MSU Stem Alliance Meeting Notes  
Friday December 13, 2013

1. **Introductions/Updates – Sekhar Chivukula**

Goal for this meeting is to further discuss the STEM Alliance purpose and joint activities.

Background and outcomes for today: (see attached STEM Alliance presentation) As an alliance, this is an effort combines synergies. This group started in response to the need for a coordinated group like this to build competitive proposals and make sustainable change at MSU. Also see Handout - Summary of Grant Opportunities.

AAU STEM Education Initiative – Melanie Cooper – (see attached presentation) presented an update on this project which concentrates on gateway STEM courses. Goal is to change departmental culture so that teaching and learning is valued.

Other related activities:

- CREATE Mini conference – Renee Bayer - Feb 20th will be an opportunity to present more about our related programs and initiatives. Call for posters in January. ([http://create4stem.msu.edu/](http://create4stem.msu.edu/))
- STEM Alliance website – Bob Geier - is being developed on the CREATE for STEM projects webpage and will provide a place to post events, requests for collaboration, discussions, etc. (see [http://create4stem.msu.edu/project/list](http://create4stem.msu.edu/project/list))
- Science Studies at State (S3) – David Stroupe and Georgina Montgomery – This group is currently made up of at least 61 faculty members that consider themselves science studies scholars. The group includes historians, social scientists, science education experts, economists, sociologists, and anthropologists, with several faculty from Lyman Briggs and others dispersed in various colleges. S3 has been building over the last 3 months and would like to coordinate with STEM Alliance members on projects of mutual interest. For example, identifying broader impacts for STEM proposals and providing background and context for scholarship and research projects. S3 organizes regular lunches to foster transdisciplinary talk and work. Find out more and join the group on the CREATE for STEM website.

2. **Breakout groups notes** - The large group broke up into three groups and listened to several short presentations by STEM Alliance members. Each group discussed collaborative interests and how the STEM Alliance might support this work.

**Breakout Group A.**

What issues are we interested in?

- More introductory courses that move away from content delivery to constructing responses/understanding? Use knowledge vs. regurgitate
- How to bring to scale? Validate learning assessments?
- How do we promote a cultural change in faculty?
- Unified front
  - Go where the data takes us?
  - Collect, analyze, publicize data.
• Mobilize students
• Brainstorming

What can the STEM Alliance do for you?
• Find collaborators for projects, for example how to evaluate classroom reform?
• How do we do rigorous qualitative interviews, undergraduate research projects?
• Brainstorming

Breakout Group B.
What issues/projects are group members interested in?
• How do we get this into classrooms,
• How do we scale this up,
• How do we find connections with informal learning, e.g. museums, Lansing Community College
• How do we find out about other people’s work? What is happening across campus?
• Common interest in integrated courses.
• Institutionalization and sustainability: How do we align these pieces so they are cost neutral and can be sustained after the funding and after the “heroes” leave
• Institutional change within the tenure and reward

How might the STEM Alliance provide support?
• How can we affect change here at Michigan State University? Use MSU as a laboratory and transform our home base, MSU.
• We (MSU) have to look at the future of higher education and how are we on that cutting edge.
• If we can (MSU) demonstrate scalable effective change. – Institute this change and this will be something we can show nationally.

Breakout Group C
• “Transform” vs. “reform” as a more palatable word for those outside the choir
• Similarities between work to help faculty, students, postdocs: but grads have less autonomy; help people learn reformed techniques early before they waste lots of time writing lecture notes ;-)  
• Ties between under-prepared and under-represented: be careful not to conflate them; what about using social capital theory? Links between FLC, Drew, ESSA, INQUIRE; links between Jerry Caldwell, AK, Jerry Urquhart on various projects; looking at persistence depending on which course track students follow
• Visual representations: factor analysis can help distinguish between valid and predictive in models; science studies – body of work on how scientists communicate, what they communicate, why;  
• Classroom as community of practice; students constructing knowledge; guide students without their realizing how they’re being guided; also, students learning science practice – but how do you make that happen in the classroom? Also, blending concepts with practice – learn the content by the doing of science and also learn how science is done by doing it
Fire-hose constricted: reduce content expectations down to key concepts, less “concept of the week” and more unpacking a core idea in different ways; spiral?

Impact of environment: e.g. not separate lecture and lab rooms/times; studying where science happens (lab, field...)

Shift from formula to “what’s going on”? from algorithm to method

Key points

Social capital: as applied to work with underprepared students

How to get students to shift from “formula-selection” to thinking about “what’s going on”, to move from algorithm to modeling?

How to get K-16 students [and their faculty / grads / postdocs] on board with this new approach to learning? CBE Life Sciences (Tanner, SF State)
  
  Start early on in each course and in their gateway courses
  
  Explain how this benefits them
  
  Get them to think about what capabilities they have picked up

Classrooms as community of practice where students learn content by doing science ... and also learn how science is done by doing it

Our literatures miss each other

Meta message is we should be talking to each other and we are not. We should be sharing our publications

Places for common ground. Social capital plays out in the research we do and can be different in science education research.

Disrupting typical notions of STEM teaching and learning in classrooms. If Alliance means something it should also be a support network. Move from “grassroots’ campaign to know that we have an alliance of people backing your efforts.

3. Large group report out and summary of upcoming grant opportunities – Elizabeth Simmons

Teaching innovation requires modified/improved teaching spaces, teaching environment. But we can’t wait for classrooms to be improved: Change possible e.g. CEM 138 is reforming in a standard classroom.

Bond together to encourage cultural change.
  
  Formalized Mentoring, including for more senior faculty support change.
  
  Unite around the data. Promote networking and publications

Look at other institutional partners/models-LCC, Impressions 5, LCC “Transforming Teaching Through Learning” as a model.

Student perspective in STEM Alliance discussions. How do our students experience the STEM gateway? Consider Student representation? But if we do Student focus groups, must be representative, not only the best students.

As MSU to UCUE  Student formative feedback on courses

Underlying issue of scalability is worthy of study. An opportunity to study across the disciplines. Transferability is another issue. Moving into LCC, Impressions 5. These may be resources to ask the question about transfer to another environment.
• Models- co-teaching, training, will faculty give time to do this? Needs to be valued by Administration.
• Suggest we have experts/volunteer mentor list on STEM alliance website
  • Classroom visits
  • See it work in STEM
  • F+OD list of former Lilly Fellows
• Mentoring can be interdisciplinary
• Get feedback from student mentees
• Grant Funding rates are low and getting lower → There is going to be a change in how faculty are evaluated
• New faculty being hired; there are high expectations for them, even with dropping funding levels. We have to focus on changing the culture to be more inclusive and change what’s happening in the classroom. Look at faculty released from teaching for a term or two. Some co-teaching, but we haven’t connected this with pedagogy and practices, and mentoring. But if we can help them learn to teach early on, there is less effort to relearn. Need to have programs in place and have them be the norm.
• STEM Alliance can become important for STEM grants College of Ed thinks about these education issues a lot → we have an opportunity to build bridges at MSU.
• Keep our focus on our students. The data is clear - Stem education has a huge dropout rate. We have to help prepare students for STEM majors.

4. Next Steps
• STEM Alliance will meet again at the end of spring semester –
• Organizers:
  a. Cori Fata-Hartley, fatahart@msu.edu, MMG,
  b. Kanchan Pavangadkar, kanchan@cns.msu.edu, Neuroscience Program,
  c. Georgina Montgomery, montg165@msu.edu, Lyman Briggs College and the Department of History,
  d. Tom Deits, DEITS@MSU.EDU, BMB Adjunct
  e. Sekhar Chivukula, Elizabeth Simmons, and Renee Bayer offered to help with support
• Reviewed handout of upcoming funding opportunities for potential
  • NSF – call for proposal to improve undergraduate education due Feb 4 – revisit wider and HHMI– focused on changing the culture/research
  • REAL is due January 10; Cause and Wider have been rolled into IUES
• Announcement: CREATE for STEM Science Education Seminar Series see CREATE website for Spring schedule: http://create4stem.msu.edu/