

Dear Colleagues,

I am pleased to introduce Volume 13, Issue 2 of the Journal of *STEM Education: Innovations and Research*. I hope you will have time during this busy part of the semester to read about several new areas of research in STEM education. This issue contains eight articles—a testament to the large amount of quality research currently taking place in our field.

First, in “The BRAID: Experiments in Stitching Together Disciplines at a Big Ten University,” Douglas B. Luckie, Richard Bellon, and Ryan D. Sweeder share lessons learned from an interdisciplinary program instituted at Lyman Briggs College, Michigan State University, that makes students explore the interactions between chemistry and biology. Among other interesting findings, they show how students benefit from explicit discussion of the connections among different fields.

With a similar focus on interdisciplinary studies, Jennifer Aurandt, Andrew Scott Borchers, Terri Lynch-Caris, Jacqueline El-Sayed, and Craig Hoff bring us the article “Bringing Environmental Sustainability to Undergraduate Engineering Education: Experiences in an Interdisciplinary Course.” They detail the program they have implemented at Kettering University, in which they use active learning techniques to teach students about environmental sustainability. This initiative, like the BRAID, has the benefit of being both valuable and feasible.

Congruent with interdisciplinarity is the need to ensure that we are teaching our students not only technical skills, but also the critical thinking skills that will allow them to apply their knowledge in the real world. D. Joseph Hagerty and Thomas D. Rockaway address this concern in “Adapting Entry-Level Engineering Courses to Emphasize Critical Thinking.” They explain a plan developed at Louisville University to explicitly incorporate critical thinking emphasis into classrooms through minor but significant changes, which seems to have caused notable improvement so far.

Before we can teach our students these critical skills, of course, we must first encourage them to remain in STEM fields. Retention of disadvantaged students is tackled by Matthew E. Elam, Brent L. Donham, and Stephanie R. Solomon of Texas A&M University-Commerce in “An Engineering Summer Program for Underrepresented Students from Rural School Districts.” They describe X-TEEMS, a program in which financially disadvantaged middle school and high school students from rural areas were brought together for two weeks of summer learning in STEM subjects. Their results reveal a positive effect on students’ attitudes towards engineering,

Next, Wanda Eugene of Auburn University and Kevin Clark of George Mason University bring together two important facets of education in “E-Learning, Engineering, and Learners of African Descent: A Needs Analysis.” We have seen abundant literature on the retention of minorities in STEM education and on techniques for making distance learning more effective; these authors consider both together, exploring how cultural influences can be taken into account when developing e-Learning resources for students of African descent.

Following these articles on retention of engineering students, Sirena Hargrove-Leak explores the task of *attracting* new students to the field in “Experience Engineering: An Engineering Course for Non-Majors.” She details an engineering course at Elon University designed to show non-majors that

they are capable of and perhaps interested in engineering. Based on her assessment results, creating such courses to change students' perception of engineering is an effective method worth further investigation.

If we hope to attract talented students into our fields, their interest and self-assurance in STEM subjects must begin early; for that, effective and confident teachers at the elementary and secondary levels are essential. Professional development for these teachers was the focus of a residential summer workshop described in "i-STEM Summer Institute: An Integrated Approach to Teacher Professional Development in STEM" by Louis S. Nadelson, Anne Seifert, Amy J. Moll, and Bradley Coats of Boise State University. Among other things, the authors report how their program improved teachers' perceived efficacy and content knowledge.

Finally, we bring you "uCollaborator: Framework for STEM Project Collaboration Among Geographically-Dispersed Student/Faculty Teams" by Stephen M. Fiore (University of Central Florida), Walter E. Rodriguez (Florida Gulf Coast University), and Deborah S. Carstens (Florida Institute of Technology). These authors share a framework they have developed that will help STEM project teams—including faculty and students—conducting research—communicate and collaborate across distances. In this time of increasing globalization, this may be a very beneficial tool for educators and students in our fields.

As always, we also welcome comments, questions, and suggestions about the broad range of valuable research published in the issue, sent at any time to jstemed@gmail.com. I wish you all a productive (and manageable) second half of the semester.

Regards,
P.K. Raju
Editor-in-Chief

I would like to extend a special invitation to anyone who might be attending the American Society for Engineering Education (ASEE) Annual Conference and Exposition in San Antonio, Texas, on June 10–13. I will be available there to meet, greet, and thank authors, reviewers, and advisory board members at the Laboratory for Innovative Technology and Engineering Education (LITEE) booth (Booth #345) from June 10–12, and I would love to speak with interested readers, authors wishing to publish, or anyone who has been involved with our journal. I can be contacted about this at pkraju@auburn.edu. I look forward to seeing some of you there!