

# PEER-LED TEAM LEARNING INTERNATIONAL SOCIETY

WEAVING TOGETHER BEST PRACTICES

# 2019

Eighth Annual Conference

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Thursday - Saturday | June 6-9  
IUPUI | Indianapolis, Indiana



**IUPUI**

THE STEM EDUCATION  
INNOVATION AND RESEARCH INSTITUTE

INDIANA UNIVERSITY-PURDUE UNIVERSITY  
Indianapolis



PEER-LED TEAM LEARNING  
INTERNATIONAL SOCIETY

# WELCOME FROM CHANCELLOR NASSER H. PAYDAR

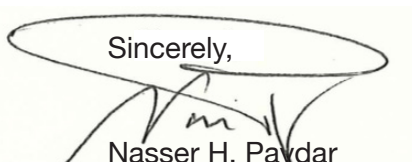


Welcome to IUPUI and to Indianapolis for the 8th Annual Conference of the Peer-Led Team Learning International Society (PLTLIS).

You are visiting our campus at the conclusion of our campus's 50th Anniversary celebration. Since our formation in 1969, IUPUI has become a leading urban-serving research institution recognized for the success of its students, its advances in health and life sciences, and its intellectual, economic, and cultural contributions to the well-being of the citizens of Indianapolis, the state of Indiana, and beyond. We enroll nearly 30,000 undergraduates and graduate and professional students in 478 distinct degree and certificate programs, and award as many as 7,000 Indiana University and Purdue University degrees each year.

All in the higher education community share a commitment to student success, and at IUPUI we constantly strive for enhanced student learning through application of high impact practices. The Peer-Led Team Learning (PLTL) approach has proved to be very beneficial for students and for their peer leaders. Students in classes employing PLTL receive structured, out of class, hands-on problem solving experiences that strengthen their learning. Peer leaders are trained in best practices and they themselves develop improved communication, discipline knowledge, and leadership skills. All participants benefit from a program that embraces diversity among leaders and learners. AT IUPUI, PLTL has been implemented in many disciplines including chemistry, computer science, biomedical engineering, mechanical and energy engineering, and organizational leadership — as well as in interprofessional education efforts that involve the schools of dentistry, medicine, nursing, public health, social work, and others.

As you explore the theme “Weaving Together Best Practices” with others in this important community of scholarship and practice, I hope you enjoy your visit to the IUPUI campus and to Indianapolis. I also hope you gain fresh insights, new ideas, and renewed enthusiasm for this important work that is so critical to the continuing advancement of student learning, engagement, and success.

Sincerely,  
  
Nasser H. Paydar  
Chancellor

# Welcome to the Eighth Annual Conference, PLTL Practitioners!

We are delighted to welcome you to the 2019 Conference of the Peer-Led Team Learning International Society, hosted by Pratibha Varma-Nelson, Professor of Chemistry, Founding Executive Director, STEM Education Innovation and Research Institute (SEIRI), IUPUI.

If this is your first PLTLIS meeting, walk up to someone you do not know and introduce yourself! Then do it again several times during the meeting. Please meet Faculty and Leaders from other campuses. If you have attended previous conferences, help make everyone feel welcomed!

Our PLTLIS conferences have a relaxed, friendly atmosphere which is conducive to sharing resources and ideas. We hope that you will be inspired in your practice while networking with other PLTL practitioners and enjoy this opportunity to learn and grow! The Conference Committee, headed by Ne'Shaun Jones and José Alberte, Conference Co-chairs, have coordinated three days of programming with something for everyone. This conference is entitled: "Weaving Together Best Practices." The sessions you will enjoy over the next few days are centered in current research, training and evaluation, trends in peer learning, and technology in teaching and learning. You will return home with some new ideas for practice to enhance your PLTL program on your campus and increase student success.

On behalf of the Board of Directors of the Society, we invite you to continue working with us over the course of the next year. Whether you are interested in helping to develop a certification program for Peer Leaders and PLTL programs, creating regional networks of practitioners, formulating what benefits an Alumni Network could bestow on former and current Peer Leaders, submitting a paper to the new Journal, *Advances in Peer-Led Learning (APLL)*, co-authoring a workbook, or have another idea for the practice of Peer-Led Team Learning, we look forward to your involvement to strengthen PLTLIS and PLTL practitioners.

Enjoy the next few days and thank you so much for being a part of PLTLIS. Stop me and introduce yourself!



**Jim Becvar**  
PLTLIS President (2017-2019)

# PROGRAM OVERVIEW

## DAY ONE

THURSDAY, JUNE 6, 2019		
8:30 AM – 9:00 AM	<b>Registration</b>	Lobby, IT Building
9:00 AM – 9:30 AM	<b>Welcoming Remarks</b> James Becvar, President, PLTLIS Pratibha Varma-Nelson, Conference Host Dr. Simon Atkinson, Vice-Chancellor for Research, IUPUI Jose Alberte, Conference Co-Chair	Auditorium- Room 152
9:30 AM – 10:30 AM	<b>Plenary Session</b> <i>What Are the Limit of Adaptability of the PLTL Model?</i> Pratibha Varma-Nelson	Auditorium- Room 152
10:30 AM – 11:10 AM	<b>Meeting and Mingling</b>	Lobby, IT Building
10:30 AM – 11:10AM	<b>Peer Leaders' Meeting: Introductory Session</b>	Room 162, IT Bldg.
11:15 AM – 12:15 PM	<b>Plenary Session</b> <i>The Brain, Physiology, Psychology and Implications for Instruction</i> Mark Cracolice	Auditorium- Room 152
12:15 PM – 1:30 PM	<b>Lunch</b>	SELB – Atrium
1:30 PM – 3:00 PM	<b>Oral Presentations I</b>	Rooms 073, 160, 162, 252
3:00 PM – 3:15 PM	<b>Break</b>	
3:15 PM – 4:45 PM	<b>Oral Presentations II</b>	Rooms 073, 160, 162, 252
5:00 PM – 6:30 PM	<b>Poster Presentations &amp; Reception Remarks</b> Dr. Partha Basu, Chair, Chemistry Department, IUPUI Dr. Simon Atkinson, Vice -Chancellor for Research, IUPUI	Lobby, IT Building

# PROGRAM OVERVIEW

## DAY TWO

FRIDAY, JUNE 7, 2019		
9:00 AM – 9:30 AM	<b>Registration &amp; Refreshments</b>	Lobby, IT Building
9:30 AM – 9:45 AM	<b>Opening Remarks</b> James Becvar, President, PLTLIS	Room 252, IT Building
9:45 AM – 12:30 PM	<b>Plenary Session</b> <i>Designing Our Lives</i> Facilitated by Virginia Rath and Barbara Waugh	Auditorium- Room 152
12:30 PM – 1:45 PM	<b>Lunch</b>	SELB – Atrium
1:45 PM – 2:45 PM	<b>Oral Presentations III</b>	Rooms 073, 160, 162, 252
2:45 PM – 3:00 PM	<b>Break</b>	
3:00 PM – 4:00 PM	<b>Oral Presentations IV</b>	Rooms 073, 160, 162, 252
4:00PM – 4:15 PM	<b>Peer Leaders' Meeting</b>	Room 162, IT Building
4:00 PM – 5:30 PM	<b>The “Unmeeting”</b> <i>The Future of PLTL: New Directions</i> Facilitated by Virginia Rath and Barbara Waugh	Lobby, IT Building

# PROGRAM OVERVIEW

## DAY THREE

SATURDAY, JUNE 8, 2019		
9:00 AM – 9:30 AM	<b>Registration &amp; Refreshments</b>	Lobby, IT Building
9:30 AM – 10:15 AM	<b>Special Panel: From Workshop Chemistry to PLTL</b> Pratibha Varma-Nelson, Leo Gafney, Mike Gaines, Mark Cracolice, AE Dreyfuss Moderator: Marcelo Sztainberg	Auditorium - Room 152
10:15 AM – 10:30 AM	<b>Break</b>	
10:30 AM – 12:15 PM	<b>Gallery Walk Showcase</b>	Rooms 073, 077, 155, 157, 159, 160, 162
12:15 PM – 1:15 PM	<b>Lunch &amp; Closing Remarks</b> James Becvar, President, PLTLIS	SELB – Atrium
1:30 PM – 5:30 PM	<b>Group Event in Indianapolis</b> <b>Tour of IUPUI</b>	Auditorium- Room 152
1:30 PM – 5:00 PM	<b>Meeting of the Peer-Led Team Learning</b> <b>International Society Board of Directors</b>	UL-0110, Library Building



# KEYNOTE PRESENTATIONS

THURSDAY, JUNE 6, 2019

## 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.

## 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.

# PLENARY WORKSHOP

FRIDAY, JUNE 7, 2019

## DESIGNING OUR LIVES: Building on the experience of leading

We all struggle with questions about life, work and our purpose in the world. This workshop gives participants time to reflect on where they are, where they would like to be and ways to create a pathway between the two. Building on the experience of leading – as a Peer Leader, faculty, staff or in some other role – participants will design their lives, cycling through the stages, tools, and mindsets of Design Thinking. How can our past leadership experience guide us in our lives, and increase our impact in the workplace, graduate school, or in other contexts?

We draw on teaching and consulting in life design. The role of Peer Leader (PL) in supporting the dissemination of knowledge also supports the understanding of the processes and dynamics of leading a group. In sharing and reflecting on their experiences, participants' understanding of their leadership skills can inform their life design. Participants engage in a meaning-making process that moves from observation, to insights, to new models of teaching, to ideas and then solutions that are prototyped in the Peer-Led Team Learning environment. This meaning-making process can be thought of as a mini-cycle of Design Thinking.

Designers have long practiced immersion in ambiguous situations, imagining and conceptualizing alternative futures, and learning through experimentation and failure. Human Centered Design brings the value of a deep understanding of the human experience to the development of new products, services and experiences. Design Thinking mindsets, skillsets and toolsets offer a means by which we can approach designing our own lives for a world in which we all want to live and work.



**Barbara Waugh** is an Executive-in-Residence at the University of California-Berkeley Haas School of Business, and a co-developer of and team coach for 'Teaming with Diversity,' in the College of Engineering. Lessons learned and taught in her 25 years at Hewlett Packard inform her coaching, talks/listenings and book, *Soul in the Computer*, enthusiastically reviewed by Dow-Jones, *Fast Company* and *Business 2.0*. She has appeared in numerous books and publications including *The Dance of Change*, *The Rebel Rules*, *The 12 Secrets of Highly Creative Women*, *Speak the Truth and Point to Hope*, *Faith and Fortune*, *Fast Company*, *Strategy & Business*, *Fortune*, and the *Stanford Innovation Review*.

Barb has a doctorate in psychology and a Masters in Theology and Comparative Literature. She has served or serves on many (advisory) boards including the State of the World Forum, the Global Fund for Women, Engineers for a Sustainable World, the Global Women's Leadership Network, the Khadafy Foundation for Non-violence, Oxfam America, the Positive Deviance Initiative, the Silicon Valley African Film Festival, and the PTA at Grass Valley Elementary School, a high-poverty, high-hopes K-5 in Oakland, CA. She is a mother and grandmother.



**Virginia L. Rath** is an accomplished scientist, design research consultant and serial entrepreneur with broad expertise in health care, pharma and biotech. She combines hands-on business experience with a strong science background to evaluate technology businesses and marketing strategies. She was a co-founder of Quotient Design Research and has extensive experience in both quantitative and ethnographic research. Virginia's experience ranges from startups to large multinationals, for- and non-profit organizations and includes medical device manufacturers, health care delivery institutions, biotech and pharmaceutical companies and other consumer product and service companies.

She is a Lecturer in the Haas School of Business at UC Berkeley and in the d.school at Stanford University. Virginia received B.S. and M.S. degrees in Biological Sciences from Stanford University and a Ph.D. in Biochemistry and Biophysics from the University of California at San Francisco. She has dual MBA degrees from the Haas School of Business at the University of California at Berkeley and Columbia University in New York.



# UNMEETING\* - THE FUTURE OF PLTL: NEW DIRECTIONS

FRIDAY, JUNE 7, 2019

**Facilitated by: Barbara Waugh and Virginia Rath**

We live in a world of rapid social and technological change. What does the Peer-Led Team Learning International Society want to do to fund, scale or grow the PLTL vision to prepare the next generation of leaders for success in this environment? Bring your ideas, passion, imagination and topics you'd like to work on to the Unmeeting!

\*Unlike traditional meetings, an Unmeeting is informal and flexible where the attendees decide on the discussion topics and choose topics they would like to participate in.

# SPECIAL PANEL

## SATURDAY, JUNE 8, 2019

### From Workshop Chemistry to Peer-Led Team Learning

From “Workshop Chemistry” to Peer-Led Team Learning, an innovative academic methodology implemented across multiple disciplines and incorporated into many founding campus initiatives: Join what promises to be an engaging conversation with some of the “founders” of the PLTL model who will share stories about their more than 25 years working on the development and dissemination of PLTL, look at the current state of implementation and future opportunities to further develop this important model.

#### MODERATOR



**Marcelo Sztainberg** is an Associate Professor and upcoming chair of the Computer Science Department at Northeastern Illinois University (NEIU). His experience at NEIU includes over five years as an academic administrator and leader of research initiatives. Dr. Sztainberg has worked extensively with underrepresented students, in particular in the field of Math Development. He has key roles in promoting Peer Led Team Learning (PLTL), Affinity Research Group methods, undergraduate research experiences, and intensive mentored summer undergraduate research. Dr. Sztainberg is actively involved with the Society for the Advancement of Chicano and Native American Students in Science (SACNAS) at the national level and was one of the founders of the NEIU chapter. He is also a board member and president elect of the PLTLIS.

#### PANELISTS



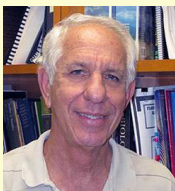
**Pratibha Varma-Nelson** is Professor of Chemistry and the founding executive director of the STEM Education Innovation and Research Institute at Indiana University-Purdue University Indianapolis (IUPUI). She is well known in the STEM education community for her pioneering work in the development, implementation 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).”



**Leo Gafney** has worked as a teacher, school principal, school board chair, and is the author of several mathematics texts. For the past 30 years, he has served as an evaluator for more than 80 funded projects, primarily college-level STEM initiatives. Evaluation methods have included the use of surveys, interviews, observations, focus groups, site visits, comparative studies, analysis of grades and other numerical data. He prepares formative, summative, and special area reports as appropriate. He has been particularly interested in Peer-Led Team Learning, undergraduate research, academic support and mentoring for minority students, dissemination, and the identification of critical success factors.

Dr. Gafney was the evaluator for the initial PLTL grants and with support from a supplemental grant he wrote, with Pratibha Varma-Nelson, *Peer-Led Team Learning: Evaluation, Dissemination and Institutionalization of a College Level Initiative*. (Springer: Dordrecht, Netherlands, 2008). This text includes: research on PLTL, available at the time; the six critical components; discussions of dissemination and institutionalization. Gafney is also author of several cumulative studies published and available from the online peer-reviewed journal, ERIC, e.g.: *The Science Education Center at Stony Brook*; *Best Practices in SUNY LSAMP*; and others. He continues to carry out program evaluations, in partnership with his daughter, Julie.

## PANELISTS CONTINUED



**Michael Gaines** is Professor of Biology and Assistant Provost for Undergraduate Research and Community Outreach at the University of Miami (UM). Gaines earned a B.S. degree at Tulane University and his Masters and Ph.D. degrees at Indiana University. His most recent research interests have focused on the ecology and behavior of large mammals in Kruger National Park in South Africa. Gaines has extensive experience in undergraduate curriculum development. He is director of UM's Howard Hughes Medical Institute (HHMI) Undergraduate Education Program. The major goal of the HHMI program is to increase the number of community college students pursuing research careers through innovative curriculum design. He directs a National Institute of General Medical Sciences (NIGMS) Bridge Program between the University of Miami and Miami Dade College. Its aim is to increase the number of community college students who are underrepresented minorities in the sciences transferring to research universities and completing baccalaureate degrees. In addition, Gaines serves as campus coordinator for the Leadership Alliance, which provides research experiences for underrepresented minority students in STEM fields. He served as the Chair of the NSF Advisory Committee for the Workshop Chemistry grant and then as Co-PI for the NSF Dissemination Grant, focusing on Biology.



**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. He was a Co-PI for the MACK grant to adopt and adapt Workshop Chemistry, and was a Co-PI for the NSF National Dissemination Grant.



**A.E. Dreyfuss** is a Learning Specialist in the field of Adult Learning and Leadership. She was the Project Manager for the NSF National Dissemination Project to disseminate the PLTL model in STEM disciplines, edited Progressions, the Workshop Project Newsletter, and the website, organized annual and regional conferences. She trained Peer Leaders who facilitate learning for groups of students at City University of New York (CUNY) campuses for 15 years. She co-founded the Peer-Led Team Learning International Society ([www.pltlis.org](http://www.pltlis.org)) and was elected as the first President. She led Team SusSTEM, through the Innovation Corps for Learning (I-Corps L) program sponsored by the National Science Foundation, developing sustainability mechanisms for PLTL campus programs. She received her Bachelor's degree from the University of Michigan, and her Master's and Doctorate degrees from Teachers College, Columbia University. She is a co-editor, with Andrea McWilliams and James Becvar, of the Facilitating Team-Based Learning: A Peer Leader's Guide to Leading Learning Activities, published by PTLIS Press (2019).

# ACKNOWLEDGMENTS

## IUPUI

The Office of the Chancellor, IUPUI

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Office of the Vice-Chancellor of Research

Dr. Simon Atkinson

Dr. Simon Rhodes, Dean of School of Science

Dr. Partha Basu, Chair of the Chemistry Department

STEM Education Innovation and Research Institute

Pratibha Varma-Nelson, Executive Director

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**Tenth Annual Conference, June 2 -- 5, 2021**

University of Houston, Downtown, Houston, Texas

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