

**Alabama Alliance for Students with Disabilities in STEM
(AASD-STEM) 6th Annual Conference**

April 2, 2016 * Auburn University Hotel and Conference Center * Time: 8:00a.m.-1:30 p.m.

Theme: Broadening the Participation of Students with Disabilities in Science, Technology, Engineering, and Mathematics: Challenges and Promising Practices

Time	Activity	Description	Location
8-8:45 am	Registration	Registration and Breakfast	Prefunction Foyer
8:45-9 am	Overview	Opening remarks: Dr. Overtoun Jenda, PI and program director AASD-STEM Program	Ballroom B (Right)
9-9:40 am	Student Presentation	Student Research Presentation: Mitchell Moore	Ballroom B (Right)
9:40-10:30am	Research Presentation	Keynote Speaker: Martina Svyantek “Reflections on a dynamic narrative: Personal development within and around disability issues in higher education”	Ballroom B (Right)
10:30-10:45		Break	
10:45-11:30am	Networking	Group Meetings	Ballroom B (Right)
11:30 am-12:30 pm	Lunch / Poster Session	Lunch and Poster Session Evaluations Closing Remarks (Dr. Glen Ray, PI AASD-STEM, AUM)	Ballroom A (Left)
12:30-1:30 pm	Breakout: sessions	AASD-STEM Executive Meeting	Governor’s Room



AASD-STEM CONFERENCE PRESENTERS

PANEL SESSION

Michael Barrett – Auburn University
Mitchell Moore – Auburn University
Martina Svyantek – Virginia Polytechnic Institute

LUNCHEON SPEAKER

Dr. Glen Ray, Department Chair and Professor in Psychology, Auburn University, Montgomery

STUDENT PRESENTATION

Mitchell Moore; Advisor: Jose Vasconcelos, Dept. of Civil Engineering, Auburn University
Modeling interstate runoff with a physics-based, spatially explicit model (GSSHA) using high-resolution DEM data and measured field data

An initial assessment (Moore et al., 2015) of interstate runoff impacts to a receiving water body yielded approximately 2 years of groundwater, surface water, and streamflow measurements upstream and downstream of a section of an interstate within a rural/forested watershed. It became clear that stormwater runoff is larger downstream of the interstate, but analysis of area-averaged runoff datasets have resulted in a variety of inconclusive findings. In order to better understand the hydrology of the interstate and its associated flow features (medians, ditches, realignment of channels, compacted soils, etc) a detailed hydrological model (GSSHA) is being set up with high-resolution DEM data, soil characteristics, and coupled with measured field data. Research questions include: Do the interstate's features (ditches, median, soil types) encourage or limit infiltration, flow velocity, and groundwater fluctuations? Of interest is the variation in surface-water groundwater interactions at the interstate stream crossing, as well as interactions within the interstate median, interception of subsurface runoff by ditches, permeability of the interstate subsurface (as compared with the surrounding area), and the runoff-rainfall ratio of the areas. To answer these questions, a resolute, physics-based model (GSSHA) is used to resolve the varying hydrologic features of the interstate. By resolving the interstate runoff features, work in the future may be done including comparing the models effectiveness of predicting land use change impacts to other widely used and available hydrological models (such as SWMM5).

KEYNOTE SPEAKER

Martina Svyantek; Department of Engineering Education, Virginia Polytechnic Institute

Reflections on a dynamic narrative: Personal development within and around disability issues in higher education

While the curriculum outlined by any department may seem straightforward and linear, Martina Svyantek's experiences during her time as an undergraduate challenged assumptions about engineering student priorities and goals. Her graduate studies have continued in the same fashion, leading her to propose her own degree program at Virginia Tech. Her current work examines disability in higher education, with a forthcoming paper at the 2016 American Society of Engineering Education conference discussing disability within engineering education itself.

POSTER PRESENTATIONS

Sean Bittner, Auburn University

Halloysite/PLGA composite films as a novel antibiotic carrier: potential and limitations

Halloysite is a promising drug delivery alternative. It can be loaded with 30 wt% chemical agent, extending release from minutes to several hours or days. However, literature experiments with biologically relevant polymers are limited. Additionally, most studies use tetracycline and other small, water soluble antibiotics. Novel antibiotics are larger, imposing release limitations. This project aims to advance understanding of controlled release from Halloysite systems. Gentamicin sulfate is mixed with halloysite, yielding 24wt% loaded nanotubes. Vacuum and pressurization cycles result in fizzing, indicating air removal. The solution is mixed and left to dry, and loading and vacuum procedures are repeated. The resulting drug-loaded halloysite is ground and stored. Films are prepared via solution casting; a 25% w/v PLGA solution is prepared using a 3:1v/v THF-DMF solution and mixing until dissolved. DLH-polymer composites are dissolved by stirring, and solutions are then cast and dried. To evaluate release, DLH films are added to deionized water in a shaking bath. Periodic samples are then tested by UV spectrophotometry. Release rates are quantified by sample absorbance and antibiotic concentration. Using tetracycline as a model, it was confirmed that antibiotic release from composite films was significantly reduced compared to PLGA films, which released 80% loaded drug after two hours. Additionally, the effects of the LA:GL ratio on degradation were studied, and it was shown that 85:15-formulated PLGA significantly increased the release rate compared to 50:50 varieties. However, the performance of 85:15 PLGA was tailored to match that of 50:50 formulations on the addition of halloysite nanotubes. The use of drug-loaded halloysite films is a promising technique for long-term controlled antibiotic release. These materials are exciting for the treatment of infected wounds, prophylactic treatment of battle field injuries and the development of antimicrobial surfaces.

William Frazier, Auburn University

Developing a Cyber Awareness Course for High School Students

Our task this summer was to expose high school students to cyber security. The main problem was how to do this. With how big the internet is and how much we rely on computers, cyber security is a big issue, especially with all the hacking and stolen information that is happening. We addressed this task in three phases. The first phase was to identify the cyber security topics that would be taught. This entailed researching topics to find which could be of use to high school-aged students. We identified 8 topics: encryption, hashing, network basics, email security, passwords, data deletion and recovery, steganography, and malware. We then designed the course material so that it would be appealing and engaging. The lessons were designed in a way that there was some lecturing/explaining each topic, and quite a lot of hands on activities. We planned on culminating the lessons by having the students participate as teams in a cyber exercise at the end of the course. The second phase was actually teaching the material. This was done over the span of one week. Two to three topics were taught each day in 2-hour increments. There were 22 students that participated, comprised of juniors and seniors. At the end of the week, the students worked in groups of 2 to present a topic they thought was interesting (whether it was one we taught or something new). The third phase was a reflection phase used to see how we should shape next years' camp. We sought feedback through live discussion on the last day of camp as well as through after-action surveys. The most valuable suggestions included placing each student in a beginner class or an advanced class. For the beginner class, students should share computers (2:1) and help each other with the activities. In the advanced class, every student will use their own computer. There should be a small lecture at the beginning of the camp that explains a little about the operating systems and how to use them. In conclusion, the students learned basic cyber security concepts (such as strong passwords, recognizing spam, how malware is contracted, etc.) while also shown tools needed to further their knowledge. Overall we got high praise for this year's camp and will use the feedback to improve next year's camp. I would like to acknowledge the funding I received from NSF (the RDE program), as well as from NSA (provided through Dr. Umphress).

Robert Lackey, Auburn University, Montgomery

One-Percenters on Trial: The Effect of Defendant's Ascribed Social Status on Mock Juror Decisions

This experiment was conducted in order to determine whether a defendant's wealth, inherited from birth, had an impact on juror decisions regarding their guilt or innocence

Dylan Rogers, Auburn University, Montgomery

Mosquitofish Response to Alarm Substance Release

The mosquitofish (*Gambusia holbrooki*) is a common species found across the southeastern part of the United States. It is an important prey species for many organisms ranging from aquatic arthropods to wading birds. Many studies have now shown that alarm substances released from predated fish play an important role in alerting conspecifics to threats in an area. Our goal was to use extract from freshly dead mosquitofish in minnow traps to see if avoidance behavior will be exhibited around the traps and if the fish's condition affects its response.

Danielle Tadych, Auburn University

Influence of Nitrogen Input on Active Soil Carbon in a Long-Term Crop Rotation Experiment

Increased nitrogen input generally increases crop yields, which could lead to an increase in Active Soil Carbon, also known as Permanganate Oxidizable Carbon (POXC). This study attempted to determine if a positive correlation exists between increased nitrogen application and active soil carbon in a long-term cotton-corn-soybean rotation. Soil samples were taken from various treatments from Cullars Rotation, which is one of the oldest soil fertility experiments in the nation. Our results showed that there was significantly less POXC in the subsurface soil than in the surface soil. Also, crop rotations where no fertilizer was used had drastically low POXC. However, our results also indicated POXC patterns changed depending on what residues or crop was planted at the time of sampling. The plots with Crimson clover tended to have more POXC when N fertilizer was not applied. Those plots with soybean residues had relatively steady POXC values for the surface but for the subsurface POXC increased with nitrogen application. Finally those plots with wheat in corn residues had generally the same POXC levels in the surface and sub-surface samples for the treatment with NPK fertilizer and lime. Thus POXC could be affected by nitrogen application in some crops and not in others.