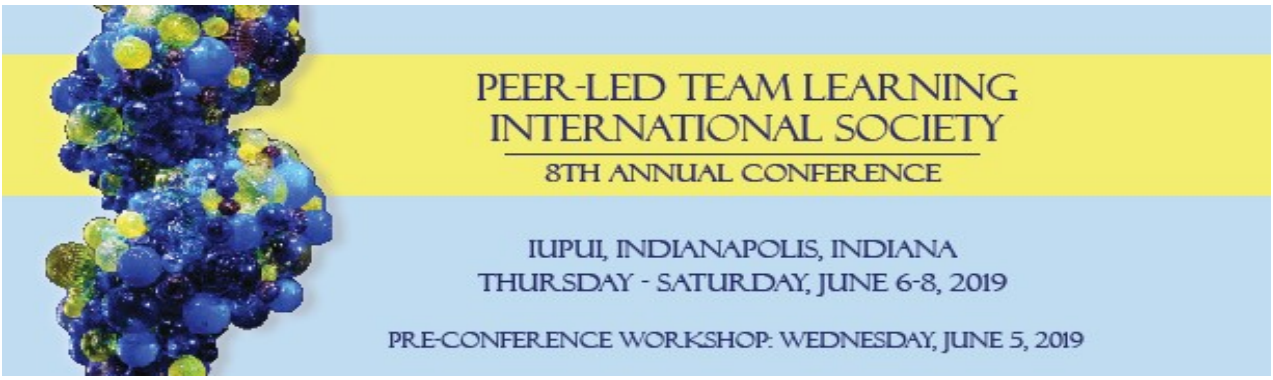


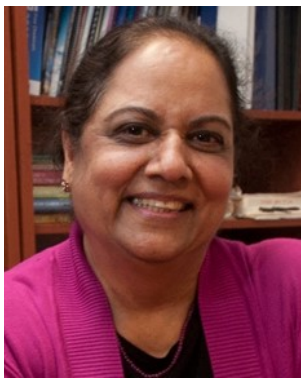
Thursday, June 6, 2019

Keynote Presentation

What Are the Limits of Adaptability of the PLTL Model?

In the 1990's, Leo Gafney, the PLTL National Project evaluator, articulated six critical components for successful implementation of PLTL, based on the evaluations he had conducted at several campuses around the country. Those six Critical Components will be revisited in this presentation and discussed in terms of evaluating the fidelity of implementation of the PLTL model. A seventh critical component will be suggested. The value of these components in implementation of cPLTL will also be discussed. This talk is adapted from a chapter co-authored by Pratibha Varma-Nelson and Mark Cracolice.

Pratibha Varma-Nelson is Professor of Chemistry and the founding executive director of the STEM Education Innovation and Research Institute at Indiana University-Purdue University Indianapolis (IUPUI). Before she joined SEIRI she was the executive director of the Center for Teaching and Learning. She is well known in the STEM education community for her pioneering work in the development, implementation and dissemination of the Peer-Led Team Learning (PLTL) model of teaching. She has been a Co-PI of three NSF funded National Dissemination Grants. In addition she was a founding Co-PI of the first NSF funded Undergraduate Research Center "Center for Authentic Science Practice in Education, (CASPiE)." Her research group is currently working on the development, implementation, evaluation, and dissemination of cyber-PLTL (cPLTL). For the cPLTL project, she has received funding from IUPUI, NSF, and EDUCAUSE, Next Generation Learning Challenges. This work broadly informs the understanding of how students learn chemistry (general and organic) in online environments as well as in face-to-face environments. Dr. Varma-Nelson is co-author of several publications about PLTL, cPLTL, and CASPiE and has made numerous presentations in local, national, and international venues. She co-authored the 2011 AAAS report, "Vision and Change in Undergraduate Biology Education: A Call to Action" as well as several other national reports. Varma-Nelson received James Flack Norris Award (2008), Stanley C. Israel regional award from the American Chemical Society (2011), George C. Pimentel Award (2018) among others. In 2017 she was selected as the ACS Fellow. She received her Ph.D. from the University of Illinois at Chicago and her B.Sc. from Pune University, India.



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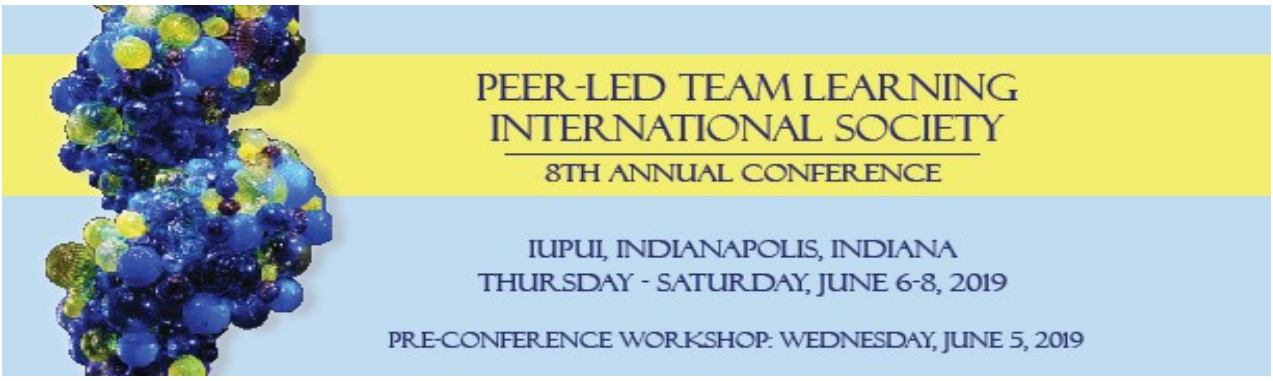

Thursday, June 6, 2019

Keynote Address:

The Brain, Physiology, Psychology and Implications for Instruction

The overarching theme of this presentation is *development,* exploring how the brain physically develops over the human lifespan. The brain forms in the third gestational week, grows further after birth until it reaches about 90% of adult volume by age 6, and reaches maximum volume at the onset of adolescence. It then enters a healthy pruning phase influenced by the environment into early adulthood that is critical in establishing young adult brain physiology. After approximately age 40, the volume of the brain again begins to decrease, and this continues for the remainder of one's life.

Developmental psychology correlates with changes in brain physiology, first focusing on the middle school, high school, and college years. The work of founders of developmental psychology will be presented, establishing a model of how learning occurs. Problem solving and the importance of deconstruction and re-representation of problems will be presented, and how this relates to a student's developmental level. The implications for instruction will explore how the peer-led team learning model provides a learning environment that allows instructors to design curricula that transcend simple content knowledge transmission, providing an opportunity to facilitate the development of the reasoning and problem-solving abilities of students.

Mark Cracolice is a Professor of Chemistry Education Research and Practice in the Department of Chemistry & Biochemistry at the University of Montana. He teaches general chemistry lecture and lab, undergraduate and graduate courses in teaching chemistry, and graduate courses in chemistry education. His general chemistry courses have included a peer-led team learning component for the past two decades. He has authored or co-authored textbooks for high school chemistry, introductory college chemistry, peer-led team learning in general and GOB chemistry, and college general chemistry. The general theme of his group's research program is investigations of how students learn chemistry. Specifically, Cracolice is interested in research topics such as the effectiveness of curriculum design, the facilitation of the development of scientific reasoning skills and general intelligence, and transfer of learning. He is also involved in the professional development of high school and college science instructors.

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