 – 2:30 PM

**Providing Effective Professional Development for an Urban Elementary School’s entire Teaching Staff**

*Presenter: Sherri Brown; Donna Jackel, University of Louisville*

This study summarizes the planning, implementation and initial findings of an urban, elementary school-wide professional development (PD) concentrating on the fall 2017 total solar eclipse. To plan the PD, we administered a 10-question survey addressed the Center for Public Education’s (2013) 5 principles for effective PD which was compiled from research from the early 1980s until present. Teachers (n=27) reported interest in learning new content ideas that can be modified for their classrooms (59%), experiencing a one-time workshop (67%), engaging in actual learning activities (85%), and having pedagogies modeled (79%). Overwhelmingly 89% wanted support during the implementation of the new strategy, which directly aligns with CPE’s Principle 2. Seventeen university students will co-plan and assist preK-5 grade level, special area, and special education teachers to implement NSTA-supported pedagogies (e.g., notebook technical drawings) and NASA Total Eclipse resources for the school’s population to observe the eclipse with approved eyewear/glasses.

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2:30 – 2:40 PM

**Session Break**

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**Session 5**

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2:40 – 3:00 PM

**Elementary Majors’ Willingness to Specialize in Science and Views on Evolution.**

*Presenter: Ron Hermann, Towson University*

This study explores the extent to which students in a generalist elementary teacher education program are willing to specialize in science and their understanding of natural selection and acceptance of the theory of evolution. Results indicate students willing to specialize in science have a higher understanding of natural selection and acceptance of evolution than their peers. Elementary education majors who are enthusiastically willing to specialize in science also have the greatest understanding of natural selection and the highest level of acceptance of the theory of evolution. These students may not fit the profile which suggests elementary teachers are uncomfortable teaching evolution (Nadelson & Nadelson, 2010), lack an understanding of the most basic concepts of evolution (Ashgar et al., 2007), avoid teaching evolution (Ashgar et al., 2007), and are inadequate at introducing evolution to young children (Prinou et al., 2011). These teachers could serve as specialists to work with building and district colleagues to develop, among other topics, evolution-related curricular materials and facilitate the implementation of those materials through co-teaching and peer-coaching.

3:00 – 3:20 PM

**Evolution of a partnership: bringing authentic real-world scientific data into the classroom**

*Presenter: Kathryn E Green, North Carolina State University*

The need to improve evolution understanding offers an exciting opportunity for scientists and teachers to work together to teach K-12 students more about evolution. While teachers are directly responsible for most of students' science learning, visiting scientists in the classroom can offer insight on how scientific skills and knowledge are applied in the world outside the classroom. In this presentation, I focus on how a scientist, a science education doctoral student, and a middle school science teacher collaborated to clarify evolutionary concepts in a 7th grade science classroom using authentic data from ongoing scientific research. While this presentation will contain information about the evolution lesson, its aim is to share an example of how teachers and scientists can symbiotically partner to improve science instruction in the classroom. At the end, tips will be offered about how to create partnerships between researchers, scientists, and classroom teachers.

3:20 – 3:40 PM

**Fluctuations in middle/high school student understanding of climate change topics in central Appalachia**

*Presenter(s): Tina J Cartwright, Marshall University; Deb Hemler, Fairmont State University; Paula Magee, Indiana University-Indianapolis*

Climate change understanding remains problematic for students and teachers. Conceptualizing the small fluctuations associated with long term changes in temperature and precipitation is a daunting. This study examined students' understandings of climate change, climate and weather in a rural mid-Atlantic section of the US over a 4 year period. A initial questionnaire was given to 7th/8th grade students to assess their ideas and knowledge about the topics just prior to a typical unit of instruction. To better understand the development of students' ideas, the questionnaire was readministered three times post instruction (immediately after, 6 months after and 4 years after). Instruction was able to alter conceptions about the benefits of the greenhouse effect, but again, the shift in conception was only temporary, reinforcing the need to cover the content more often while paying specific attention to external cultural factors that can make learning the content challenging.

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**3:40 – 4:00 PM**

**Mid-Afternoon Break/ Set-Up Posters**

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## Session 6      Poster Presentations

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4:00 – 5:30 PM

Poster 1      **Use of Task for Identifying Concepts of Engineering and Teaching**

*Presenter: Will H. Thatcher IV, University of Cincinnati*

Recent adoptions of the Common Core Standards for Mathematics (CCSM) and the Next Generation Science Standards (NGSS) have left many instructors questioning how to properly implement new classroom practices. One approach has been the integration of engineering concepts in Mathematics and Science curricula. The present study used an interview task to identify initial conceptions, upon entering a PD program, held by Mathematics and Science teachers' of: the components which comprise engineering, and the role of the instructor in teaching engineering. The most frequently mentioned components of engineering were: real-world applicability, background research, brainstorming, experimentation, creating a product/design/model, a revision process, and communicating with others. In addition, while the majority of participants believed that the role of the teacher dictates whether a task may be considered engineering, there were some who held that students may practice concepts of engineering without an instructor present.

Poster 2      **Canceled**

Poster 3      **The Nature of Solutions and Solubility (NSS–DI Eng V.3) pilot evaluation of alignment to US test item and layout norms**

*Presenter: Mandy McCormick Smith, The Ohio State University*

Statistical findings showed the NSS–DI Eng V.1 was useful in terms of diagnosing students' ideas about solution chemistry concepts (Authors, 2016a;b; in review). However, data pointed that test items could be improved upon including the translation of text features and the visual layout to be more like traditional American large-scale tests, e.g. ACT, SAT, etc. Participants will take the original English translation instrument (NSS-DI Eng V.1) (Authors, 2016a;b; in review) and two weeks later the same participants will take the newly modified NSS-DI Eng V.3 instrument.

Eventually, 5 CTT stats will be run to re-evaluate the reliability and discriminatory power of this third version (NSS-DI Eng V.3), this presentation will focus on the changes made to the diagnostic instrument to be more in alignment with traditional American large scale tests.

Poster 4      **Development of Preservice Science Teachers' Confidence to Teach NGSS-based Science Lessons**

*Presenters: Lyvia Karoline Da Silva; Deepika Menon, Towson University*

The Next Generation Science Standards (NGSS) presents a 3-Dimensional (3-D) approach to science teaching and learning that integrates: Crosscutting Concepts, Science and Engineering Practices, and Disciplinary Core Ideas. This new vision

calls for re-thinking science teacher preparation at the college level. This study investigates the development of preservice teachers' confidence to teach 3-D science lessons after their participation in a science methods course, and the associated course factors supporting the change. A total of 27 preservice middle/secondary STEM teachers participated. Data were collected using pre- and the post-surveys, open-ended questionnaires, and two semi-structured interviews. At the beginning of the semester, only 11% of the participants reported understanding of NGSS, whereas 85% of participants felt confident to design and teach 3-D science lessons at the end of the semester. The course factors that helped participants were: hands-on activities, understanding 3-D lesson structure, and team teaching the lesson to their peers.

Poster 5 **Expectations, Experience & Relationships: A Qualitative Look at Three Themes in Beginning Teacher Identity**

*Presenter: Whitney D. Richardson, North Carolina State University*

At the start of any career, one is faced with many challenges and opportunities which will shape the type of employee they will become. Whether that employee will succeed or fail is based on various factors, both on the job and within their personal lives, which help to develop their identity as a professional. Identifying three emergent themes, this study provides insight into those experiences which shape teacher professional identity in novice science educators; and in turn, how those experiences shape the teacher's perception of their role within the classroom environment.

Poster 6 **Summer STEM Preservice Teacher Field Experiences at a Science Museum: An Innovative Collaboration**

*Presenters: Justina Ogodo; Karen E. Irving; Brittany Garvin-Hudson; Patricia Brosnan; Sarah Donley, Ohio State University; Craig Kelley, Center of Science and Industry, COSI*

Preservice STEM teachers participated in a summer field experience at a Local Science Museum presenting discovery hands-on learning opportunities using existing STEM carts. The carts' purpose was to engage visitors and connect them to STEM learning through discussion and hands-on activities. Participants practiced engaging people with science and math content, using language appropriate to the prior knowledge of the visitors, and testing a variety of approaches with the same content. The partnership provided more knowledgeable summer volunteers for the science museum, a stronger partnership between the local science museum and the university and community schools, and a source of new ideas and teaching tools for the science museum. Following the summer field experience, the preservice STEM teachers worked with science museum designers to create new STEM carts for future use. Benefits to the preservice teachers included attention to and subsequent improvement in their communication skills.

Poster 7 **Preservice Teachers' Science Conceptual Understanding and Technology Self-Efficacy: Affordances of an iPad-based Physics Curriculum**

*Presenters: Matthew J Conway; Deepika Menon, Towson University*

With the outburst of mobile technologies such as iPads, smart phones, etc., education systems are incorporating such technologies in grade-schools. This calls for changes in ways preservice science teachers are prepared at the college-level so they are well-equipped in using mobile technologies in their future classrooms. This study investigates the development of preservice elementary science teachers' technology self-efficacy and science conceptual understandings during their participation in a science content course. Data, including pre-and post-administration of Technology Self-efficacy, Physics Concept test, and open-ended questionnaires, were collected from 73 preservice elementary science teachers engaged in an innovative iPad-based curriculum, Exploring Physics. The repeated measures analysis of variance revealed statistically significant changes in participants' technology self-efficacy and science conceptual understandings. The qualitative trends suggest that the affordances of the curriculum assisted participants as learners of science as well as helped perceive themselves as teachers capable to integrate mobile technologies in science teaching.

Poster 8 **Development of Preservice Elementary Teachers' Identities to Teach Science**

*Presenters: Alissa N Buettner; Deepika Menon, Towson University*

The construct of teacher self-identity- ways in which teachers perceive themselves as successful science teachers, is particularly important in shaping teachers' views, attitudes, and decision-making regarding science teaching. In this study, we explore how preservice elementary teachers' science teacher identities develop through their student-teaching experiences in a field-based science methods course. Data including pre- and post-surveys and open-ended questionnaires were collected from 92 preservice elementary science teachers enrolled in a field-based science methods course. Data were analyzed to: (1) determine initial and final percentages of participants that reported their self-confidence before and after teaching, and (2) common themes from student responses representing their views and perceptions of being a science teacher. The contributing factors towards development of preservice teachers' science teaching identities were: increased knowledge to use pedagogical tools to teach science, collaboration during lesson planning, first-hand experiences in the classroom, and positive feedback from mentor teachers.

Poster 9 **An Exploratory Study of Video-based Coaching and a Virtual Community of Practice on a Beginning Science Teacher**

*Presenter: Justin McFadden, University of Louisville*

This study aimed to better understand how a beginning science teacher enacted the reform agenda set forth in the Next Generation Science Standards (NGSS Lead States, 2013) with a particular emphasis on teacher implementation of, and student engagement in science/engineering practices. Paired with a video-based, classroom embedded coaching program, the study explored the influence and impact of a virtual community of practice (Barab, et al., 2003) on teacher learning

and understanding of proposed changes to classroom instruction. The study utilized a qualitative case study design (Merriam, 2015) and constructed grounded theory during analysis (Charmaz, 2006). Preliminary finding indicated video-based coaching failed to be recognized and utilized as a tool worthy of use due to a variety of teacher beliefs that emerged during and after data collection.

Poster 10 **An exploration of the relational maps of a newly hired alternatively licensed science teacher's induction experiences during the first three years**

*Presenter: Angela W Webb, Louisiana State University*

Benefits of induction for new science teachers are well established; yet, the association between induction and retention is not unilateral. Participation in formal, comprehensive induction does not guarantee retention. Numerous factors, like teachers' relationships during induction, mediate teachers' experiences and commitment to teaching. This presentation explores the induction experiences of one newly hired, alternatively licensed science teacher through the lens of Relational-Cultural Theory (RCT), which frames growth and development in/through relationships within sociocultural contexts. Specifically, I will present the participant's relational maps across her first three years of teaching and discuss the ways in which resilience in her job was advanced through relationships. Implications of RCT for science teacher induction will be offered. The induction experiences of science teachers, not to mention alternatively licensed science teachers, are underexplored. This presentation addresses this gap by offering a longitudinal look across a new alternatively licensed science teacher's first three years of teaching.

Poster 11 **Earth & Space Science Passport: Using Professional Development as a pathway to certification**

*Presenters: Deb Hemler; Sean Harwell, Fairmont State University*

With the recent adoption of NGSS, West Virginia finally recognized Earth and space science (ESS) as an important component of the high school curriculum. Prior to the fall of 2016 ESS was relegated to middle schools and offered as an elective in the "workforce ready" curriculum. Given the lack of ESS certified teachers in WV, the Earth and Space Science Passport grant was proposed as a solution to ease the transition to the new NGSS-based curriculum, provide necessary ESS content knowledge, provide resources for engineering design integration, and provide a pathway toward ESS certification. Now at the start of the second grant cycle, this study begins the analysis of the grant's progress on these relative objectives.

Poster 12 **Undergraduate Students' Beliefs About Their Motivational Reasons for Pursuing Geoscience as a Major or Geoscience Teaching Certification**

*Presenters: Rommel Miranda; Joel Moore; Ronald Hermann; Kyle Hurley, Towson University*

Funded by the National Science Foundation, this qualitative study investigates undergraduate students' beliefs about their motivational reasons for pursuing geoscience as a major or secondary geoscience teaching certification. Nine undergraduate students from a large mid-Atlantic university participated in the

study. Quantitative methods were used to explore this study's research questions. This presentation will present research findings that will help to modify, create, or establish transfer pathways into geoscience majors, to publicize career opportunities in the geosciences and geoscience education, to increase the retention and recruitment of students into geoscience majors, and to inform geoscience and education departments in other institutions across the nation.

Poster 13 **Alternative conceptions of population interactions held by middle school students: An analysis of the field-testing data of the Middle School-Life Science Concept Inventory (MS-LSCI)**

*Presenters: Andria Stammen; Dr. Kathy Malone, Ohio State University*

Our goal in developing the Middle School-Life Science Concept Inventory (MS-LSCI) is to design a valid and reliable instrument that allows researchers and educators to measure students' conceptual understanding in life science topics, as well as students' specific alternative conceptions. The MS-LSCI has the potential to become a valuable tool in aiding researchers and educators as they determine interventions that support students in the development of science literacy. This presentation will focus on the alternative conceptions held by 6th, 7th, and 8th graders in the core concept of population interactions as measured during the MS-LSCI's field-testing with nearly 500 middle school students.

Poster 14 **What science teachers know about computational thinking**

*Presenter(s): Vance J Kite; Lanette Phillips; Soonhye Park, North Carolina State University*

The NGSS emphasizes learning science concepts through scientific practices. Research indicates teachers have difficulty integrating computational thinking (CT) into science instruction. This study examined teacher perceptions of the role of CT in scientific investigation through analysis of a questionnaire completed by 128 secondary science teachers. Teacher responses to the questionnaire were analyzed using the constant comparative method to identify emerging patterns. Data analysis revealed discrepancies between science teachers' perceptions of CT and the academic community's definition of CT. While researchers discuss CT in terms of abstraction, programming, systems thinking, debugging and big-data; science teachers describe the role of CT in terms of small-data, trend/pattern identification, and conclusion validation. If teachers are to adequately prepare their students for a CT-saturated future, teacher training programs must develop strategies for enhancing teachers' understanding of the discipline.

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**6:00 – 8:00 PM      Cook-Out (Shawnee/Cherokee Rooms)**

**8:00 – 10:00 PM      MA-ASTE Annual Celebration (KY Cabin)**

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# Saturday, September 30, 2017

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7:00 – 9:00 AM

**Registration**

7:00 – 9:00 AM

Breakfast in the Dining Room (use ticket from Registration Packet)

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## Session 7

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9:00 – 9: 20 AM

**That Was So Much Fun! Can We Do It Again: Stories of Elementary Science Teacher Enthusiasts**

*Presenter(s): Leslie Bradbury; Rachel Wilson, Appalachian State University*

Research articles and book chapters related to elementary science education frequently include a section in the literature review lamenting the state of elementary science teaching (i.e. Davis, Petish, & Smithey, 2006; Roth, 2014). In this presentation, we will offer a counter-narrative to this view by sharing the stories of elementary teachers in our local school system who are science teacher enthusiasts. We based the findings on interview transcripts and copies of lesson plans from 13 participants. Our hope is that by presenting an alternative view about elementary science teaching and teachers, we might open a new conversation that enables science educators to work with these STEs to improve elementary science teacher education as well as elementary science teaching in our area.

9:20 – 9: 40 AM

**Developing ELLs Academic Language through Science Notebooks**

*Presenter(s): Lisa A. Gross; Shanan Fitts, Appalachian State University*

The researchers present how English Language Learners' (Grades 3 and 4) academic science language was developed and communicated through writing in science notebooks. Using systemic functional linguistics, data from 12 ELLs notebooks were collected and analyzed. The researchers examined ELL students' ability to write scientific observations, record and apply data collected during inquiries, and utilization of data to support scientific thinking through science notebooks. Entries were coded using the analytic framework proposed by Ruiz-Primo & Li (2004) and the WIDA writing assessment (2012), specifically the areas of language control, linguistic complexity, and vocabulary usage. Findings include evidence of ELLs students' science language development, conceptual understanding, and use of data to support scientific claims. The researchers discuss how exploring science language and genres with youth helps to expand their linguistic repertoires, which in turn may increase students' interest and confidence when it comes to participating in the sciences (Fang, 2005).

9: 40 – 10:00 AM **Development of an assessment tool to measure the impact of an outreach program on children's life science conceptions**

*Presenter(s): Shelby L Snowden; Kerry O Cresawn, James Madison University*

Madison Discovery is a VA standards-aligned outreach program for 3rd-5th graders run by biology majors and pre-service teachers at JMU. Over the past three years, the program has reached over 3000 children. The high level of interest in the program is, in large part, attributed to a design that integrates the one-hour enrichment lesson into both their current science and math topics. In addition to sustaining the program in our local community, a long-term goal of Madison Discovery is to make it attractive to and adoptable by science faculty at other institutions. A critical step in this is to develop protocols for assessing the impact of the lessons on the students' conceptual understanding of the targeted topic. We will present preliminary results of a drawing-based assessment using stamps to gain a better understanding of 3rd graders conceptions of the trophic food pyramid before and after the aligned outreach lesson.

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**10:00 – 10:20 AM Mid-Morning Break**

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**Session 8**

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10:20 – 10:40 AM **Preservice Teachers' Understanding of the Three-dimensional Learning in a Science Lesson**

*Presenter: Deepika Menon, Towson University*

While three-dimensional (3-D) science learning including disciplinary core ideas, crosscutting concepts, and scientific practices has been emphasized by the Next Generation Science Standards (NGSS Lead States, 2013), there are limited resources and models to train and support preservice teachers to understand and implement 3-D learning in their lessons. The purpose of this research was to investigate how preservice secondary STEM teachers' understanding of standards (NGSS, Common Core) developed in a science methods course. We analyzed pre- and post-interviews of 27 preservice secondary STEM teachers. Findings suggest that preservice teachers' initial views on standards (NGSS, Common Core) fell on a continuum, with most of the responses indicating little awareness and knowledge of the need and relevance of standards in designing science lessons. Unlike before, preservice teachers associated 3-D framework as a guideline for what as well as how to teach science, and identified relevance of the new vision in science teaching.

10:40 – 11:00 AM **Professional Development Partnership: NGSS and UDL for Grades 6-8**

*Presenter: Sarah Haines, Towson University*

Effective implementation of the Next Generation Science Standards (NGSS) requires teachers to design flexible curriculum to ensure meaningful access for diverse learners. In this session, we describe findings from a collaborative partnership between a teacher preparation program and local school district focused on providing on-going, intensive professional development for general and special educators in high-needs middle schools. The professional development activities focused on applying UDL to teach the NGSS. This session also provides the framework used to design and implement the professional development as well as feedback from teachers involved in the project.

11:00 – 11:20 AM **Science Classroom Observation Instrument: Feedback for Teachers Implementing NGSS-Aligned Three-Dimensional Instruction**

*Presenter: Stephanie B. Philipp, University of Louisville, Steve Henderson, Briarwood Enterprises*

Teachers across the US are participating in professional learning programs to deepen their knowledge of the Next Generation Science Standards (NGSS) and to learn how to plan, teach, and assess across the three dimensions of the standards. To report on effective NGSS professional learning programs, we need to evaluate programs, in part, by looking at how teachers apply new knowledge and skills in classroom instruction. We have developed an easy to use classroom observation instrument aligned with the NGSS that gives descriptive feedback to both teachers and professional learning program leaders. We are currently using this instrument to formatively evaluate our two-year professional learning program that supports teachers developing and using NGSS-aligned classroom-embedded assessment tasks. Preliminary results show that the instrument gives targeted, descriptive feedback to teachers and points out program changes that could be made to support teachers' mastery of using science and engineering practices with their students.

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**11:20 – 11:30 AM Session Break**

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**Session 9**

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11:30 – 11:50 AM **Who Made that Decision?**

*Presenter: Helen Meyer, University of Cincinnati*

In this presentation I share the results of a research study with a focus on teachers' ideas about student decision making and control. The data comes from a larger study of teachers integrating engineering design lessons into the science and mathematics instruction. The design

process encouraged teachers to provide multiple opportunities for students to make decisions during the instructional unit. The potential decisions that could be turned over to students included items such as: defining the problem, selecting the product design, researching needed information, setting up design tests or product aesthetics. This qualitative study reports on the kinds of decisions the teachers were most comfortable allowing their students to make and how the teachers felt about allowing students to control the process. Data for the study was gathered from interviews and classroom observations.

The data used includes interviews, lesson observations, and lesson plans.

11:50 – 12:10 PM **The EiE-Ohio Project Year 2: Building 21st Century Learners**

*Presenter(s): Vinta A. Tiarani; Karen E. Irving; Kathy L. Malone; Trudy Giasi; Rachel L. Kajfez, The Ohio State University*

The EiE-Ohio: Building 21st Century Learners project is a collaboration between the Columbus City Schools and the Colleges of Education, Arts & Sciences, and Engineering at Ohio State University to introduce STEAM integrated engineering units to high needs elementary schools. The project includes training for three elementary teachers and one graduate student to implement the Engineering is Elementary (EiE) units designed with support from the National Science Foundation and the Science Museum of Boston. The second element of the project includes Summer Institutes I and II during which the teacher leaders, project leaders, and graduate students introduce the curriculum to elementary teachers at the participating schools. The third element of the project includes after-school and follow-up sessions to continue the professional learning community and to provide opportunities to share and critique video of classroom implementation. Findings from the first two years of implementation at six schools are presented.

12:10 – 12:30 PM **Critical Media Literacy in Elementary Science: Exploring the Messaging in Science Circular Narratives**

*Presenter(s): Kim Haverkos, Thomas More College; Stacey Britton, University of West Georgia*

This presentation will explore the messaging within a particular series, the *Science Studies Weekly*, which is developed by Studies Weekly, “America’s New Textbook” company ([www.studiesweekly.com](http://www.studiesweekly.com)). What are the science messages within these texts that the students are expected to learn? Do these messages suggest an ethical responsibility in terms of how one is to engage with and use science as a student or as an adult? Through the lenses of eco-justice and feminism, we used critical content analysis to explore the messages within second grade *Science Studies Weekly* texts. Science education through these weekly readers remains locked into a techno-oriented ideology with little to no time for reflection

on the ways in which ethical responsibility should be tied into educative experiences, particularly in science education. Our suggestion is that these readers need to be re-storied with an explicit agenda that applies critical media literacy to make room for ethical and moral discussions, critical thinking and decision making based in discussions of science vs. Science, new knowledges from marginalized voices and places, as well as hope.

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12:30 – 1:30 PM    **LUNCH (May Lodge Dining Room)**

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**12:30 – 1: 30 PM    MA-ASTE Business Meeting**

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### **Business Meeting Agenda**

- ⇒ Overview of 2017 Conference
  - Stephanie Philipp (Co-Chair)
  - Sherri Brown (Co-Chair)
- ⇒ Hosting and Plans for 2018 Mid-Atlantic Conference
- ⇒ 2017 Mid-Atlantic ASTE Graduate Student Research Presentation Award
- ⇒ Other Business

### **MA-ASTE Current Leadership**

<b>Regional Director</b>	Rommel Miranda Towson University
<b>Secretary</b>	Paula Magee, Indiana University-Purdue University Indianapolis
<b>Treasurer</b>	Rachel Wilson Potter, Appalachian State University