Office of STEM Education
UNIVERSITY OF GEORGIA

2017 STEM Institute
Graduate Student STEM Education Research Posters

Posters will be displayed in the Kellogg Concourse throughout the duration of the event. A dedicated session from 10 – 10:30 AM provides an opportunity to meet the students and learn about their work.

1	*Students as Stakeholders: Enhancing the Study of Virtual Reality through Interdisciplinary Service-Learning*	**Talal Alothman** (co-authors: Kyle Johnsen, Gretchen Perkins, David Knauft) *Computer Science* *University of Georgia*
	Service-learning (SL) is defined as "the application of academic skills and knowledge to address a community need, issue, or problem and to enhance student learning." While examples of SL being incorporated into Computer Science (CS) curriculum exist, SL pedagogy has not been widely adopted. Our focus in this paper will be a CS classroom that studies Virtual Reality (VR) VR is defined as "an artificial environment which is experienced through sensory stimuli provided by a computer and in which one's actions partially determines what happens in the environment". In this course, students are assigned a project where the goal is to develop a VR experience that helps students in the elementary level learn about scientific phenomena. The VR experience is developed in collaboration with student-teachers from the SL course Project FOCUS (Fostering our Communities Understanding of Science). Project FOCUS is "an ongoing partnership between the University of Georgia and the Clarke County School District to improve science instruction in elementary schools". The student-teachers visit classrooms to participate in instructing science to elementary-level students. The student-teachers then serve as clients to the CS students providing them with feedback on the topics that elementary level students have difficulty understanding. The CS students use that feedback to develop a VR experience that teaches the scientific topics through VR that is both interactive and immersive. In our paper, we aim to examine the role incorporating SL pedagogy has on upper-level CS undergraduate education specifically within the focus of VR.	

2	*Transitioning to eBooks: Student use of various textbook features*	**Elizabeth Day** *Chemistry* *University of Georgia*
	The textbook is a multipurpose reference to find problem-solving algorithms or to gain conceptual understanding of the lecture content.1 The prices of traditional textbooks can also be prohibitive; the Government Accountability Office noted that from 2002 to 2012, textbook prices have increased 82 percent.2 One potential cost-saving solution is eBooks,3-5 especially with the availability of open-source eBooks.6 The slow adoption of eBooks in college chemistry classrooms might be attributed to electronic platform concerns.5 Features of traditional textbooks may need to be retooled for eBooks. In light of the now-defunct TextRev national textbook survey,7 our survey identifies which features of current textbooks students consider useful, demonstrates how students respond to the current features of their textbooks, and identifies other resources that students use in lieu of the textbook. The results of this survey can inform future studies on optimizing these useful features for eBooks.	

3	*Multi-Outcome experiment development for organic chemistry utilizing NMR spectroscopy*	**Kasey Leigh Yearty** (co-authors Caroline Glessner, Ryan Maynard, Richard Morrison) *Chemistry* *University of Georgia*
	Undergraduate organic chemistry laboratory courses across the United States complete similar experiments at various institutions. These experiments follow "cookbook" style procedures and use known starting materials to synthesize known products. Students completing these experiments have little to no variation in their observations, results, data analysis, or reports, limiting opportunities for critical thinking. The use of multi-outcome experiments (MOEs) in organic chemistry requires critical thinking from students to identify the starting material and/or product for an experiment using spectroscopic analyses. The number of options for unknown starting materials generates student results that differ from classmates, providing more unique learning experiences and individualized reports.	

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4	*Research based active learning activity for use in a physical chemistry SCALE-UP classroom*	**Alaina Brown** (co-author Gary Douberly) *Chemistry* *University of Georgia*
	With the increase in popularity of SCALE-UP classrooms here at UGA, it is important to continually create new activities that will both challenge and keep students engaged with the class material. Moreover, the number of physical chemistry SCALE-UP materials are generally lacking when compared to General and Organic Chemistry. This newly created activity was used to teach junior and senior level Chemistry students at UGA about Thermodynamics/Chemical Equilibrium concepts. Students were asked to read a scientific research paper1 in order to answer the questions presented in the activity. This strategy is unique in that it is based on results from physical chemistry research performed at UGA. From preliminary quantitative data, students believed that the problems presented were challenging but were useful in helping them learn the material.	

5	*The Translational Value of Customer Discovery: Our Experiences with the NSF I-Corps™ L Program*	**Karen J.L. Burg, PhD** (co-author Sarah Rowlinson and Timothy Burg) *Harbor Lights Endowed Chair* *Dept. of Small Animal Medicine & Surgery* *College of Veterinary Medicine* *University of Georgia*
	The Innovation Corps (I-Corps™) evidence-based entrepreneurship program was established in 2011 by the National Science Foundation (NSF) to help scientists and technologists overcome the "Valley of Death" encountered when attempting to commercialize their products. Teams of three, typically consisting of an academic researcher, a would-be entrepreneur and an industry mentor, are accepted into the program to pursue the translation potential of their ideas. A persistent challenge in science, technology, engineering and mathematics (STEM) education has been the low adoption rate of evidence-based instructional practices. This low adoption rate is attributed to developers of these innovations lacking the entrepreneurial skills needed to effectively assess the "market" and propagate their innovations. This lack of adoption can be seen as education's "Valley of Death"; hence, the I-Corps™ L program was established in 2014 to apply I-Corps™ strategies and framework to educational products. In this program, the NSF places emphasis on widespread adoption of new learning technologies; that is, transferring the best evidence-based practices to potential adopters where those practices can benefit large numbers of students or learners. The operating theory is that a learning technology must meet a customer need the same way a commercial product must, even if the learning technology is distributed at no cost. Our team participated in the I-Corps™ L program during summer 2015; we provide our experiences as an example.	

Bonus	*Demonstration of Electronic Learning Modules* The iBooks and AR app are free to download and may help with a course. Learn about potential interactive educational materials for your work	**Dr. Jim Moore** Director of Educational Resources College of Veterinary Medicine *University of Georgia*