

Mar 21st, 7:00 AM

STEM Conference 2019

STEM Conference

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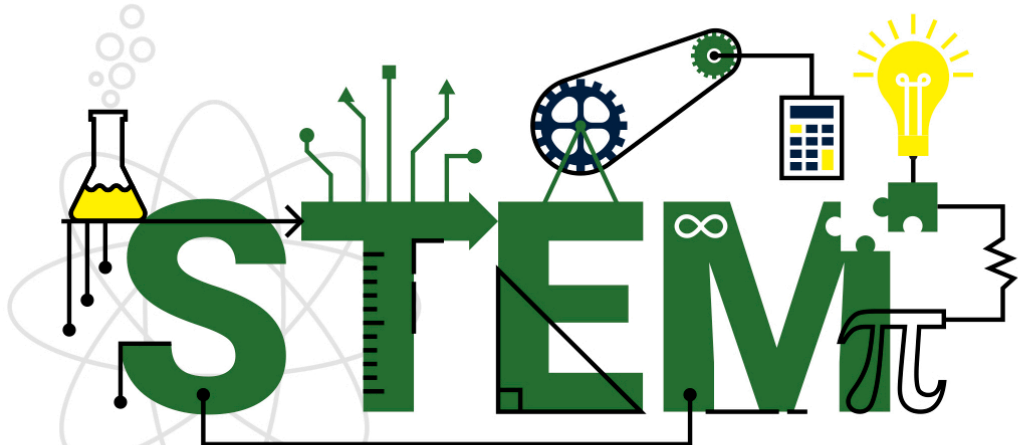


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Interdisciplinary STEM Teaching & Learning Conference

8th Annual i²STEM^e Conference

March 21-23, 2019

Georgia Tech-Savannah Campus | Savannah, GA



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Coordinator, i²STEM[®],
Georgia Southern University

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Assistant Professor,
University of Northern Iowa

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i²STEM[®], Georgia Southern University

Cynthia Bolton-Gary
Associate Dean,
Georgia Southern University

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★ **Featured or Keynote Speaker**

90 Minute Workshop

45 Minute Session

20 Minute Research Burst



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Thursday, March 21

6:00-8:00 pm Poster Reception at Georgia Tech-Savannah Campus

Friday, March 22

8:30-9:30 am Registration

9:30-11:00 am Workshop 1 (90 Minutes)

9:30-10:15 am Session 1 (45 Minutes)

10:30-11:15 am Session 2 (45 Minutes)

11:30-11:50 am Research Burst 1 (20 Minutes)

12:00-1:00 pm Lunch (Provided)

1:00-2:00 pm Keynote, Dr. Natalie King: *Dismantling Divisive Walls to Promote Diversity and Inclusivity in STEM Education*

2:15-2:35 pm Research Burst 2 (20 Minutes)

2:45-4:15 pm Workshop 2 (90 Minutes)

2:45-3:30 pm Session 3 (45 minutes)

3:45-4:05 pm Research Burst 3 (20 Minutes)

4:15-4:35 pm Research Burst 4 (20 Minutes)

4:45-5:00 pm Research Burst 4 (20 Minutes)

5:00 pm Dinner on Your Own

Saturday, March 23

8:00-8:30 am Registration | Continental Breakfast 

8:30-10:00 am Workshop 3 (90 minutes)

8:30-9:15 am Session 4 (45 minutes)

9:30-9:50 am Research Burst 5 (20 Minutes)

10:00-11:30 am Workshop 4 (90 minutes)

10:00-10:45 am Session 5 (45 minutes)

11:00-11:20 am Research Burst 6 (20 Minutes)

11:30-11:50 am Research Burst 7 (20 Minutes)

12:00-1:30 pm Keynote, Dr. Micah Shippee: *WanderlustEDU*

1:30 pm Closing Remarks | Conference Adjourns

1:45 pm Grab and Go Lunch (Provided)

Speakers

Keynote Speakers



Dr. Natalie S. King

Assistant Professor of Science Education, Georgia State University
Dismantling Divisive Walls to Promote Diversity and Inclusivity in STEM Education

Friday, March 22 | 1:00-2:00 pm | Page 10

Natalie S. King, Ph.D., is an assistant professor of science education at Georgia State University. Her scholarly work focuses on advancing girls of color in STEM education, community-based youth programs and the role of curriculum in fostering equity in science teaching and learning. King is passionate about preparing students to enter careers within the STEM disciplines and founded I AM STEM, a community-based program that provides a comprehensive curriculum embracing students' cultural experiences while preparing them to become productive and critically-conscious citizens. King offers training and curriculum support so that organizations can deliver high-quality and affordable STEM programs to develop this generation's scientists, engineers, inventors and mathematicians.



Dr. Micah Shippee

Social Studies Teacher, Liverpool Middle School
WanderlustEDU

Saturday, March 23 | 12:00-1:30 pm | Page 19

Micah Shippee, Ph.D., is a social studies teacher and educational technology trainer, and works to bridge the gap between research and practice in the educational sector. He explores ways to improve motivation in the classroom and seeks to leverage emergent technology to achieve educational goals. As an innovative "ideas" person, Shippee likes to think, and act, outside the box. As an educational consultant and keynote speaker, he focuses on the adoption of emergent technology through the development of an innovative learning culture. He believes that innovation is the pedagogy of the future.

Featured Speakers



Kania Greer
Ed.D.
Georgia Southern
University
(p. 13)



Sabrina Grossman
CEISM
Georgia Tech
(p. 11, 18)



Jayma Koval
CEISM
Georgia Tech
(p. 8, 11, 18)



Michael Kuenlen
Ph.D.
Mercer University
(p. 8)



Charles Roberts
Ph.D.
Mercer University
(p. 8)



Jeffrey Rosen
CEISM
Georgia Tech
(p. 14, 18)

Thursday, March 21

6:00-8:00 pm

Conference Poster Reception

Georgia Tech
Savannah Campus
PARB 114/115

Poster Presentations

3-in-1: Design and Gamified Delivery of an Online Pre-Med Organic Chemistry/Biochemistry Course

Suzanne Carpenter, Georgia Southern University

STEM courses that must successfully train students to become fluent in a range of challenging foundational skills and knowledge must also maintain student engagement and challenge without frustrating students who begin their learning with a range of experience and aptitude. The presenter will describe the design of a unique, online undergraduate chemistry course combining the topics of biological relevance in three chemistry courses (organic chemistry I, organic chemistry II and biochemistry) into a single non-laboratory course for the Georgia Southern University medical laboratory science program. Essential information is conveyed using pecast audiovisual lectures that are fully controlled by students to adjust information flow and repetition. Flashcard applications are used by students to build fluency in foundational terminology and knowledge. Lastly, a gamified, interactive environment is used to incentivize students to master course content and collaboratively construct higher-level knowledge in cooperation and competition with their peers.

Pico Grid-Smart Home ENERGY Management System

James Conaway, Statesboro High School, Georgia Southern University, National Science Foundation Energy Program

Donita Legoas, AR Johnson Health Science & Engineering Magnet School, Georgia Southern University, National Science Foundation Energy Program

Kristina Istre, AR Johnson Health Science & Engineering Magnet School, Georgia Southern University, National Science Foundation Energy Program

Two middle school STEM teachers worked alongside two engineering graduate students and an engineering professor to experiment with a home energy management system. This system was designed to automatically detect and classify incoming signals to keep track of power consumption on a per-device basis by monitoring the current (and voltage) flowing through a single electrical outlet. The knowledge and expertise that these middle school teachers have obtained will be utilized to create an energy unit that will be shared in their seventh and eighth grade classrooms. These units cover Georgia Department of Education (DOE) curriculum standards in STEM.

Engaging Students with Disabilities Through Robotics

Karin Fisher, Georgia Southern University

The purpose of this presentation will be to provide information about the importance of engaging students with disabilities in after-school robotics programs. Students with disabilities (SWD) often lack skills to form relationships with other students and most educators do not know how to teach teamwork skills (Loughry, Ohland, & Woehr, 2013). More importantly, teamwork, social skills and soft skills are needed in the workplace (Phillips & Kaseroff, 2014). Students who participate in after-school activities have improved academic performance and psychosocial development (Durlak, Weissberg, & Pacan, 2010). Yet many students with disabilities do not participate in extracurricular activities. This presentation will highlight the popularity of robotics programs for SWD, the law and funding for SWD to participate in after-school activities, the researcher's experience coaching a team of students with autism, and how to start a robotics program at your school.

Pilot Study for the Self-Tracking, Assessment and Reflection Study (STARS) in a General Chemistry Course

Issac Graves, Georgia Southern University

Shainaz Landge, Georgia Southern University

Jessica Orvis, Georgia Southern University

This presentation will focus on a time management study where in the presenter focused on a class of undergraduate students in their first semester of a chemistry (Principles of Chemistry I) course. The intended purpose for this project was to understand how the use of instructor-designed time management tools and intervention techniques relate to the students' success as measured by exams and overall course grades. The overarching goal was to help students responsibly allocate their time and resources to focus more on their study habits and success.

Thursday Schedule

Teaching About Phenomena Using the Next Generation Science Standards (NGSS) 3D Framework

Alejandra Lara-Chavez, Georgia Southern University

This poster presentation will highlight the presenter's work on incorporating a phenomena-based learning segment using a 3D framework into a high school biology class. The presenter created, implemented and refined individual lessons based on personal and colleague reflection. In addition, the presenter analyzed students' growth in implementing the classroom's evidence research framework. Examples of student work will be shared for participants to get a more holistic idea of the lessons that were developed and used. Next steps for lesson plan revision and implementation will also be discussed. Participants will leave with access to the full lesson plans.

Comparative Study of Brain Activities in Immersive Visualization Environments: An Innovative Pedagogical Technique

Max North, Kennesaw State University

Immersive visualization environments, and variations of virtual reality technologies, hold great promise for creating and advancing innovative pedagogical techniques in STEM and other related disciplines. This poster presentation will specifically show a comparative study of brain activities that were performed to determine the effectiveness of different Immersive Visualization Environments in pedagogy.

NOTES



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Friday, March 22

8:30 am-9:30 am Registration

Lobby

9:30-11:00 am Workshop 1 (90 Minutes)

PARB 114/115

Become Future Ready! Start Coding Today!*David Lockhart, Big Guy in a Bow Tie*

Well, folks, we have a new language and it's the language of the future. Coding is in! We have to get our students into this world where there simply aren't enough people yet. Apple, Google and all the others don't have enough engineers to fill their jobs, and it's just going to get worse unless we do something about it. Come to this presentation and find simple coding solutions for the beginning tiny ones and the more advanced, older crowd. Participants will get plenty of chances to see how this can fit into their class and to really get started with coding tools!

ELAB 21

Content and Instructional Strategies: Results of a Math and Science Partnership (MSP) Workshop*Janel Smith, Georgia Southern University*

The presentation will explore elements of a two-year workshop that supported hands-on, research-based professional development in contrast to how participants engaged in activities. Specifically, the presentation will discuss the results of a two-year MSP workshop funded by a state grant that partnered faculty from a university with over 30 teachers from a local county. While analyzing results, the presenter will discuss and explore how workshops can model best practices of STEM education and changing teacher practices through an intensive two-year program of professional development.

9:30-10:15 am**Session 1 (45 minutes)**

PARB 126

Technology-Based Collaborative Learning of Flipped Model in Monolingual and Bilingual Classrooms (and Students' Learning Outcomes in Biology)*Adebiyi T. Oladosu, College of Education, Ikere, Ekiti State, Nigeria*




This presentation will detail a study wherein a flipped model of personalized learning was adopted using WhatsApp for both monolingual and bilingual classrooms. Ninety randomly sampled biology students of the College of Education in Ekiti State, Nigeria were used for the study. The sampled population of traditional, monolingual and bilingual consisted of 30 students each. The monolingual and bilingual groups were flipped before each of the instructions using their personal WhatsApp. However, the monolingual group was strictly restricted to the lingua franca as means of instruction and during collaboration among the students. Meanwhile, students in the bilingual group could speak the language of their immediate environment during collaboration in the classroom and were encouraged to do so. Biology Achievement Tests were administered on the three groups. The findings from the study show that students in the bilingual classroom performed better than those in the monolingual one, and those in monolingual, tech-based collaborative learning performed better than the traditional group. It was therefore recommended, among others, that the language of the immediate environment should be incorporated into instructional strategy when students are collaborating in a flipped classroom.

PARB 127

Using LEGO Robots to Understand the Relationship Between Rate of Change, Unit Rate and Slope*Shelli Casler-Failing, Georgia Southern University*

This presentation will allow participants to become middle school mathematics students as they collect data to determine the rate of the robot. A classroom lesson will be conducted (with the participants playing the role of the student) to show how LEGO robots can be an engaging tool to create collaboration among students as well as support the understanding of concepts. Participants will work in groups of 2-3 to measure and record the distance traveled by their robot during three different pre-programmed times. The data will be recorded and graphed before being used to complete a series of tasks to create a connection between rate of change, unit rate, and slope. This presentation will culminate with a discussion regarding participants' reactions to the activity and its implication for classroom use.

Friday Schedule


- PARB 128  **Create a Generation of Problem Solvers with Engineering is Elementary**
Jayma Koval, Georgia Institute of Technology, CEISMC
Engineering is Elementary is an engineering curriculum for learners in pre-kindergarten through the eighth grade that was developed by the Museum of Science in Boston. The curriculum is hands-on, research-based and designed to introduce learners to the engineering design process while creating a generation of problem solvers. There are 20 hands-on, engineering design challenges that complement science topics including electricity (electrical engineering), balance and forces (civil engineering), and insects (agricultural engineering). In this session, participants will explore sample design challenges while learning more about the curricular offerings from Engineering is Elementary and other available professional development opportunities.
- PARB 227 **Definitions and Meaning for Future Teachers in Spatial Measurement: Length, Area and Volume**
Eryn Stehr, Georgia Southern University
Jia He, Augusta University
students in the United States have consistently demonstrated poor performance in spatial reasoning in standardized testing. One possible reason is students' lack of conceptual understanding of measurement concepts (length, area, volume, capacity). This session will engage participants in activities that compare and contrast different ways to define meanings of measurement concepts. The presenters will share card sorts that use several definitions of each concept from mathematics textbooks written for future elementary teachers (e.g., Beckmann, 2012) and from elementary mathematics curricula (e.g., Saxon Math). Participants will reflect on how various definitions may affect the understanding of measurement concepts of future elementary teachers and elementary students
- PARB 239  **Building Your STEMpire**
Michael Kuenlen, Georgia Public Broadcasting
Looking for more high-quality resources for STEM Education? Get started with GPB Education, Discovery Education and PBS LearningMedia resources. The presenter will cover how to navigate through the three websites, how to curate your own collection of resources, and some tips for engaging implementation in the classroom.
- PARB 255  **Developing Essential Learning and Study Skills Among Students in STEM Courses at Higher Education Institutions**
Charles Roberts, Mercer University, Macon
To prepare students for success in STEM courses and beyond, it is often necessary to implement measures that promote their development of needed concomitant skills, including their ability to communicate effectively. Fully engaging students in performance-enhancing, problem solving activities that promote the sound development of essential critical thinking and logical reasoning skills is a must. Getting them to incorporate a myriad of high-impact learning and study strategies into their daily routines is equally urgent. In this session, a tried and effective method of accomplishing those objectives, through proven pedagogical means, will be explored and illustrated.

10:15-10:30 am

Break | Visit Exhibitors

10:30-11:15 am

Session 2 (45 Minutes)

- PARB 127  **Mission STEM Possible**
Michael Kuenlen, Georgia Public Broadcasting
Ready to go deeper into Discovery's resources? Discovery Education partners with countless companies and organizations to offer a robust collection of lesson plans, virtual field trips, family activities and more. In this session, the presenter will explore these resources with tips for utilizing them in the classroom.

PARB 128

Ethical Hacking: Teaching Cyber Safety from a Hacker's Point of View

Bryson Payne, University of North Georgia

This session will primarily be for high school and middle school teachers, with a focus on ethics and teaching students both the how and why of cybersecurity. For example, teachers often tell students not to save their passwords on classroom or library computers. But, when shown how to hack a stored password in any browser with just five clicks, students finally understand why password security is so important.

PARB 239

Using Math Acceleration to Address Deficiencies of STEM Students*Jesse Kiefner, Community College of Baltimore County*

The Community College of Baltimore County (CCBC) developed the Accelerated Mathematics Program (a.m.P) in 2009 to address student deficiencies in mathematics. At CCBC, approximately 70% of incoming students are not college-ready and must complete developmental coursework. a.m.P allows students to register concurrently for consecutive math courses, enabling students to complete math coursework in half the time. STEM students with developmental math needs have the most to gain; completion, retention and engagement have increased since implementing this co-requisite learning model! Attendees will learn about the nuts-and-bolts of this model, best practices for implementation, instructional strategies, lessons learned and future planning.

PARB 227

Making STEM Fun and Interactive in the Preschool Classroom for Retention and Readiness*Dwight Calhoun, Mr. Cardiotone Enterprises, LLC*

The Mr. Cardiotone Enterprises' STEM Fitness Academy International (SFAI) Curriculum is categorized as an R1 project in progress. The curriculum shows teachers how to build a gradual and systematic continuing STEM education program for preschoolers as they transition into the primary, secondary and post-secondary classroom. The SFAI curriculum also uses the STEM Chessboard Game which is a 64-block, daily lesson plan geared toward specific teaching and student learning (blended contexts) in an ongoing STEM education. As a multi-faceted curriculum, SFAI has a dual purpose of not only STEM education but an integrated, recreational wellness and fitness program which simultaneously combats childhood obesity and diabetes.

11:30-11:50 am**Research Burst 1 (20 Minutes)**

PARB 126

Developing Civic-Mindedness in Middle- and High-School Students Using Service-Learning*James Hopper, EAST Initiative*

This presentation will examine the development of civic-mindedness in middle and high school students as observed via case studies of two rural schools during the 2017-2018 school year. Further discussion will center around how integrating service-learning projects into classes can help secondary educators develop civic-mindedness in students.

PARB 127

Investigation in Ethno-STEM: Experiences in Indigenous Knowledge Systems*Iman Chahine, University of Massachusetts Lowell*

Ethno-STEM is an emerging program that calls for infusing cultural practices in STEM education. As an integrated field of knowledge, ethno-STEM is an inherent component of indigenous knowledge systems (IKS), which has been recently established by international world organizations as a top global priority for empowering communities in their efforts towards sustainable development (Kapoor & Shizha, 2010). However, despite its highly proclaimed importance for the preservation of social and traditional capitals around the world, no clear effort has been cited that sheds light on the contributions of cultures to the mainstream STEM knowledge. With more than 6,000 cultures having existed within the last 500 years, it has never been more important for STEM teachers across geographic settings to understand and appreciate the riches that can be cultivated from studying cultural practices and their contribution to STEM education. In this presentation, participants will engage in ethno-STEM investigations that are inspired by cultural practices and that can enrich STEM teaching and learning. The main goal of this research is to advance teachers' understanding of the role of cultures in producing and disseminating mathematical/scientific knowledge systems. The overarching goal is to increase knowledge of ethno-STEM fields, to enhance awareness of different perspectives, and to encourage mutual understanding and intercultural relationships.

11:50 am-12:00 pm Break | Visit Exhibitors

Friday Schedule

12:00-1:00 pm

Buffet Lunch

1:00-2:00 pm

PARB 114/115

Keynote

Dismantling Divisive Walls to Promote Diversity and Inclusivity in STEM Education

Dr. Natalie King, Georgia State University

In this presentation, King will share her stance on STEM education being a civil right and how educators can center access, equity and inclusivity through citizen science. She will present tangible approaches that teachers can utilize to embed service learning into their courses, and how K-12 teachers and administrators can build capacity to sustain their STEM programs and course offerings. In dismantling divisive walls, King will center faith-based institutions as an under-utilized resource in the community. Churches have the potential to be a driving force for STEM education (particularly during out-of-school time), and can positively impact younger generations by working through the complex dynamics of sustaining STEM partnerships. Furthermore, when churches are overlooked or excluded, there are missed opportunities to foster intergenerational relationships, civic leadership and activism for more purposeful STEM engagement. King invites participants to reimagine a more comprehensive, critical and collaborative commitment to community-based STEM education.

2:00-2:15 pm

Break | Visit Exhibitors

2:15-2:35 pm

Research Burst 2 (20 Minutes)

PARB 127

Teaching Technical Writing to Engineering Students: Design, Implementation and Assessment for Project-Based Instruction

Yang Gao, San Jose State University

This study, through the perspective of project-based instruction (PBI), designed, implemented and then assessed a technical writing course for engineering students. The study first analyzed the existing literature by addressing current challenges in technical writing for students in engineering majors and why PBI is an effective pedagogy in teaching technical writing to engineering students. The study then introduced the design of a semester-based technical writing course and specific timeline, writing tasks and projects that had been involved in the course. The study then described specific tasks through the rationales behind each task and the connections between them. Different from the existing literature that has evaluated the effectiveness of PBI from a student perspective, this study examined PBI effectiveness from a teacher perspective. The study finally proposed alternative methods to assess PBI and described specific methods and participants involved in the assessment process.

PARB 128

Is an Open-Source Curriculum Effective? An Assessment of Open-Source Curriculum Against a Text-Based Curriculum

Senthil Balaji Girimurugan, Florida Gulf Coast University

The presentation will help researchers gain more insight in implementing a text-based curriculum as opposed to an open-source-based curriculum. Results of data analysis from an ongoing project will be presented for discussion. Administrators and faculty could take a guided approach in choosing curriculum using the study results with academic freedom and other factors in mind.

Enjoying the conference? Share what inspires you!

#STEM19



2:35-2:45 pm

Break | Visit Exhibitors

2:45-4:15 pm

Workshop 2 (90 Minutes)

PARB 126

Making “Sense” of Functions*Dennis Wilson, Texas Instruments*

Student comprehension of functions is more complete when they are presented with multiple representations. In this session, participants will examine functions outside of the traditional numerical, algebraic and graphical models. Using the TI-Innovator, numerical input will be transformed into real-world output that students can see and hear. Real-world input will then be used to create numerical and graphical output. Come hear the difference between linear and exponential functions.

PARB 239

**Under the Sea: A Deep Dive into 3D Learning Curriculum Modules Using Authentic Phenomena in Marine Environments***Sabrina Grossman, Georgia Institute of Technology, CEISMC**Jayma Koval, Georgia Institute of Technology, CEISMC*

The presentation will showcase week-long, life science modules that were developed to emphasize the integration of math and science practices. The practices are grouped together into integrative themes (experimental design, data visualization and data-driven decision making) which highlight concepts in NGSS science and engineering practices, providing a foundation for three-dimensional learning within an authentic context. This session is aimed at K-12 teachers who will preview life/marine science modules such as Marine Snow, Oil Spill, Deep Sea, Coral Reef, and Crab Aquarium challenges. Participants will also receive access to curriculum materials and discover how the modules can be integrated within their classrooms.

ELAB 21

Engaging Events: Using QR Codes to Bring Your School Events to Life*Alexandria Newton, Green Charter of the Midlands*

Student engagement is one of educators' top priorities. Participants in this session will learn how to use QR codes to increase engagement not only of students but parents, community members and stakeholders as well. These activities will also enhance student communication skills, collaboration skills and creativity.

2:45-3:30 pm

Session 3 (45 Minutes)

PARB 114/115

**Fireside Chat for Those Interested in Building and Sustaining Community Partnerships***Natalie King, Georgia State University*

This session will serve as an informal dialogue with attendees who are interested in building and sustaining community partnerships.

PARB 127

Using LEGO Robots to Support Understanding of Absolute Value in a Mathematics Classroom*Ann Mitchem, Georgia Southern University**Jillian Arnold, Georgia Southern University**Shelli Casler-Failing, Georgia Southern University*

This presentation will allow participants to become middle school mathematics students as they apply their understanding of absolute value through the use of LEGO robots. A classroom lesson will be conducted (with the participants playing the role of the student) to show how LEGO robots can be an engaging tool to create collaboration among students as well as support the understanding of concepts. Participants will work in groups of 2-3 to operate a robot along a number line and record data on a task sheet as the robot moves forward or backward in random increments. This presentation will culminate with a discussion regarding participants' reactions to the activity and its implication for classroom use.

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PARB 128

Cotton: From Farm to Market—Bringing Ag. into Elementary

Justin Liles, Jim Mack Odom Elementary
Lauri Dalton, Jim Mack Odom Elementary
Patricia Lirio, Jim Mack Odom Elementary
Maggie Wilson, Jim Mack Odom Elementary

As a rural elementary school striving for STEM certification in south Georgia, the presenters bring real-life and real-world experiences into their instruction. Being from Colquitt County, where farming is the largest industry and home of the Agriculture (Ag.) Expo, the presenters decided to incorporate agriculture into their classrooms in all subject areas. Their students attend the Ag Expo as one of their connection times each week. Each grade has some form of a continual agricultural project contributing to a long-term STEM project of providing food to a local senior center. In this session, the presenters will share how they bring agriculture to an elementary school and give participants a small glimpse of an agricultural STEM activity called “Cotton: From Farm to Market.”

PARB 227

Building a Culture for STEM/STEAM Success

Allyson Morgan, Georgia Department of Education
Rontra Brown, Georgia Department of Education

During this session, the presenters will share information about building a STEM/STEAM culture, navigating the certification process, and using Title IV funds for your STEM/STEAM initiatives. This session is for K-5 and 6-12 teachers, school leadership and system leadership. There will be time for discussion and a Q-and-A session.

PARB 255

Pico Grid-Smart Home ENERGY Management System

James Conaway, Statesboro High School, Georgia Southern University, National Science Foundation Energy Program
Kristina Istre, AR Johnson Health Science & Engineering Magnet School, Georgia Southern University, National Science Foundation Energy Program

Two middle school STEM teachers worked alongside two engineering graduate students and an engineering professor to experiment with a home energy management system. This system was designed to automatically detect and classify incoming signals to keep track of power consumption on a per-device basis by monitoring the current (and voltage) flowing through a single electrical outlet. The knowledge and expertise that these middle school teachers have obtained will be utilized to create an energy unit that will be shared in their seventh and eighth grade classrooms. These units cover Georgia Department of Education (DOE) curriculum standards in STEM.

3:45-4:05 pm

Research Burst 3 (20 Minutes)

PARB 127

**SciComm: What Does it Mean to Communicate with the Public?**

Kania Greer, Georgia Southern University

Science communication has come a long way in recent years, however, researchers still struggle with making their research relevant, interesting and accessible to the general public. This session will look at the ways science (and research in general) is communicated and provide some tips on helping researchers communicate more effectively including audience participation, humor and formative assessment. This session is focused on researchers but is relevant to post-secondary education and K-12 educators as well.

PARB 128

A Different World: Seeing the World Through Virtual Reality (VR)

David Lockhart, Big Guy in a Bow Tie

What's one of the best things about technology in the classroom? It's being able to connect with the outside world and, thankfully, there's cutting-edge technology that lets us do it easily in virtual reality! Come to this session to learn what you need to get started, how to jump in easily, and how to move to the next step of building your own. Of course, there is also time to experience it firsthand and an idea-share to bring it all together!

Friday and Saturday Schedule

4:15-4:35 pm

Research Burst 4 (20 Minutes)

PARB 227

An Integrative Approach to STEM Education Methods Courses for K-12 Teachers

Rebecca Gault, University of West Georgia

Stacey Britton, University of West Georgia

STEM teachers are faced with the challenge of implementing a curriculum integrated across content areas with rich tasks that address real-world concerns. Teachers may find that their backgrounds in one content area have left them under-prepared for integrative planning. In developing two methods courses for the graduate STEM Endorsement program in the College of Education—one with science as the emphasis and one with mathematics—the presenters realized their courses should be coordinated, integrated and adapted to have more emphasis on engineering and technology. This presentation will provide an overview of how they attempted to accomplish this goal.

PARB 255

An Investigation into Persistence and Non-Persistence of Second- and Third-Year Engineering Students

Kimberly Ball, Mississippi State University

Persistence rates are low for engineering students across the United States with less than 40% graduating. There are very few studies which examine reasons engineering students either persist or do not persist during their second and third years in school. Based upon Tinto's Model of Retention, quantitative and qualitative reasons will be looked at in terms of institutional factors and individual factors for the 2014 entering class of 714 freshman engineering students at a mid-size research university who are currently enrolled in their fifth year (since less than 20% graduate in four years).

4:45-5:00 pm

Closing Remarks

5:00 pm

Dinner on Your Own

Saturday, March 23

8:00-8:30 am

Registration | Continental Breakfast



8:30-10:00 am

Workshop 3 (90 Minutes)

PARB 114/115



STEM Innovation and Design: Integrating Math and Science into MS Engineering and Technology

Jeffrey Rosen, Georgia Institute of Technology, CEISMC

During this workshop, participants will engage in select activities that were created as part of a STEM-integrated engineering and technology middle school course. The 18-week courses take students through the middle school standard for engineering and technology while strengthening their foundational math skills and science practices. The courses were developed as part of an National Science Foundation-funded project and current results will be shared to demonstrate the courses founded impact on math and science learning. Participants will take part in the collection of data and see how this experience connects students to learning across disciplines through application. By the end of the session, participants will see how integration was accomplished in the course and how they can access the materials at their own schools for teaching or for pre-service learning.

**Workshops
Continue on
the Next Page**

PARB 126

Moving Towards Understanding with TI-Rover

Dennis Wilson, Texas Instruments

Student understanding of mathematics is more authentic when it is presented with multiple representations. Participants will examine mathematical ideas of the traditional numerical, algebraic and graphical models in the context of the real world. Using the TI-Innovator and TI-Rover, numerical input will be transformed into real world output that students can experience. Output from the Innovator and Rover will help students make sense of algebraic and geometric problems as they persevere in solving them.

ELAB 21

Engaging the STEM Classroom

Kiara Love, Oak Hill Middle School

Tiandra Harris, Georgia College and State University

Benita Blackwell, Oak Hill Middle School

In this session, teachers will be introduced to different ways of enhancing the STEM classroom through music, movement, content and retention. With technology constantly changing, instructors must create new ways to evolve with technology. Being able to evolve will continue to keep instructors relevant to their students. The audience for this session is K-12 teachers.

8:30-9:15 am

Session 4 (45 Minutes)

PARB 127

Preparing Future Interdisciplinary Scientists

Hagar Labouta, University of Manitoba

The presenter will examine how authentic, interdisciplinary science experiences allow undergraduate science students to transfer their learning beyond the initial learning context. The presenter will also show that, when undergraduate science students practice science in an authentic, interdisciplinary science environment, they better excel as future interdisciplinary scientists. Recommendations for design principles to help other science programs foster an effective interdisciplinary community of science practice in their contexts will also be discussed. The presenter will engage the participants in discussion on how to incorporate these principles in other educational STEM contexts.

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Saturday Schedule

PARB 128



Engaging Students in Renewable Energy

Donita Legoas, AR Johnson Health Science & Engineering Magnet School, Georgia Southern University, National Science Foundation Energy Program

This session will share lesson plan activities, research and strategies involving renewable and non-renewable energy concepts acquired through the Georgia Southern University Summer Energy Program offered through a National Science Foundation grant. Working in the engineering lab with a professor and two graduate students, teacher participants designed a cost effective, efficient, dual-axis solar tracker with an Arduino microcontroller and sensors. Light, humidity, temperature and compass sensors were used to establish a relationship between solar intensity, humidity and temperature. In addition, a smaller, similar dual-axis tracking model was designed and fabricated to utilize with students in middle school classrooms. Solar tracking, wind, nuclear, water, geothermal and biomass fuel resources will be shared in the workshop. Finally, information to apply for the Georgia Southern Summer Energy Program will be shared with attendees.

PARB 239

Reconceptualizing the Roles and Contributions of Girls and Women in STEM

Natalie King, Georgia State University

In this presentation, Dr. King will explore how educators can leverage the multiple identities of girls of color and engage them in STEM learning through civic leadership, activism and intergenerational relationships. She will provide examples of youth activism being enacted through community-based initiatives and how educators can create spaces where deficit notions about girls of color can be problematized and replaced with affirming narratives. Attendees will learn how to challenge the capitalistic agenda for encouraging girls' involvement in STEM, and reframe STEM as a mechanism to promote sisterhood and social justice. Improving the plight of women and girls in STEM requires action on both the micro and macro levels.

PARB 227

What is the State of STEM in America?: Defining the Challenges and Opportunities for All Sectors

Erin White, STEMconnector

The challenges, opportunities and context of "STEM" has changed significantly in the 20 years since the National Science Foundation coined the term. This presentation will ground the audience in the present, establishing a common language for those working in any sector that touches STEM talent pathways. It will describe the current STEM landscape including the organizations, systems and influences that comprise it. The presentation will explore the five critical gaps in STEM talent uncovered in the State of STEM report. Finally, the presentation will outline best practices in closing these gaps that can be employed by educators, industry and others.

PARB 255

Bridging the Gap: Preparing STEM Students for Careers in Healthcare

Tasia Hilton-Betton, Saint Leo University

Science, technology, engineering and math (STEM) skills are important to many healthcare careers. For many entry-level healthcare jobs, a foundation in science and mathematics is required. This session will teach educators the importance of STEM skills in the healthcare industry and provide best practices for inspiring and preparing STEM students to pursue a career in healthcare.

9:30–9:50 am

Research Burst 5 (20 Minutes)

PARB 127

Creative Coding: Adding Coding to Your CORE Class*David Lockhart, Big Guy in a Bow Tie*

Learning to program is such an important skill, but we will only scratch the surface if we do it in specialized classes. It's time to get coding into CORE classes, and there is no better way to get it there than the ideal of classroom creation! Think about it, you can have kids create while learning a future skill. Come to this session to learn how!

PARB 128

A Flipped Large Calculus 1 Class: First Observations and Conclusions*Piotr Mikusinski, University of Central Florida*

Gateway courses like Calculus 1 are widely known to be the stumbling block of retention in STEM disciplines. With success rates of entry calculus classes at about 50%, a large metropolitan university with typical Calculus 1 classes between 230 and 460 students, are applying active learning strategies in these large lecture settings. Beginning with the smaller section, faculty implemented a flipped format delivery with six undergraduate Learning Assistants helping students during class. The use of these evidence based strategies in this setting are new to the department. This session will provide attendees details on how the project was implemented, the active learning strategies used, and experiences from the perspective of the instructor, participants and the Learning Assistants. Results from this pilot will add to the growing body of knowledge of how research-based instructional strategies designed in other STEM disciplines work in large lecture math courses.

9:50–10:00 am

Break | Visit Exhibitors

10:00–11:30 am

Workshop 4 (90 Minutes)

PARB 227

How to Take STEM from Activities to Interdisciplinary or PBL*Kaija Spencer, InnovativeSTEM PD*

In this workshop, the presenters will focus on progressing STEM instruction from activities to PBLs and interdisciplinary instruction. In discussing PBLs and interdisciplinary instruction, the presenters will address the development of curriculum (utilizing state standards) to support both PBLs and interdisciplinary instruction, student learning and outcomes, authentic learning, collaborating across disciplines, and community partnerships. They will also share their professional experiences with participants including the struggles and victories. By participating in this workshop, it is their hope that all attendees will leave with a better understanding of how to move from just doing STEM activities to engaging students in PBLs and interdisciplinary instruction via STEM.

PARB 255

Combining Math, Literacy, Science and More: Centers in Action*Janel Smith, Georgia Southern University*

Research shows that the integration of content is a beneficial quality to K-12 education and is a cornerstone of a STEM program. Teachers are encouraged to make connections between disciplines, without specific guidance as to how this looks, sounds and feels. This workshop will involve teachers as students to experience interdisciplinary education through a centers format. The teachers will then explore the opposite perspective to plan for interdisciplinary centers for one's own classroom. This gives teachers an opportunity to take the learning experience and implement it practically in one's elementary or middle grades classroom.

Saturday Schedule

10:00–10:45 AM

Session 5 (45 Minutes)

PARB 127

Exploring Geometric Theorems in Dynamic Geometry Environments

Tuyin An, Georgia Southern University

Proof and reasoning about geometric theorems play a key role in both secondary and college geometry education. Students' visualization and creativity in geometric reasoning are often limited by using traditional learning tools (e.g., paper and pencil). Research has shown that using the dragging feature of Dynamic Geometry Environments (DGEs) can promote students' understanding and reasoning ability in geometry learning. In a college geometry course, the presenter explored some theorems using the free online DGE, GeoGebra. This powerful tool helped students gain a deeper understanding about the nature and logic of geometric theorems.

PARB 128

Input and Output: Using LEGO Robots to Understand Functions

Shelli Casler-Failing, Georgia Southern University

This presentation will allow participants to become middle school mathematics students as they use a LEGO robot to collect data in order to determine "the function." A classroom lesson will be conducted (with the participants playing the role of the student) to show how LEGO robots can be an engaging tool to create collaboration among students as well as support the understanding of concepts. Participants will work in groups of 2-3 to develop a table of input and output data, which will then be used to determine the function represented by the data. This presentation will culminate with a discussion regarding participants' reactions to the activity and its implication for classroom use.

ELAB 21



Integrate Your Physical Science and Algebra Curriculum Using Energy-Based Simulations from the A.M.P-IT-UP Project

Jayma Koval, Georgia Institute of Technology, CEISMC

Sabrina Grossman, Georgia Institute of Technology, CEISMC

Jeffrey Rosen, Georgia Institute of Technology, CEISMC

During this presentation, researchers from Georgia Tech will present four simulation-based curriculum modules that can be used in eighth grade physical science and algebra courses. The modules are contextualized in energy concepts and were developed to emphasize the integration of math and science practices within grade-level specific disciplinary content. A laptop or internet-ready device is necessary for exploring the simulations. Session attendees will receive access to curriculum materials.

10:45–11:00 AM

Break | Visit Exhibitors

11:00–11:20 am

Research Burst 6 (20 Minutes)

PARB 127

Prerequisite Coursework as a Predictor of Performance in Subsequent Science Courses

Mark Wireman, Grand Canyon University

Samantha Russell, Grand Canyon University

The authors investigated the relationship of prerequisite science course results as predictors of student success in subsequent science courses by analyzing pre-health undergraduate students in a STEM program. The data analysis revealed a significant relationship between the student outcomes in the first and second course and the three-course sequence. A significant relationship was also found between the first and third courses as well as the second and third course. These results can be utilized for future implementation of remediation to increase student persistence, student retention and student outcomes in future studies.

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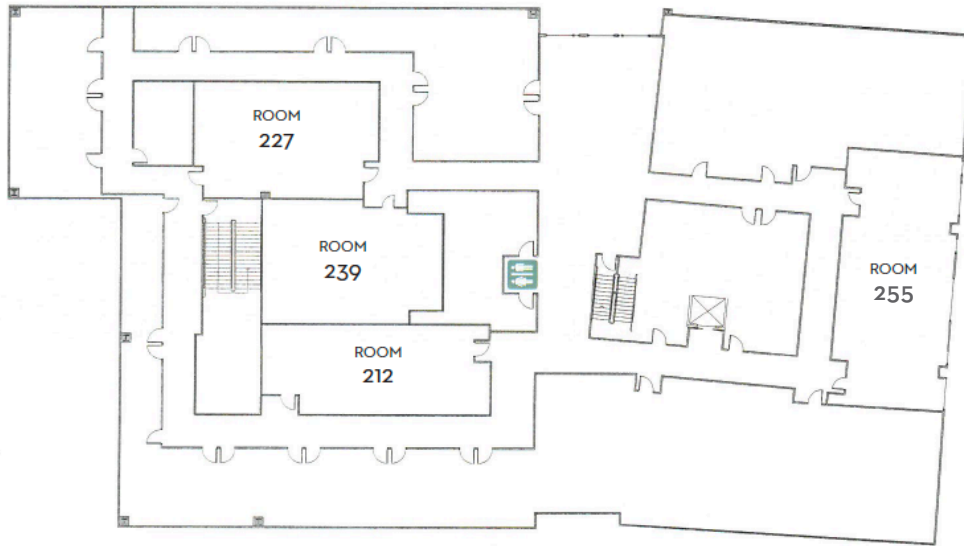
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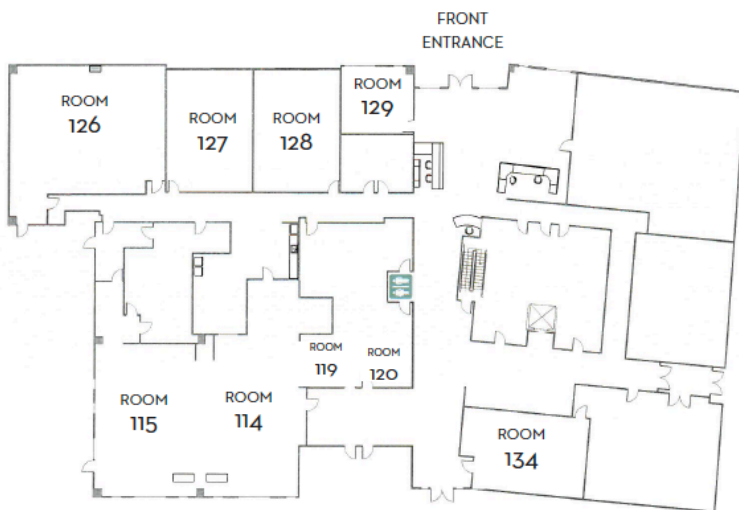
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Map

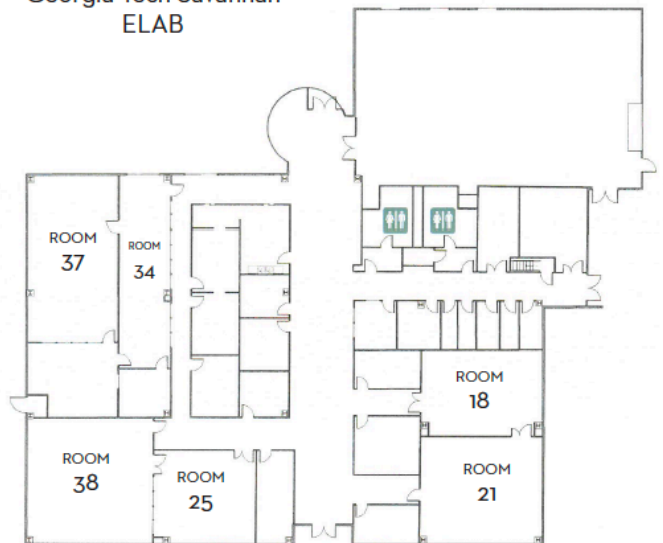
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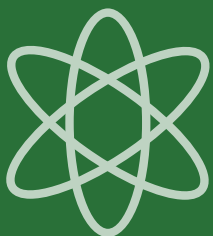
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