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Interdisciplinary STEM Teaching & Learning
Conference (2012-2019)

2013 Interdisciplinary STEM Conference (March
8, 2013)

2013 Georgia Scholarship of STEM Teaching & Learning Conference Program

Georgia Scholarship of STEM Teaching & Learning Conference

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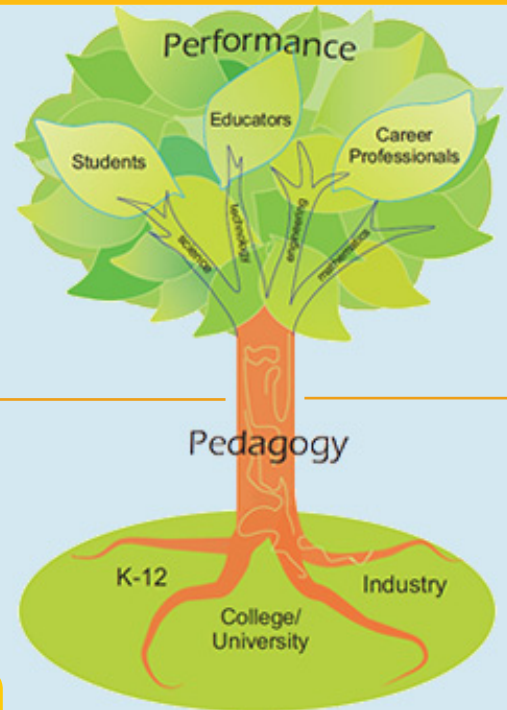
MARCH 8, 2013 at the NESSMITH-LANE Conference Center, Statesboro, GA

2ND Annual Georgia Scholarship of **STEM** Teaching and Learning Conference

CONFERENCE PROGRAM

This conference will provide space for showcasing and discussing the varied work ongoing at Georgia higher education institutions and in collaboration with K-12 school partners to advance the scholarship of STEM teaching and learning. It will also serve as a link to STEM business and industry and as a channel for extending web-based learning opportunities.

stem.georgiasouthern.edu



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CONFERENCE THEMES

PARTNERSHIP, PEDAGOGY, AND PERFORMANCE will be introduced as a new theme for this year's conference.

In addition to Partnership, Pedagogy, and Performance, the seven umbrella themes of Project Kaleidoscope will serve as organizers for the conference:

- 1. INSTITUTIONAL TRANSFORMATION**
(exploring what works in engaging people, policies and practices that make it happen)
- 2. THE HUMAN INFRASTRUCTURE**
(exploring what works in nurturing STEM leaders, at all career stages)
- 3. THE PHYSICAL INFRASTRUCTURE**
(exploring what works in shaping spaces that support 21st century STEM learning)
- 4. THE ACADEMIC PROGRAM**
(exploring what works in undergraduate STEM courses, from the very first courses for all students through capstone courses for majors)
- 5. THE PEDAGOGICAL TOOLS**
(exploring what works in designing, implementing and assessing teaching approaches that have an impact on student learning)
- 6. THE STATE CONTEXT**
(exploring the social and political context for attending to the quality of undergraduate learning in STEM fields)
- 7. THE 21ST CENTURY STUDENT**
(exploring the nature of current and emerging generations of students)

STEM

SCIENCE TECHNOLOGY ENGINEERING & MATH

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THURSDAY | MARCH 7 HOLIDAY INN

*Poster Session Descriptions on pages 11 & 12

6 — 9 p.m. Registration
7 — 9 p.m. * Poster Sessions & Reception

EXHIBITORS
ROOM 2904A



FRIDAY | MARCH 8 NESSMITH-LANE CONFERENCE CENTER



7:15 a.m. — 1 p.m. Registration
7:30 — 8 a.m. Continental Breakfast
9 — 9:20 a.m. * Poster Session

Room 1603 8 – 8:15 a.m. Welcome and Announcements

Dr. Joy Darley – Associate Professor, Mathematical Sciences, Georgia Southern University
Dr. Thomas Koballa – Dean, College of Education, Georgia Southern University
Dr. Martha Abell – Dean, College of Science & Mathematics, Georgia Southern University
Dr. Brooks Keel – President, Georgia Southern University
Dr. Kamau Bobb – USG STEM Initiative Coordinator, Georgia Board of Regents
Regent Rusty Griffin – University System of Georgia

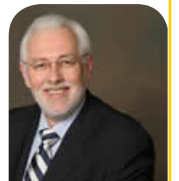
Room 1603 8:15 – 9 a.m.

KEYNOTE ADDRESS

Morning Keynote Address Building, Refining & Defining STEM Learning Outcomes – K-16 Implications

Dr. Richard A. Duschl, Penn State University and National Science Foundation

The July 2012 release of the National Research Council *Framework for K-12 Science Education: Practices, Crosscutting Concepts and Core Ideas* heralds 'a new vision of science in education.' The *Framework* sets out a comprehensive agenda for the reform of science and engineering education coordinated around 3 Dimensions: Science & Engineering Practices, Crosscutting Concepts, and Core Ideas. While the *Framework's* central mission is to impact K-12 education through implementation of the *Next Generation Science Standards*, there are important but less understood implications for higher education, informal science education and publics' understandings of science communication efforts. In this talk, I will provide an overview of these sweeping developments as well as examine these implications in terms of 1) teacher professional development and 2) designing undergraduate STEM courses.



Room 1909 9:30 – 10:15 a.m.

Using a Sarcomere Model to Teach Skeletal Muscle Structure and Function

Dr. Kelly P. Massey, Georgia College

Many students struggle with the structure and function of the skeletal muscle contractile mechanism, the sarcomere; which is an integral part of a Physiology of Exercise course. This study looked at incorporating "in-class" construction of a working sarcomere model [using modifications on the model instructions set forth by Jittivadhna et al. (2009)] within an Exercise Physiology course, in conjunction with a lecture component on skeletal muscle structure and function. Objectives of the model construction were to have each student be able to successfully identify every component of the sarcomere as well as be able to successfully demonstrate the action of the sarcomere unit. Final assessment results from the model construction classes are compared to Physiology of Exercise classes that did not construct a working model, and solely utilized traditional lecture modalities.

Session objectives will be to demonstrate construction and utilization of the sarcomere model and discuss how the model was used in class to assist with the student's understanding of the structure and function of the sarcomere unit. The session audience will be invited to assist with construction and be able to examine the completed workable sarcomere units. Final assessment results will be compared and discussed during the session.

Room 2901 9:30 – 10:15 a.m.

A Service Learning Course to Enhance Elementary STEM Education in Gwinnett County

Dr. Allison D'Costa, Dr. Bernadette Peiffer, Dr. Judy Awong- Taylor, Dr. Clay Runck, Dana McGraw, Sarah Iqbal, Evelyn Mathew, Devyn McCracken-Harvill and Mark Miller, Georgia Gwinnett College

Georgia Gwinnett College's (GGC) School of Science and Technology offered a Service Learning course in collaboration with Gwinnett County's McKendree Elementary School. GGC STEM majors conducted 20 hours of inquiry- based, hands on science activities in 5th grade classes. The 5th graders presented the activities and results of their investigation to their parents at Family Science Night.

Room 2903 9:30 – 9:50 a.m.

Peer Teaching in Computer Science through Videos

Dr. Gita Phelps, Georgia College

Computer Science upperclassmen produced short videos demonstrating concepts for freshman-level Computer Science programming courses. The videos were used to supplement the textbook and aid in class discussion and assignment review. We will share our methods for recruiting peer teachers, producing and archiving the videos and assessments of their effectiveness.

9:55 – 10:15 a.m.

Student Engagement Improves the Success Rate in the Computer Programming Course (CS1)

Mr. Said Fares, Dr. Mary Fares, Valdosta State University

It is known that introductory computer programming courses are difficult and that failure rates are high. This paper presents a number of changes in module organization and instructional delivery system. The primary results indicate a positive evaluation of the modified instructional delivery system, overall satisfaction with the course and consequently, a higher success rate.

Room 2905 9:30 – 10:15 a.m.

Calculus at Georgia State University

Dr. Dabney Dixon, Rebecca Rizzo, Mark Grinshpon, Iman Chahine, Kori Maxwell, Erol Akbas, Jeremy Brazas, Mark Germann, Georgia State University

Calculus continues to be a challenge for many students. We have pursued a multifaceted approach to supporting students that involves a) a drop-in tutorial center, b) Supplemental Instruction, c) weekly graded homework, d) online practice using ALEKS, and e) a new Calculus for the Life Science course sequence. The influences of these various support mechanisms will be discussed.

Room 2908 9:30 – 10:15 a.m.

Changing Their Idea of “Studying” into Our Idea of “Learning” - The Efficacy of Interactive Online Programs

Dr. Leslie S. Jones, Valdosta State University

One of the most frustrating aspects of college teaching is facing a lecture hall full of students who sit in class trying to figure out the easiest ways to pass rather than the best way to actually learn. New online platforms provided by publishers are an effective way to beat these passive learners at their own game. Picture the joy of walking into your class knowing that students have read the text before your lecture. Imagine how you can teach if you do not have to assume you start with one big tabula rasa. Building assignments into course requirements will change their *modi operandi* due to the fact that their grades hinge on the completion of these assignments. The most important reward is seeing how this helps students who enter college without adequate study skills learn what they can do to master course content and succeed.

Room 2911 9:30 – 10:15 a.m.

Cycling Through STEM

Dr. Angel Abney, Dr. Laurie Huffman, Dr. Catrena Lisse, Georgia College

As an inclusive collaboration of higher educators, the Innovative Course-building Group at Georgia College uses civic issues and active pedagogies as a catalyst for designing engaging courses that result in important student learning in the STEM disciplines and beyond. In this session, we will present examples of new and redesigned courses along with lessons learned from our faculty-learning community. After a brief overview of our activities, session participants will actively explore and share techniques for designing sustainable, innovative courses. Exercises will focus on the teaching cycle (goals, assessments, and reflection) for participants to develop concrete strategies to engage and enhance students' critical thinking and problem solving skills in their own courses.

Room 1701 9:30 – 10:15 a.m.

Thinking Like Mathematicians and Political Scientists: A Two-Year High School Lesson Study in Citizen STEM Integrating Mathematics, Government, Technology, and Literacy

Dr. Sandra Webb, Georgia College; Dr. Quintin Green, Mr. Robert Winborne, Ms. Michelle Braswell, Mrs. Jackie Bowman, Northeast High School

Lesson study involves continual cycles of collaborative planning, lesson observation, examination of learning outcomes, debriefing, and revision. This session reports two cycles of lesson study in a STEM learning community representing problem-based simulations associated with the presidential campaign and election of 2012. Presenters explain the process, disciplinary learning outcomes, and the benefits of multidisciplinary approaches in secondary education.

Room 2904B 9:30 – 9:50 a.m.

Teacher Strategies Designed to Counter Student Marginalization in Classrooms

Krystal Evans, Lauren Mimbs, Jason Trankle, Georgia College

Senior pre-service teachers at the John H. Lounsbury College of Education at Georgia College will provide the audience with feedback relating to field-based training. The presenters will provide attendees with an understanding about defining marginalization and its affect on student learning. We will provide information about the pedagogy and strategies utilized to counter student marginalization.

9:55 – 10:15 a.m.

Convincing Students To Study Outside of Class

Dr. James T. Baxter, Valdosta State University

I wish to share with the audience some of the things I have learned in 40 years of teaching chemistry to students at VSU. I also wish to get feedback from the audience on how they help their students become successful. Student success in chemistry courses depends on two things. One, time spent outside of class studying and two, studying correctly. Students must spend two to three hours per day outside of class studying. They also must work problems over and over every day. Many students come to college never having been challenged in high school by difficult courses. When they are told that they must spend many hours outside of class they simply do not believe because of their past experiences. I use a combination of humor, mistakes that I have made and how they were corrected, and parables that entertain and teach a lesson. Students need to be challenged and encouraged often during a semester. This approach has worked for both chemistry and nursing majors.

Room 1909 10:30 – 11:15 a.m.

Classroom Solutions: Managing Common Core

Mrs. Donna Lamkin, Mrs. Stacy Hinds, Chapman University

Participants will learn research-based, classroom tested strategies that empower teachers, inspire students, and raise test scores. They will learn how to build and maintain high achieving classrooms. The evidence based strategies expand learning and enhance the efficacy of academic and behavioral programs that are already in use. The strategies increase student on-task time and create classroom environments conducive to maximum student performance.

Room 2901 10:30 – 11:15 a.m.

SCIENCE! Girls: A Middle-School Summer Program for Developing Interest in STEM Disciplines Among Female Students

Dr. Pat Uelmen Huey, Georgia Gwinnett College

SCIENCE! Girls is a week-long summer program for middle school girls that seeks to foster excitement and curiosity about STEM and empower them to achieve in math and science. This session will include a program overview, the efficacy of the program in meeting its goals, and a demonstration of activities successful in engaging girls in science.

Room 2903 10:30 – 11:15 a.m.

Realignment of the Undergraduate Organic Chemistry Laboratory-Toward a Four Year Undergraduate Research Experience

Dr. Joseph Sloop, Georgia Gwinnett College

The new organic chemistry I laboratory program at Georgia Gwinnett College incorporates green chemistry principles, use of spectroscopic instrumentation, stereochemistry investigation by polarimetry, and use of the Avogadro molecular modeling program. The organic chemistry II laboratory experience has been reworked into a semester-long, multi-step synthesis project. Students work together in research groups, first planning a synthetic route for their target compound and then performing their synthesis.

Room 2905 10:30 – 11:15 a.m.

Providing Early Childhood Pre-Service Teachers with Increased Science Content Knowledge and Effective Teaching Strategies: A Two Year Project

Dr. Lyndall Muschell, Dr. Holley M. Roberts, Dr. Christine Mutiti, Georgia College

This presentation explores the results of a two-year project with pre-service teachers which focused primarily on providing increased knowledge of science concepts, effective strategies, and use of resources to improve science instruction while increasing confidence for the teaching of science.

Room 2908 10:30 – 11:15 a.m.

Facilitating the Reluctant Math Learner's Engagement and Success in Math

Dr. Ramakrishnan Menon, Georgia Gwinnett College

Mathematically underprepared, unsuccessful, and unmotivated undergraduates need to experience success in math, begin to think mathematically, and be aware of the relevance of math to real life experiences, as well as to science, technology, engineering, etc. We will share some approaches that do just that, by drawing examples from math, biology, automotive engineering, medical tests, and court cases.

Room 2911 10:30 – 11:15 a.m.

Research Participants Discuss STEM Conference Participation and Impact on Thinking and Practice

Ms. Colleen Beyer, Dr. Thomas Koballa, Dr. Delena Bell Gatch, Georgia Southern University; Dr. Leslie S. Jones, Valdosta State University; Dr. Sharmistha Basu-Dutt, Dr. Farooq Khan, University of West Georgia

Last spring, Georgia Southern University hosted its first Scholarship of STEM Teaching and Learning conference. Conference participants were asked to respond to a survey and a subset of participants was selected for an in-depth study. In this session, an overview of the research project will be presented and current research participants will discuss the impact of conference participation on their thinking and practice.

Room 1701 10:30 – 11:15 a.m.

Partnership, Pedagogy, and Performance

Dr. Georgia Wood Hodges, Dr. J. Steve Oliver, University of Georgia

Using a panel format, collaborating teachers and researchers will present how a partnership between a high school and a university-based project resulted in a powerful learning experience for 500 introductory biology learners who individually interacted with interactive 3-D computer environments. Teachers will speak to pedagogical, technical, instructional, and personal issues related to their role in the project.

Room 2904B 10:30 – 10:50 a.m.

Increasing STEM Research Skills Through An Interdisciplinary, Real-World Software Development/Chemistry Partnership Using iPads

Dr. Mai Yin Tsoi, Dr. Sonal S. Dekhane, Georgia Gwinnett College

We addressed Organic Chemistry (Orgo) and Software Development (SD) learning needs in an interdisciplinary mobile learning project. SD students were hired to develop Orgo mobile applications for Apple products. An authentic opportunity for SD students to develop necessary STEM research skills, these apps helped the Orgo students as well. We discuss the implications in curricular design and student motivation/research skills.

10:55 – 11:15 a.m.

Institutionalizing STEM at Georgia Perimeter College: The First Year

Dr. Cynthia Y. Lester, Georgia Perimeter College

In 2011 Georgia Perimeter College (GPC) established its Office of STEM Initiatives with support from the University System of Georgia (STEM II Initiative) and the GPC Administration. The Office was created to provide college-wide leadership for all STEM activities for its five campuses. The presentation will provide an update on accomplishments and challenges faced during the first year of institutionalizing STEM programs.

Room 1909 11:30 a.m. – 12:15 p.m.

Transitioning from High School Mathematics to College Mathematics

Dr. David Stone, Georgia Southern University; Ms. Susan Boddiford, Southeast Bulloch High School; Ms. Lydia Bragg, Screven County High School

The first two goals of the University System's STEM initiative are "promoting K-12 student preparation for and interest in majoring in STEM fields in college", and "increasing the success of STEM majors in college" The mathematics that many students "learn" in high school does not always transfer to the mathematics that they are expected to learn in college. We want to be sure that the K-12 preparation is actually preparing students for their college mathematics courses, realizing that a bad math experience for a college freshman usually sends him/her out of the STEM pipeline. The purpose of this session is to initiate conversations between all faculty so that a smooth transition may take place between high school and college mathematics.

Room 2901 11:30 – 11:50 a.m.

Joining & Using Google Plus Communities: Georgia STEM Teaching & Learning Conference Community

Mr. Daniel Rivera, Georgia Southern University

The 2nd Annual Georgia STEM Teaching & Learning Conference has chosen Google Plus Communities as the designated tool for encouraging communication among university faculty, K-12 teachers & administrators, research institutions, and businesses. The purpose of this session is to show participants how to get connected and then how to use Google Plus Communities for collaboration.

11:55 a.m. – 12:15 p.m.

The Need to Teach Political Literacy to Teacher Candidates

Dr. Mike Borders, Mrs. Donna Borders, Gordon State College

Teaching Political Literacy to Teacher Candidates - the why, what and how - is premised on the need to increase political support for public K-12 and higher education. Survey data analyses from 84 teacher candidates and 84 clinical supervisors within an eight-county Georgia area along with research literature reviews will be exhibited.

Room 2903 11:30 – 11:50 a.m.

Artificial Versus Organic: Science, Inquiry, and Language (or the lack thereof) in the Pedagogical Details of Teachers' Practice and Understanding of Science and Inherent Interdisciplinary Connections

Dr. Dan Bauer, Georgia College

Excellence in science and in language arts depend on the same thing--precision of language, evidence, detail, observation, and boundless curiosity. This presentation shares narratives and strategies of improved learning, teaching, and engagement informed by the mindset of the National Writing Project.

11:55 a.m. – 12:15 p.m.

Inquiry-Based Instruction

Molly Nation, Langston Chapel Middle

"The Effects of Inquiry-Based Instruction in the Science Classroom" took place as a part of Georgia Southern University's M.A.T. Program. From January 2012 through May 2012, secondary Physical Science Students at Burke County High School were subjected to additional inquiry-based laboratories, webquest, and experiment design that were implemented to supplement traditional lecture style instruction. The results show significant gains in the areas of student engagement and achievement.

Room 2905 11:30 – 11:50 a.m.

Undergraduate Curriculum Integration: Bringing Students Together Through Research

Dr. Clay Runck, Dr. James Russell, Dr. Allison D'Costa, Georgia Gwinnett College

At Georgia Gwinnett College we are integrating the undergraduate educational experience for our Bachelor of Science students in the Biology discipline. We are using the opportunities presented by the genetic information revolution to combine biology courses in a longitudinal and integrative research project aimed at cataloguing biological diversity over space and time on the developing Georgia Gwinnett College campus.

11:55 a.m. – 12:15 p.m.

Research Experience via Active Collaboration with High Schools (REACH)

Dr. Sharmistha Basu-Dutt, Dr. Megumi Fujita, Dr. Victoria Geisler, Dr. Douglas Stuart, University of West Georgia

The nature, activities and outcomes of the REACH program, a symbiotic partnership between UWG and selected high schools in West Georgia, will be presented. REACH provided an enrichment opportunity for high school students and teachers to experience the full spectrum of the scientific enterprise, understand the true nature of how and what scientists do, and explore exciting career opportunities.

Room 2908 11:30 – 11:50 a.m.

A Personalized Solution for Increased Student Success

Dr. Marcela Chiorescu, Dr. Rodica Cazacu, Georgia College

An important component of undergraduate education is the understanding of basic mathematics. To help students enhance their basic mathematical knowledge necessary for their academic success, Georgia College has begun offering a redesigned College Algebra course based on the latest technology and learner-centered pedagogy. This presentation will give an overview of how the redesigned course was implemented and the results.

11:55 a.m. – 12:15 p.m.

Does Concurrent Review Lead to Better Results?

Dr. Allison Wolf, Georgia Perimeter College

Teaching college algebra on a specified timeline can leave under-prepared students confused as new material is presented. At the same time, faculty can feel frustrated by time constraints that do not allow for reviewing material necessary for student success. We attempt to address both these challenges by using concurrent online review.

Room 2911 11:30 a.m. – 12:15 p.m.

Creating a Faculty Learning Community to Support Scholarship of Teaching and Learning among STEM University Faculty

Dr. Cher C. Hendricks, Georgia Institute of Technology; Dr. Myrna Gantner, University of West Georgia

In this session, we describe the creation of a Faculty Learning Community for university faculty in science, mathematics, and computer science. These faculty, recipients of mini-grants funded by the USG STEM Initiative, are studying ways to improve their instruction and increase student learning in STEM courses. Through the FLC, they are able to collaborate and support each others' work.

Room 1701 11:30 – 11:50 a.m.

Effects of an Intensive New Faculty Workshop on Teaching

Dr. Delena Bell Gatch, Dr. Michelle Cawthorn, Dr. Joy Darley, Georgia Southern University

Historically, university faculty receive little training for becoming teachers. Some universities offer short workshops on teaching to their incoming faculty. However, few of these workshops last more than a week. We will report on the efficacy of an intensive month long teaching workshop designed for new faculty members. The goal of the workshop was to guide faculty through the process of course development while equipping participants with an appropriate pedagogical toolbox.

11:55 a.m. – 12:15 p.m.

Faculty + Support = Creativity + Innovation

Dr. Jason Huffman, Dr. Charles Martin, Dr. Rosalie Richards, Georgia College

This session will engage faculty and administrators interested in designing, implementing, and sustaining a vibrant community of STEM educators at their home institution. After a brief presentation on the nuts and bolts of implementing a successful faculty-led STEM Mini-Grant Program at Georgia College, the presenters will facilitate a discussion on the benefits of this type of initiative for faculty, the value-added for the institution, and strategies to address challenges that may arise.

Room 2904B 11:30 – 11:50 a.m.

Introducing Research Skills into the Introductory Biology Curriculum

Dr. Michael Erwin, Dr. Judy Awong-Taylor, Dr. Latanya Hammonds-Odie, School of Science & Technology, Georgia Gwinnett College

As part of an initiative to implement a 4-year Undergraduate Research Experience for all SST students at Georgia Gwinnett College, modules of the introductory biology lab curriculum were modified to include opportunities for students to experience the processes of science and to develop basic research skills. Presenters will discuss the research-based aspects of the modules, implementation, and assessment.

11:55 a.m. – 12:15 p.m.

Engaging Biology and IT Students by Creating Cell-Biology Web Animations

Dr. Xin Xu, Dr. Adrian Heinz, Dr. Allison D'Costa, Georgia Gwinnett College

As interdisciplinary methodology becomes increasingly important to the scientific community, it is essential to show students how collaboration across disciplines provides significant benefits. We proposed a project where student from three courses collaborated to create an animation to demonstrate a biology concept or procedure. This presentation shares our experience of planning and implementation of such a collaborative project.

Room 1603 12:15 – 1:30 p.m.

KEYNOTE ADDRESS

Luncheon Keynote Address

To Arise, To Spring, To Come to Life...Creating STEM Communities that Thrive!

Carol Elsen Godfrey, Vice President of Marketing & Product Development, Southwire Energy Division

As scientists and mathematicians, we are problem solvers, finding solutions to the world's toughest problems: Man on the Moon...done; Vaccine to eradicate Polio...done; Clean water...a bit more to be done. So, creating communities of technical excellence is right in our our wheel house. Carrolton, Georgia is one city where engineers are hard at work, some as young as 15 years old!



Room 1601 1:45 – 2:30 p.m.

Implementing Common Core Standards in the Classroom

Ms. Ashley S. Green, Shirley Hills Elementary

The purpose of this session is to show teachers hands-on ways to implement the 3-5 grade common core math fraction standards. This session will show how teachers can use engaging activities to meet state standards and address mathematical practices. This session will also address the progression of the standards and how the activities across the grade level can build upon one another.

Room 1909 1:45 – 2:30 p.m.

Implementing the Language of Math

Dr. Connie H. Rickenbaker, Ms. Peggy Kimmons, Mr. Eric Cardoso, Georgia College; Mr. Luccas McDonald, Baldwin County Schools

Join us as we share stories about the implementation of math as a second language in GC's Early College high school. Our partnership includes the instructor who teaches and requires use of the language, his students, GCSU math majors in his class, and the learning and teaching between them. Participants are also invited to reflect upon and share their stories.

Room 2903 1:45 – 2:30 p.m.

CCGPS Online Technology Resources for the Classroom

Mrs. Laura Blair, Bryan County Middle School; Mrs. Amy Peay, Screven County High School

Technology is an important resource for the modern classroom. There are many online resources that are free and available for teachers to use to support their classroom through enrichment, remediation, or simply additional resources for their classrooms. With the new Common Core Georgia Performance Standards, teachers are constantly looking for new ways to reach their students and better their resources. The objectives of this session are as follows: (1) Informing participants of resources available online for them and their students and (2) Looking at Symbaloo, Remind101, and TodaysMeet.com. The participants are welcome to bring their own technology in order to view the websites and resources on their own devices.

Room 2905 1:45 – 2:30 p.m.

Teaching Undergraduates at the Peer Review Level

Dr. Thomas J. Manning, Chemistry, Valdosta State University

Undergraduate science students have participated in a host of science activities, including designing, synthesizing and submitting cancer drugs to the National Cancer Institute, writing and submitting a patent, formed a company and won two SBIR grants, launching high altitude balloons and developing a new nomenclature system for nanostructures. This presentation will outline ten projects conducted by students as part of classes that have been published in peer reviewed journals and discuss the logistics surrounding them.

Room 2908 1:45 – 2:30 p.m.

Improving the Accessibility and Inclusion of STEM Education: Meeting the Needs of Students with Disabilities

Dr. Nathan W. Moon, Mr. Robert L. Todd, Dr. Tristan T. Utschig, Georgia Institute of Technology

This presentation discusses projects at Georgia Tech and the University of Georgia to improve the accessibility and inclusion of STEM education for postsecondary students with disabilities. These efforts focus on instructor training, student mentorship and learning communities, and practical classroom and laboratory resources for educators and administrators. Participants in this session will gain a better appreciation for the instructional needs of students with disabilities in STEM, and they will be provided with information to assist them in their own classrooms and laboratories. This interactive session will showcase online resources such as the online course modules available from SciTrain U, GSA web portal, and SciTrain handbook, as well as print resources such as accessibility and inclusion checklists.

Room 2911 1:45 – 2:30 p.m.

Science Talk: A Pedagogical Tool for Using Instructional Conversation for Conceptual Growth in Science

Dr. Victoria Deneroff, Dr. Rosalie Richards, Georgia College

Non-science majors often do not engage in the intellectual processes of science despite substantial previous exposure to science courses. We have observed many students who are able to produce “right” answers that merely covered over profound misunderstandings about how scientists use evidence to create models. Only through extended discussions which hold students accountable for evidence have we been able to facilitate students’ learning of this core activity of science. We have therefore adopted conversation as our principal instructional tool. Our goal for this session is to engage participants in actual course activities to explore what works in navigating students’ struggles with how to connect experimental data with scientific theories.

Room 1701 1:45 – 2:30 p.m.

Using Origami Boxes to Explore Mathematical Ideas

Dr. Arsalan Wares, Valdosta State University

The purpose of this workshop is to provide an example of how a simple origami box can be used to explore important concepts in geometry and calculus. The mathematics behind the particular origami box and the significance of the role origami in mathematics classroom will also be addressed during the talk. As a hands-on activity, the audience will get an opportunity to create an origami box during the presentation.

Room 2904B 1:45 – 2:30 p.m.

Project FOCUS: Assessing Long-Term Impact of Service-Learning Experiences of Undergraduate Science Majors on Post-Graduation Civic Behaviors

Dr. Shannon O. Wilder, Office of Service-Learning, University of Georgia

Project FOCUS is a service-learning course created 10 years ago at the University of Georgia that partners undergraduate science students with K-5 teachers to enhance science instruction. Survey research examines the long-term affects of service-learning participation on civic engagement behaviors and beliefs of FOCUS alumni compared to science majors who did not take this service-learning course.

Room 1601 2:45 – 3:30 p.m.

Integrating Manipulatives to Improve Fraction Concepts

Mrs. Rachel Dunn, Georgia Southern University

The aim of this session is to demonstrate the tools used to help reinforce and recreate students’ conceptual knowledge of fractions, specifically targeting the unit of reference. These manipulatives will provide teachers with instructional support for Common Core Standards, which emphasize critical thinking skills and various representations of knowledge, specifically with fractions. Participants will become actively engaged in learning about these tools, including jumping on a number line floor mat, working with circular fraction pieces and placing fractions on a number line rope. By representing knowledge through circular and linear methods, students will use critical thinking skills and support will be provided for fraction concepts.

Room 1909 2:45 – 3:30 p.m.

What Students Need to Know Before Taking College Science Courses

Dr. Michelle Cawthorn, Dr. Brian Koehler, Dr. Jim LoBue, Dr. Robert Mayes, Georgia Southern University

Careers in math, science, and engineering are accompanied by a challenging course of study, and students need to be well prepared. The subject of this round-table discussion will be the key skills that students should have upon entering college, to succeed in math, science, or engineering.

Room 2903 2:45 – 3:05 p.m.

Can Project-Based Teaching/Learning Motivate Student Interest in Freshman and Sophomore Courses in Engineering?

Dr. Barry Hojjatie, Valdosta State University

We will report on the results of an externally funded project to improve student interest in engineering using project-based teaching and learning and Tablet Pc technology. Changes were made in some of the fundamental engineering courses to include hands-on projects, field trips and also invited speakers to the classroom. The results suggest that these changes can improve retention in engineering.

Room 2905 2:45 – 3:05 p.m.

University of West Georgia Institutional Stem Excellence:UWISE

Dr Anne Gaquere, Dr Rebecca Harrison, Dr Scott Sykes, University of West Georgia

The University of West Georgia received renewed funding from the University System of Georgia Board of Regents under the STEM II initiative. Based on results obtained during the first year, we modified our approach to improving STEM education under this initiative. This presentation will discuss both the redesigned summer bridge program and STEM mini-grant opportunities for faculty and students.

3:10 – 3:30 p.m.

School Counseling and STEM Careers

Dr. Lee Edmondson Grimes, Tabi Kenny, Georgia Southern University

School counselors are trained experts on career development in every school. With the nation's recent awareness of the importance of STEM careers, school counselors are perfectly positioned to bring the STEM message to students in every grade, elementary, middle, and high school. Specific strategies for school counselors to employ for connecting STEM career awareness to math and science classes in K-12 will be discussed. Dr. Grimes is a certified school counselor.

Room 2908 2:45 – 3:05 p.m.

Student Teaching and K-6 Mathematics Teacher Preparation

Mr. Erik Jacobson, University of Georgia

This session will report evidence on the effects of student teaching timing, duration, and quality on elementary mathematics teachers' knowledge and beliefs from a nationally representative sample of US public institutions preparing K-6 teachers to teach mathematics. Implications for mathematics teacher education in Georgia will be discussed.

3:10 – 3:30 p.m.

Science Literacy in General Chemistry Courses

Dr. Timothy Martin Ayers, University of West Georgia

A variety of real world applications of scientific principles are presented to the introductory chemistry students using common media outlets, readily available documentaries, and internet resources. A variety of assessment tools are currently being explored to properly judge the learning outcomes and impact on the level of engagement of the students.

Room 2911 2:45 – 3:30 p.m.

The Impact of Supplemental Instruction on Teaching and Learning

Dr. Rosalie Richards, Dr. Laurie Huffman, Dr. Catrena Lisse, Dr. Mike Gleason, Jeanne Haslam, Dr. Marcela Chiorescu and Lisa Buttitta., Georgia College

This session is designed for participants new to Supplemental Instruction (SI) or already acquainted with non-remedial, peer-facilitated learning opportunities. After a brief introduction to our SI Program at Georgia College, members of an SI Teaching Circle will facilitate a discussion with conference participants on the benefits and challenges of the program from the perspective of our students, supplemental instructors and our faculty.

Room 2904B 2:45 – 3:05 p.m.

Differentiated Instruction in the STEM Classroom: Discussing Answers to Common Questions

Dr. Peggy L. Moch, Dr. Sharon Richert, Valdosta State University

Very few resources are available to STEM instructors for helping them teach 21st Century students and in particular how to differentiate instruction to help retain students in the STEM classroom. The answer to the questions many STEM instructors ask themselves may lead to helping them embrace positive reasons for altering their teaching style to incorporate improved pedagogical tools for students.

3:10 – 3:30 p.m.

Developing a STEM Teacher Recruitment Pipeline

Dr. Kimberly Shaw, Dr. Cindy Ticknor, Dr. Tim Howard, Columbus State University

The Columbus Region Academy of Future Teachers of STEM (CRAFT-STEM), a Phase I Robert Noyce Teacher Scholarship Program, combines internships and scholarships, an exciting summer STEM Honors Camp, a new Teaching Connections Seminar, and an impressive array of existing resources to recruit, prepare, and graduate an increasing number of STEM teachers committed to serving high need high schools.

ROOM 1603 3:30 - 4:30 p.m.

Partnership, Pedagogy, & Performance Collaboration (Networking Opportunity)

Course-Embedded Research and Service Learning Internships-GGC's High Impact Practices for Enhancing Student Engagement and Learning in STEM Fields

Dr. Judy Awong-Taylor, Dr. Allison D'Costa, Dr. Clay Runck, Dr. David Pursell, Dr. Greta Giles, Dr. Thomas Mundie, Georgia Gwinnett College

STEM II Initiative POSTER

GGC's STEM Initiative includes a 4-year undergraduate research experience (4-yr URE) initiative designed to promote the success of students in STEM education, and a Service Learning Internship course designed to provide opportunities for STEM undergraduate students to gain teaching experience in science at the K-5 level. We will describe components of our STEM Initiative and progress made to date.

STEM II Initiative Progress: Instruction, Engagement and Impact

Dr. Cynthia Y. Lester, Georgia Perimeter College

STEM II Initiative POSTER

The goal of the Georgia Perimeter College STEM II Initiative is to promote student access and to improve student success in the STEM disciplines. To adequately prepare GPC students for careers in STEM areas, the STEM II Initiative focuses on two strategies: Strategy I – Structured Mini-grant program. Strategy II – Institution-Specific Strategies that deepen STEM student engagement. The purpose of this poster is to provide an update on the strategies.

Evaluation Findings from the STEM II Initiative for 2011-2012

Dr. Nathan Moon, Georgia Institute of Technology

STEM II Initiative POSTER

This poster presents key findings from a formative evaluation of the USG STEM Initiative during the 2011-2012 academic year. It outlines programs undertaken by the initiative as a group, including mini-grants and service learning opportunities, and institution-specific strategies. The poster presentation also discusses progress toward common goals, such as course redesign, improving instructional delivery, and enhancing student support.

UWise – University of West Georgia Institutional STEM Excellence

Dr. Swamy Mruthinti, Dr. Anne Gaquere, Dr. Rebecca Harrison and Dr. Scott Sykes, University of West Georgia

STEM II Initiative POSTER

As a part of the BOR STEM II initiative, the University of West Georgia is conducting a multicomponent year-long project for incoming STEM freshmen called UWise. One of the most interesting outcomes of this initiative is the collaboration between English and STEM disciplines to create a unique interdisciplinary course, which is described in the presentation.

STEM II @ Georgia College: Towards Institutional Transformation

Dr. Rosalie Richards, Dr. Charles Martin, Dr. Jason Huffman, Georgia College

STEM II Initiative POSTER

At Georgia College, implementation of the USG STEM II Initiative is flourishing and multi-faceted. Our initiative offers faculty opportunities to engage in a vibrant culture that values the scholarship of STEM teaching and learning. Similarly, students provide K12 STEM teacher support or peer-facilitated tutoring for hundreds of students in entry-level STEM courses. Between 2007 and 2012, Georgia College observed significant increases in STEM/STEM Education majors and in STEM/STEM education degrees conferred. STEM II at Georgia College has not only made a positive impact on student performance and retention but also has helped create an environment that fosters creativity and innovation as well as institutional, statewide and national recognition of STEM-related work. Supported by USG Presidential STEM Initiative.

STEM and Branches: Update on the Columbus State University STEM-II Initiative

Dr. Cindy Ticknor, Dr. Tim Howard, Dr. Kimberly Shaw, Columbus State University

STEM II Initiative POSTER

Two USG STEM Initiative awards to Columbus State University have spawned the growth of several STEM and STEM education programs and nearly \$2.6 million in grants. We provide an update on STEM-II Initiative projects including a peer leader program for core math and science courses, a faculty mini-grants program to promote scholarship on teaching and learning and awareness of best practices models, and a service learning course. The infrastructure that emerged through the first STEM Initiative and continued to develop with the STEM-II Initiative paved the way for a \$1.4 million UTeach replication grant and a \$1.2 million Robert Noyce Teacher Scholarship Program grant. We describe key developments in these two programs designed to recruit and prepare more STEM teachers.

Increasing the Number of Undergraduates who Succeed in STEM at UGA

Nancy Vandergift, Dr. Chuck Kutal, The University of Georgia

STEM II Initiative POSTER

The University of Georgia has implemented several strategies focused on improving instruction and student achievement in STEM courses and assisting in the preparation and professional development of K-12 science and math teachers. Specific activities include a mini-grants program, learning communities, pre-service teacher recruitment, expanding Project FOCUS, and increasing faculty effort to improve instruction and student learning in the STEM disciplines.

New Directions in STEM Education at Georgia State University

Dr. Dabney Dixon, Dr. Susan Swars, Georgia State University

STEM II Initiative POSTER

Georgia State University continues to make advances in STEM education. Mini-grants have been an effective mechanism of change. Other efforts include changes in the teaching of mathematics and administrative changes to support our students more effectively.

TRIG-STAR

James M. Anderson, President - Surveying and Mapping Society of Georgia, Georgia State Trig-Star co-ordinator - National Society of Professional Surveyors

A TRIG-STAR is a mathematics student who has demonstrated in competition that he or she is the most skilled among classmates in the practical application of trigonometry. The competition for the honor is a timed exercise which is the solving of a trigonometry problem that incorporates the use of right triangle formulas, circle formulas, the law of sines, and the law of cosines. The contest helps to promote careers in surveying and mapping to students at the High Schools across the country. The award is sponsored by the National Society of Professional Surveyors and cosponsored locally. State winners also have the opportunity to participate in the National TRIG-STAR competition for awards. Visit the Trig-Star website at www.trig-star.info.

Science Literacy in General Chemistry Courses

Timothy Martin Ayers, University of West Georgia

A variety of real world applications of scientific principles are presented to the introductory chemistry students using common media outlets, readily available documentaries, and internet resources. A variety of assessment tools are currently being explored to properly judge the learning outcomes and impact on the level of engagement of the students.

Posters continue on next page

POSTERS

Thursday, March 7 Holiday Inn

7 – 9 p.m.

Friday, March 8 Nessmith-Lane Conference Center Lobby

9 – 9:20 a.m.

Research Experience via Active Collaboration with High Schools (REACH)

Dr. Sharmistha Basu-Dutt, Dr. Megumi Fujita, Dr. Victoria Geisler, Dr. Douglas Stuart, University of West Georgia

“RESEARCH EXPERIENCE via ACTIVE COLLABORATION with HIGH-SCHOOLS (REACH)” is an outreach program targeted to help high school students develop competitive science fair projects by actively engaging them in a Problem Based Learning (PBL) research experience that uses Peer Led Team Learning (PLTL) and Process Oriented Guided Inquiry Learning (POGIL) to learn, discuss, and apply concepts in a real-world context.

Teacher Professional Development: Using Local Resources to Engage Teachers and Students in Learning

Dr. Missy M. Bennett, Ms. Heather Scott, Georgia Southern University

Do your students or teachers suffer from “nature deficit disorder”? Engage and interest students and teachers in the study of ecology and other content through the use of place-based resources to teach national and state standards. This presentation shares preliminary data and engaging strategies from professional development activities which engage secondary teachers in the investigation of local natural resources and encourage the development of ecology lessons and activities using local resources.

Nomenclature - Mail Man Analogy: Implementing Elaborate Visual Analogies in Organic Chemistry

Ms. Janessa Dunn, Ms. Shannon Rhodes, Ms. Sania Fazeli, Mr. Nazim Ali and Dr. Shainaz Landge, Georgia Southern University

Analogies play a significant role in scientific teaching. It can be used as a transition to introduce a novel abstract concept. The main aim of this project is to utilize visual analogies in one of the important topics in organic chemistry i.e: “Nomenclature” (naming organic compounds). A mail-man “character” is used to remember the rules needed for the naming system.”

Integrating Manipulatives to Improve Fraction Concepts

Mrs. Rachel Dunn, Georgia Southern University

Many students are overwhelmed by mathematics because the language is too difficult, the teaching strategies are insufficient or they have lost motivation. With a recent emphasis on meeting the Common Core expectations, using manipulatives to eliminate misconceptions in the mathematical classroom has become even more prevalent. I explored the misconceptions that many students struggle with and provided possible methods of eliminating them at all levels for learning. During this investigation, I studied the effect of manipulatives on students’ understanding of fraction concepts and the students’ conceptions of the unit of reference when working with fraction word problems. I learned that students can increase achievement with the integration of various representations of manipulatives with fraction concepts. Specifically, students dramatically increased their conceptual knowledge of the unit of reference by manipulating several tools, including number lines, fraction bars, pizza fraction party, estimation rope and others.

The Journal of Teacher Education: Conversations with the Editor

Dr. Stephanie Knight, Editor of the Journal of Teacher Education

This is an informal opportunity for asking questions about the role of an editor, research trends, and suggestions for publishing in the *Journal of Teacher Education*.

Interactive Learning to Improve Student Success Rates in Teaching Programming: A Case Study

Mr. Said Fares, Dr. Mary Fares, Valdosta State University

It is known that introductory computer programming courses are difficult and that failure rates are high. This paper presents a number of changes in module organization and instructional delivery system. The primary results indicate a positive evaluation of the modified instructional delivery system, overall satisfaction with the course and consequently, a higher success rate.

School Counseling and STEM Careers

Dr. Lee Edmondson Grimes, Tabi Kenny, Georgia Southern University

School counselors are trained experts on career development in every school. With the nation’s recent awareness of the important of STEM careers, school counselors are perfectly positioned to bring the STEM message to students in every grade, elementary, middle, and high school. Specific strategies for attaching STEM career awareness to math and science classes in k-12 will be discussed.

Creating Effective Partnerships to Promote STEM Education: Lessons in Crafting and Developing a Partnership Model

Dr. Diley Hernandez, Dr. Donna Llewellyn, Dr. Marion Usselman, Dr. Cher Hendricks, Analia Rao, Georgia Institute of Technology

Our purpose is to describe effective practices in developing partnerships between universities, K-12 school districts, and philanthropic organizations. We focus on development of the GoSTEM model, a current collaboration between Georgia Tech and a local school district funded by a private Atlanta-based, non-profit organization for the purpose of increasing the number of Latino students in the STEM pipeline.

What You Should Know: Transitioning to College Science Courses

Dr. Delena Bell Gatch, Dr. Jim LoBue, Dr. Michelle Cawthorn, Georgia Southern University

Careers in math, science, and engineering are accompanied by a challenging course of study, and students need to be well prepared. This poster lists the key skills that students should have upon entering college, to succeed in math, science, or engineering.

Caretta Research Project

Mrs. Kristina Williams

Since 1973, the Caretta Research Project has been a hands-on research and conservation program dedicated to protecting the Loggerhead Sea Turtle.

I²STEM^e - What, Who, Where?

Kania Greer, Grants Coordinator, Bob Mayes, Director; Institute for Interdisciplinary STEM Education at Georgia Southern University

I²STEM^e is a new Institute on the campus of GSU whose focus is to increase opportunities for K-20 students, teachers, and businesses to partner together to improve STEM Education in Georgia around the tenets of place-based learning, problem based learning and teaching for understanding.