

## **UMass STEM Ed Institute Presents:**

### **Fall 2014 STEM Tuesday Seminars**

- STEM seminars are held at 4PM on the first and third Tuesdays of each month during the academic year in Hasbrouck 138.
- Everyone is welcome; no reservations are needed, and there is no charge.
- Parking is available in the Campus Center Garage.

#### **September 16**

##### **Kevin Griffith**

*Professor, Microbiology, University of Massachusetts Amherst*

“Training future scientists: biotechnology in the classroom, the laboratory, and beyond”

The United States continues to lag behind other developed nations in high school STEM education. As a result, the Microbiology Department at UMass-Amherst is currently developing several programs geared toward strengthening education in biotechnology at the high school, undergraduate, and graduate levels. During this talk, I will focus on our efforts in developing a new M.S. concentration in Applied Molecular Biotechnology (AMB) that was successfully launched last year. AMB is a 1 year, professional M.S. program that combines rigorous classroom instruction with hands-on, applied laboratory research. The AMB laboratory is unique because students learn basic skills in molecular biology and biochemistry and then apply that knowledge to independent research projects that stem from current research interests at UMass and surrounding colleges. Our efforts to train students extend beyond the classroom and the laboratory to include a mentoring program and a summer internship program that was developed in combination with partners in industry. Plans are currently underway to develop continuing education summer programs specifically designed for UMass undergraduates, and educators and students at nearby high school and community colleges.

#### **October 7**

##### **Tom Jordan**

*Visiting Researcher, Astronomy Department, UMass Amherst*

“QuarkNet: Teaching and Learning 21st Century Physics\*”

Nearly 600 physics teachers from across the US attend one-week, locally-organized professional development workshops hosted by physicists at their universities. Some teachers have been attending these meetings since 1999. QuarkNet provides opportunities for teachers to learn new physics and coach each other in pedagogical practices. Some of the teachers spend weeks at Fermilab or CERN actively contributing to research. All the teachers become members of a local

professional community; they increase their understanding of new physics and they collaborate on ways to introduce 20th and 21st century physics in their classrooms. Their students analyze particle physics data, attend master classes and construct classroom cosmic ray detectors. I will provide an overview of the program's 16-year history, what we have learned and describe the Data Portfolio. This latter is a learning framework that helps students to develop an understanding of analyzing "big data."

\*Supported by the United States Department of Energy and the National Science Foundation.

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## **October 21**

**Josh Finkel**, *Math Teacher, South Hadley; Executive Director, Tech Foundry*

“Tech Foundry: An innovative approach to IT education”

Tech Foundry has set out on a mission to turn Western Massachusetts into a major technology hub. We plan on achieving this goal by building a dynamic and fluid training program that will allow our curriculum to respond to market demand in close to real time. Working with groups that include inner city high school kids, underemployed college graduates, veterans returning from duty, and employed individuals whose employers need them to improve their technical skills, we seek to solve the shortage of IT and computer science professionals in not just Western Massachusetts, but the entire region. Our plan includes building bridges between private, public, non-profit, education, and start-up sectors as has never been done before, setting each of them up to be significant stakeholders in the success of the program and therefore be highly motivated to participate in its development.

## **November 4**

**Felicia Griffin-Fennell**, *Director, STEM Starter Academy, Springfield Technical Community College; Devan Greene*, *Coach, STEM Starter Academy*

“Lessons Learned: STEM Starter Academy at Springfield Technical Community College”

In an effort to increase the number of students who enroll in and complete programs in science, technology, engineering, and mathematics (STEM), Springfield Technical Community College launched the STEM Starter Academy. Over seven weeks in this summer, students completed three courses—Introduction to Engineering, remedial Math, and College Success—aimed at

giving them a head start for their first semester at STCC. The students also met guest speakers and visited local companies. This talk will center on the lessons learned from launching an intensive summer program geared around STEM education.

## **November 18**

**Karen Tallman**

*PhD, Education*

### "Journal Clubs as a Path to Creating Teacher Communities of Practice"

This talk examines how a journal club of preservice and inservice science teachers, who met regularly to discuss science education research articles, can help build a community of practice. While journal clubs are used in the medical and science education fields, they are rarely used in science teacher education. I conducted a qualitative case study of a science teacher journal club. The findings from this study reveal the journal club functioned as a community of practice. The findings further describe the benefits of bringing preservice and inservice science teachers together to 1) form professional networks among inexperienced and experienced science teachers; 2) become critical thinkers and consumers of theoretical knowledge; and 3) collaborate and learn from peers. While this study examined science teacher education, it has implications for many STEM education environments.

## **December 2**

**Todd Campbell**

*Associate Professor, Science Education, Department of Curriculum & Instruction, Neag School of Education, University of Connecticut*

### “Design Strategies for Engaging Students in Developing and Using Models”

Engaging students in developing and using models has been identified as one of the eight science practices in the Next Generation Science Standards. Models anchor the social and material work of scientists and as such are also seen as important anchors for science teaching and learning. Given this, this presentation describes design strategies within a curriculum unit focused on students' understanding of acceleration to reify how the practice of modeling can support students' understanding of disciplinary core ideas, cross-cutting concepts, and other science practices. Through building a unit of instruction around students developing an explanatory model of a scientifically rich phenomenon (i.e., objects accelerating differently on different ramps), this presentation offers a vision for how students can engage in instruction targeted by NGSS. Additionally, beyond the study of acceleration in the physical sciences, the design strategies used within the example curriculum unit are considered transferable to other disciplines (e.g., biology, earth science).