



**Facilitating Change in Undergraduate
STEM: An Invitational Symposium
Integrating Multiple Perspectives**

June 16-19, 2008
Alberta, MI

Featured Talks

Monday, June 16, 7:30 pm

Facilitating Change: Experiences with the Reform of STEM Education

Judith Ramaley, Winona State University

The changing nature of knowledge production and international competition and collaboration will affect the organization, working relationships, educational strategies and societal roles and expectations that we attribute to our universities as well as how our K-12 educational system prepares its students for the workplace, for citizenship and for postsecondary education. Our educational institutions will begin to work together and interact in different ways to create research and educational environments that are easy to traverse and responsive to the changing knowledge and skill needs of a global, multidisciplinary, collaborative and open business and community landscape and to address the daily challenges of life in the regions we serve. Before moving to a new phase of seeking to improve the outcomes of STEM education at both K-12 level and in postsecondary education, we can learn a great deal from the progression of reform efforts that have occupied us in waves of about 10 year duration since the launching of Sputnik set in motion a new era of concern about the competitiveness of science and engineering in this country and a new wave of investment in STEM education at both Federal and state level. As we shall see, many of the reasons why these earlier waves of reform have had limited effects are still present today.

Tuesday, June 17, 1:30 pm

Understanding & Enabling Networks in 21st Century Organizational Forms

Noshir Contractor, Northwestern University

Recent advances in digital technologies invite consideration of organizing as a process that is accomplished by global, flexible, adaptive, and ad hoc networks that can be created, maintained, dissolved, and reconstituted with remarkable alacrity. This presentation describes a multi-theoretical multilevel (MTML) model of the socio-technical motivations for creating, maintaining, dissolving, and reconstituting knowledge and social networks. Using examples from his research in a wide range of activities such as disaster response, Communities of Practice at Procter & Gamble, public health and massively multiplayer online games (WoW - the World of Warcraft), Contractor will present a visual-analytic framework that can be used to Discover, Diagnose, and Design our knowledge networks in 21st century organizational forms.

Tuesday, June 17, 2:30 pm

Models of Change and Implementation

Andrew Van de Ven, University of Minnesota

1. What model of change do you have in mind?
 - Planned change
 - Regulated change
 - Dialectical change
 - Evolutionary change
2. What sequence of steps are required to develop & implement your model? Do your steps consider the factors that influence innovation adoption and implementation in the:
 - STEM Innovation itself?
 - Individuals?
 - Organizations?
3. What breakdowns are you experiencing in implementing your model? When change does not unfold as expected:
 - Do you change the organization to fit your model? or
 - Do you change your model to fit the organization?

Wednesday, June 18, 9:00 am

An Experiment in Institutional Change in STEM Education: The Science Education Initiatives at the University of Colorado and the University of British Columbia

Carl Wieman, University of British Columbia and University of Colorado, Boulder

These initiatives are a substantial (\$5M and \$12 M) 5 year experiment aimed at achieving sustained department-wide change in teaching practices at major public research universities. I will describe the model of these initiatives and the ideas and observations that drove their design. I will also provide some preliminary observations as to what aspects of these initiatives are working well, what are working poorly, what is working as expected and what are some unexpected surprises, both good and bad. I will also extrapolate from 2 to infinity to discuss which aspects of educational change are similar and which are different across science disciplines.

Background material available at www.cwsei.ubc.ca and www.colorado.edu/sei/

Wednesday, June 18, 10:30 am

Diversifying Change in Undergraduate STEM Education

Carol Colbeck, University of Massachusetts Boston

This paper plays on different ways the term "diversity" is used in higher education research to explore change in undergraduate STEM education. Acknowledging the diversity of institutional types beyond the structures and strictures of research extensive universities broadens consideration of options and challenges for organizational change. Changes in recruitment, instructional, and support practices may enhance ethnic, gender, and learning style diversity of STEM student and instructor populations. Higher education scholars and administrators have diverse perspectives on possibilities of organizational change to enhance undergraduate education. Pulling together these meanings of "diverse," the presenter will draw on her experiences as higher education scholar and as education dean to analyze actual and potential change in public research intensive and comprehensive institutions in which a high proportion of undergraduates from underrepresented groups are participating in STEM education.