



# LSMCE

Louis Stokes Midwest  
CENTER OF EXCELLENCE

## A Call To Action

LSAMP MODEL FOR BROADENING  
PARTICIPATION IN STEM

SCIENCE • TECHNOLOGY • ENGINEERING • MATHEMATICS

**October 20-22, 2013**

**Indianapolis Marriott East &  
IUPUI Hine Hall**





ANDRÉ CARSON  
UNITED STATES CONGRESS

October 21, 2013

Greetings:

Welcome to the 2013 Conference of the Louis Stokes Midwest Center of Excellence. I am thrilled that you have chosen Indianapolis as this year's conference site, and I hope you will find that our city embodies Indiana's reputation for Hoosier hospitality.

Technology plays a critical role in our daily lives and will be at the heart of America's future economic success. In order for our young people, especially underrepresented minority youth, to be nationally and internationally competitive, we must ensure they are strong in the areas of science, technology, engineering, and mathematics. This year's theme, *A Call to Action: LSAMP Model for Broadening Participation in STEM*, is timely as we explore and share best practices to engage students in STEM-related education, equipping them with the tools and support necessary to move their education and our nation forward. For this reason, I have repeatedly advocated for increased funding to technical education programs focusing on STEM fields through the Carl D. Perkins Career and Technical Education initiative.

As a strong believer that education is the key to success, I am pleased each of you are in attendance today and would like to extend my most sincere thank you for your hard work and dedication to our future and our students. I am confident today will be filled with rich and productive discussions, and I look forward to working with each of you to broaden participation in STEM education and careers.

Sincerely,

A handwritten signature in dark ink, appearing to read 'AC' with a stylized flourish.

André Carson  
Member of Congress

# Welcome

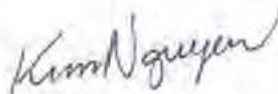
Dear Colleagues,

Welcome to Indianapolis! We at the Louis Stokes Midwest Center of Excellence (LSMCE) appreciate the opportunity to host you for this event. Our inaugural conference brings together key administrators, educators, and researchers to examine the educational process and environment leading to degrees earned by underrepresented minority (URM) students in science, technology, engineering, and mathematics (STEM). The invited speakers are experienced leaders in student learning, research mentoring, and institutional support programming. They will present evidence-based outcomes and the measurable impacts of their efforts to increase the success of URM students on their campuses and around the nation.

Indiana University Purdue University Indianapolis (IUPUI) was named by *Diverse Issues in Higher Education* in May 2013 as among top 30 best non-HBCU schools for minorities. We are honored to have this opportunity to respond to the national call for diversifying STEM workforces by increasing the participation and improving the achievement of URM students in STEM disciplines. We are very pleased to offer a home for LSMCE and be the hosting site for this important conference.

We would like to personally thank the National Science Foundation (NSF) directors for their ongoing support of the Louis Stokes Alliances for Minority Participation (LSAMP) and for providing major funding support for this conference. Additionally, we welcome and thank institutions in the Midwest that responded to our call for action by supporting the participation of their faculty and administrators at the conference. Let's unite in partnership and share our best approaches to cultivating the rich pool of STEM talents among our nation's URM students. Our tireless work will help shape the future of recruitment, retention, advancement, and globalization of URM students in STEM disciplines.

Sincerely,

A handwritten signature in dark ink, appearing to read "Kim Nguyen", written in a cursive style.

Kim S. Nguyen, LSMCE Co-Principal Investigator  
Conference Organizer  
IU School of Education at IUPUI



# A Call To Action

LSAMP MODEL FOR BROADENING  
PARTICIPATION IN STEM

October 20-22, 2013

Indianapolis Marriott East & IUPUI Hine Hall

Sponsored by the Louis Stokes Midwest  
Center of Excellence (LSMCE)

Supported by the National Science Foundation  
award 1202563

## Conference Program

All conference events take place at the Indianapolis Marriott East, EXCEPT the Monday afternoon session which will be held on the IUPUI campus in Hine Hall Auditorium (IP).

### Sunday, October 20

4:00- 6:00 p.m. **Registration and Check-in Open**

(Hotel Lobby)

6:00- 7:00 p.m. **Welcome Reception**

(Freedom Hall)

*Entertainment provided by DJ*



7:00- 8:00 a.m. **Registration & Breakfast**

(General Session Room)

8:00- 8:10 a.m. **Opening Remarks**

*Crystal Porter*  
*Associate Director for Special Projects*  
*Louis Stokes Midwest Center of Excellence*

8:10- 8:20 a.m. **Welcome**

*LeRoy Jones, II*  
*Co-Principal Investigator*  
*Louis Stokes Midwest Center of Excellence*

8:20- 8:50 a.m. **Call to Action**

*A. James Hicks*  
*Program Director*  
*Louis Stokes Alliances for Minority Participation*  
*National Science Foundation*





**Breakout Sessions**

**9:00- 10:00 a.m.**

**(Salons A-D)**

**Salon A Community College Pathways to STEM Degrees:  
Challenges and Opportunities to Broadening Participation**

*Lindsey Malcom-Piqueux  
The George Washington University*

**Salon B Developing and Leveraging Resources to Sustain  
Undergraduate Research Initiatives at Your University**

*Randy Duran  
Louisiana State University*

**Salon C Defining STEM Majors in Community Colleges for WebAMP  
Reporting: Guidelines and Recommendations for Practice**

*Mary Darrow, Iowa State University  
and Cynthia Bottrell, Hawkeye College*

**Salon D The Trajectory of Aspiring African American  
Engineers and Computer Scientists: A Mixed  
Methods Understanding of Success**

*Christopher Newman  
University of San Diego*

**Student Breakout Sessions**

**9:00- 10:00 a.m.**

**(Salon E)**

**From the Classroom to the Community: How Minority STEM Students Impact the World**

*Trina Fletcher  
Purdue University*



For many college students, the road to graduation is not easy. For minority and female students in STEM, statistics show that this path is almost impossible and certain achievements are unreachable. Luckily, there is a wealth of tips, tricks and information that can help students make the most of college and graduate ready to take on today's globally competitive society.

Minority students in STEM are key individuals who can help the upcoming generation close the math and science education gaps in K-12 schools via various avenues such as tutoring and out of school programs. This in turn will impact their communities and address issues that are critical towards factors from the STEM education pipeline up to educational policy.

## Breakout Sessions

10:15- 11:15 a.m.

(Salons A-D)

**Salon A**   **A Stem of Enrollment, Retention, Graduation and Advancement in STEM: A Transformative Broadening, by Design, of the Participation of Minorities**

*Diola Bagayoko*

*Southern University A&M College*

**Salon B**   **Promoting Intercultural Competence, Global, and International Experiences with Underrepresented Minority Students Pursing Science, Technology, Engineering and Math**

*Simone Gbolo*

*University of Minnesota Twin Cities*

**Salon C**   **Making Racially Minoritized Students Matter: A Student Developmental Perspective for STEM Undergraduate Education**

*Lori Davis-Patton*

*Indiana University-Purdue University*

*Indianapolis(IUPUI)*

**Salon D**   **Improving Retention Rates in STEM**

*Andrew Grosovsky*

*University of Massachusetts Boston*

## Student Breakout Session

10:15- 11:15 a.m.

(Salon E)

### Internship Opportunities at Argonne National Laboratory

*Meridith Bruozas and Deon Ettinger*

*Argonne National Laboratory*

In today's science world, it is not just important for the next generation of STEM professionals to be well versed in theory and academic knowledge, they also need to be able to apply their understandings to real world problems. Argonne National Laboratory strives to explore and develop solutions to real world problems (i.e. clean energy, safe disposal of nuclear waste, homeland security issues). We offer a number of internship programs for undergraduate, graduate and faculty that provide opportunities to work alongside Argonne scientists and engineers as they work to solve some of our societal issues. This session is geared towards students.





## Luncheon Keynote

11:30– 12:45 p.m.

(General Session Room)

11:45- 12:00 a.m. **Announcements and Introductions**

*Crystal Porter*

*Associate Director for Special Projects*

*Louis Stokes Midwest Center of Excellence*

12:00- 12:45 p.m. **Keynote Presentation**

## **Building Tomorrow's Diverse STEM Workforce: Lessons and Challenges**

The National Science Foundation supports basic research in science, engineering, and education. The NSF has had a long-standing commitment to prepare the next generation of scientists and engineers, going back to the earliest years of NSF. Each year the NSF supports hundreds of thousands of researchers, postdoctoral fellows, trainees, teachers, and students in all fields of science engineering. I will discuss key lessons and challenges for broadening participation and enhancing diversity in the STEM fields for tomorrow's innovative and global workforce.



*Joan Ferrini-Mundy*

*Assistant Director*

*Directorate for Education and Human Resources*

*National Science Foundation*

**Shuttles to IUPUI Depart at 12:50 from Marriott East**



**Monday, October 21, 2013**  
**1:30- 4:00 p.m.**  
**Hine Hall (IP) Auditorium**



**AFTERNOON KEYNOTE**

**1:30- 2:30 p.m.**

**Panel Discussion - *Voices of Change: Impact of LSAMP***

**Moderator**

*Pamella Shaw, DMD, MPH*  
*Associate Dean for Diversity, Equity,*  
*and Inclusion*  
*Indiana University School of Dentistry*

**Panelists**

*Shira Ruggs Dancy, IU School of Dentistry*  
*Trina Fletcher, Purdue University*  
*Trevor Grand Pre, DePaul University*  
*Pablo E. Guzmán, California Institute of Technology*  
*Mariah Judd, IUPUI*  
*Sannah Ziama, University of Kentucky*

**2:40- 2:45 p.m.**

**Keynote Introduction - Zebulun R. Davenport, Ed.D.**  
*Vice Chancellor, IUPUI Division of Student Affairs*

**2:45- 3:50 p.m.**

***Beyond Deficit Perspectives on Minoritized Students in STEM Fields***

*Shaun R. Harper, Ph.D., University of Pennsylvania*



Most published research on Blacks and Latinos in STEM fields is based on important, yet repetitive examinations of the following questions: why do so few pursue STEM majors; why are they so underprepared for college-level math and science courses; why are their grades and other indicators of academic achievement disproportionately lower than their White and Asian American counterparts; why do so many change their majors to non-STEM fields; and why do so few continue on to graduate degree programs in STEM?

While answering these questions is essential to narrowing racial achievement gaps and attainment disparities in STEM, most empirical studies continually amplify failure and deficits among minoritized students instead of achievement. As such, little is understood about those who, despite all that is known to complicate and undermine achievement for their particular racial groups, manage to successfully navigate their ways to college and through the STEM postsecondary pipeline. Hence, an anti-deficit achievement framework for research on students of color at various junctures of the STEM pipeline (from K-12 schools through doctoral degree attainment and transitions into science research and long-term industry careers) will be presented in this session. The framework is informed by qualitative interviews with 634 Black and Latino student achievers at 40 high schools and 86 colleges/universities across the U.S.

**Sponsors:** IUPUI Academic Affairs Conference Fund Award, University College, Division of Student Affairs, Office of Diversity, Equity, and Inclusion, Office of Planning and Institutional Improvement, IU School of Education at IUPUI

**Hosted By:** Louis Stokes Midwest Center of Excellence

**Supported By:** The National Science Foundation (NSF) under HRD 1202563. Any opinions, findings, conclusions or recommendations expressed are those of the author and do not necessarily reflect the views of NSF.

**Shuttles depart IUPUI from Hine Hall at 4:30 to return to the Marriott East Indianapolis**



## Poster Session

5:30- 6:30 p.m.

(Atrium)

Posters 1 - 40 will feature student scientific posters.

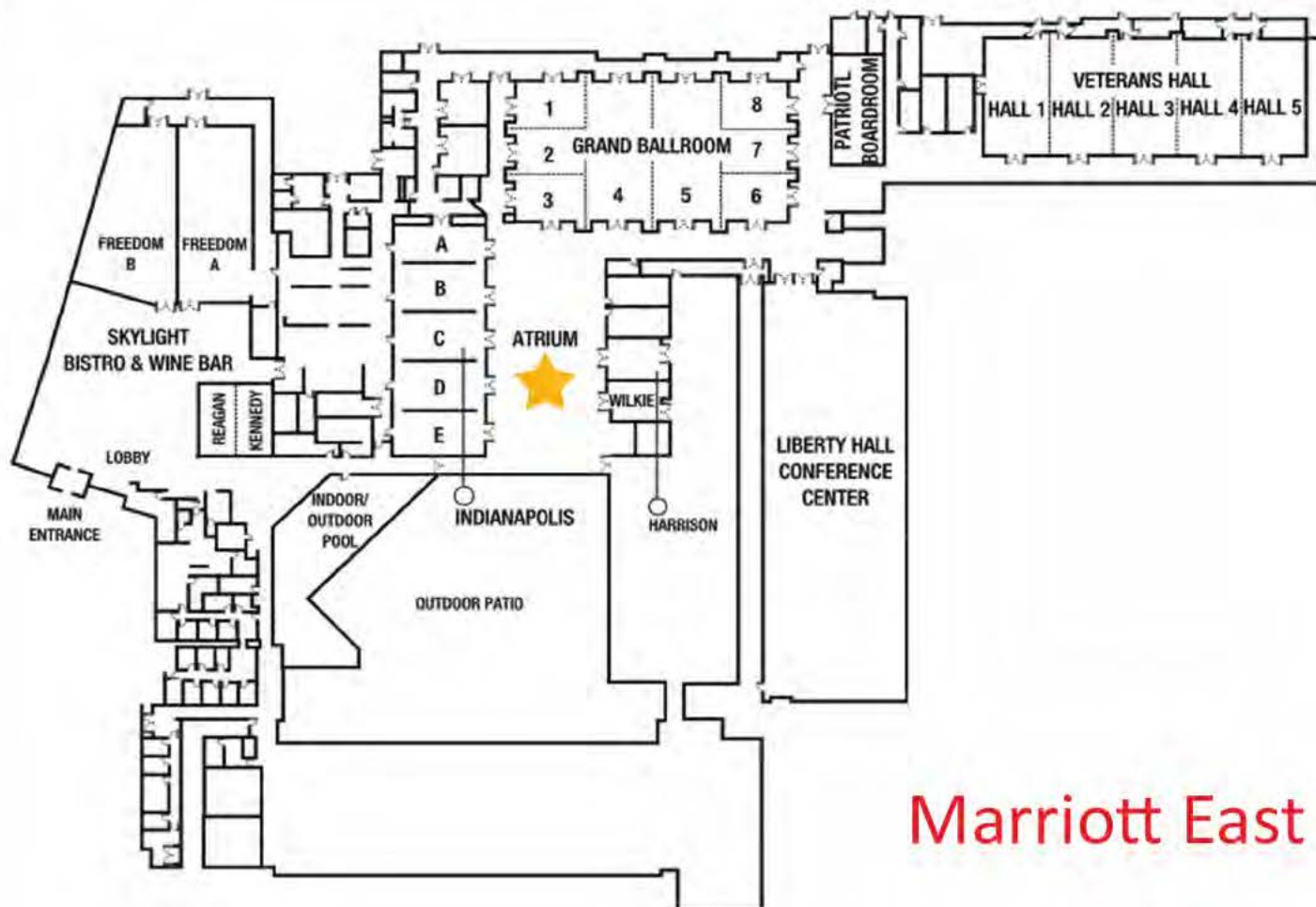
Posters 41 – 46 will feature best practices to broaden participation of minorities in STEM.

Abstracts located on page 33.

Specific posters locations can be found in the registration packet.

Nicole Campos from California State University-LSAMP will be available to preview and discuss the video, *Becoming A Scientist or Engineer*. Dr. Juanita Barrena will premiere the video later in the evening at the Louis Stokes Midwest Center of Excellence dinner.

**Becoming a Scientist or Engineer:** Your Pathway to the Future with LSAMP is intended primarily for high school and lower division college students from racial/ethnic groups historically underrepresented in STEM fields. The goal of this video is to motivate these students to pursue majors and careers in STEM, and to encourage them to seek out LSAMP or other programs that provide support and enrichment experiences to help facilitate their success.



## Marriott East



**Louis Stokes Midwest Center of Excellence Dinner**

**(General Session Room)**

6:30- 6:45 p.m. **Seating and Announcements**

6:45- 6:50 p.m. **Introduction**

*Crystal Porter*

*Associate Director for Special Projects*

*Louis Stokes Midwest Center of Excellence*

6:50- 7:45 p.m. **Aiming high and making a difference**

*Juanita Barrena*

*Principal Investigator*

*California State University-LSAMP*



The NSF's Louis Stokes Alliances for Minority Program, initiated in 1991, was rigorously evaluated by the Urban Institute in 2006, and the evaluation report entitled, *Revitalizing the Nation's Talent Pool in STEM*, references the research and theoretical basis of the LSAMP program, and provides evidence of the effectiveness of its implementation, nationwide.

To further document and disseminate information about best practices employed by the LSAMP program and promote the NSF's goal of reaching across society to ensure that the diversity of the nation's cultures are represented in the STEM workforce, the two videos described below were produced for national distribution. The videos were produced by Academic Telecommunications and Creative Services at California State University, Sacramento, under the direction of Dr. Barrena, and are based upon work supported by the NSF under HRD 0802628. Any opinions, findings and conclusions or recommendation expressed in the videos are those of the authors and do not necessarily reflect the views of the National Science Foundation.

Dr. Barrena will premier, **LSAMP: Aiming High and Making a Difference**, and **Becoming a Scientist or Engineer: Your Pathway to the Future with LSAMP**.

7:45- 8:00 p.m.

*Socializing and Networking*

7:00- 8:00 a.m. **Breakfast**

(General Session Room)

8:00- 9:00 a.m. **Panel Discussion**

**Commitment to Broadening Participation: Five  
LSAMP Leaders' Perspectives on Impact Moderator**

*Marian Wilson-Comer  
Professor Emeritus  
Former ILSAMP Executive Director  
Chicago State University*

**Panelists**

*Benjamin C. Flores  
University of Texas System LSAMP  
(1992)  
University of Texas at El Paso*

*Arlene Maclin  
Washington/Baltimore/Hampton Road LSAMP (1993)  
Howard University*

*Ernest Chavez  
Colorado LSAMP  
(1996)  
Colorado State University*

*Herb Schroeder  
Alaska Alliance-Alaska Native Science and Engineering Program (ANSEP)  
(2001)  
University of Alaska Anchorage*

*Sheila Edwards Lange  
Pacific Northwest LSAMP  
(2008)  
University of Washington*





**Breakout Sessions**

**9:15- 10:15 a.m.**

**(Salons A-D)**

- |                |   |
|----------------|---|
| <b>Salon A</b> | <b>Building a Digital Library: A Knowledge Management Tool for Capacity Building in the LSAMP Community</b><br><br><i>Rebecca Pitkow and<br/>Carl Mitchell<br/>Guardians of Honor</i> |
| <b>Salon B</b> | <b>Mentoring &amp; Retention Strategies</b><br><br><i>Rafael Bahamonde, Randall Roper, Subah Packer, IUPUI<br/>and Cristina Moreira<br/>Bennett College</i>                           |
| <b>Salon C</b> | <b>PLTL: A student-faculty partnership for transforming the learning environment</b><br><br><i>Pratibha Varma-Nelson<br/>Lin Zhu<br/>IUPUI</i>  |
| <b>Salon D</b> | <b>Globalization-expanding Opportunities for Diverse Students</b><br><br><i>Sheila Edwards Lange, Cathryne Jordan, and<br/>Stephanie Gardner<br/>University of Washington</i>         |

**Student Breakout Session**

**9:15- 10:15 a.m.**

**(Salon E)**

**15 minute Oral Research Presentations**

- |                    |  |
|--------------------|--|
| <b>9:15 – 9:30</b> | <b>Structural Dynamics of the S4-S5 linker in the Activation of Voltage-Gated Channels</b><br><br><i>Annie P. Clark, Southern University and A &amp; M College</i> |
| <b>9:35 - 9:50</b> | <b>Annual Energy consumption in a community lab and analysis of the electricity energy flow</b><br><br><i>Esdras Misael Murillo, Iowa State University</i>         |
| <b>9:55- 10:10</b> | <b>Analysis of Anti-Clostridium difficile Activity of Paired Antibiotic Combinations</b><br><br><i>Emanuel Fordjour, The University of Texas at Arlington</i>      |

**Breakout Sessions 10:30- 11:30 a.m. (Salons A-D)**

**15 minute Oral Research Presentations (Salons A-C)**

**Salon A**

10:30 – 10:45 **Grinnell Science Project**

*James Swartz, Grinnell College*

10:50- 11:05 **NSF LSAMP Nation: Innovative Retention Methods  
for "Technologically Amplified" Scholars**

*Diana Lizarraga, University of California Berkeley*

11:10- 11:30 **Retention and Advancement of URM Students in STEM Disciplines  
in Liberal Arts Colleges and Universities: Role of Undergraduate  
Research and Integrated Core-Chemistry Laboratories**

*Surendra Mahapatro, Regis University*

**Salon B**

10:30 – 10:45 **Engineering and Science Summer Academy (EESA)  
Bridge Program as a Component of the Scholars  
Program Retention Initiative**

*Theodore Caldwell, Michigan State University*

10:50- 11:05 **Onondaga CC Post-Freshman Summer Bridge Program**

*Tamara Hamilton, Syracuse University*

*Tomicka Wagstaff, Rochester Institute of Technology*

11:10- 11:30 **The LSAMP Program at the University of Texas at  
Arlington: Successes and Challenges**

*Tuncay Aktosun, University of Texas at Arlington*

**Salon C**

10:30 – 10:45 **PEERS A successful retention program for URM science students**

*Tama Hasson, University of California, Los Angeles*

10:50- 11:05 **Bridge to Baccalaureate: Men of Color in STEM**

*Joel Mixon, University of Minnesota*

11:10- 11:30 **Community College, An overview of the success  
in learning math approach**

*Mary Johnson, University of the  
District of Columbia Community College*



**Salon D**

**Research Opportunities at Argonne**

*Meridith Bruozas and Deon Ettinger*  
*Argonne National Laboratory*

In today's science world, it is not just important for the next generation of STEM professionals to be well versed in theory and academic knowledge, they also need to be able to apply their understandings to real world problems. Argonne National Laboratory strives to explore and develop solutions to real world problems (i.e. clean energy, safe disposal of nuclear waste, homeland security issues). We offer a number of internship programs for undergraduate, graduate and faculty that provide opportunities to work along side Argonne scientists and engineers as they work to solve some of our societal issues. This session is geared towards faculty, and administrators.



Ms. Bruozas is an educator by training and has spent the past 15 years in a combination of district, non-for-profit and academic service positions researching and promoting STEM education. She earned her M.S. in Learning Sciences from Northwestern University. She oversees Argonne National Laboratory's educational programs that currently serve over 4,000 middle and high school, 231 undergraduate, 280 graduate students and 300 post-doctoral appointments each year. Her publications include several national curriculum resources for the K-12 classroom and numerous professional presentations and research articles.

Dr. Deon Ettinger is a Program Leader in the Communications, Education and Public Affairs Division (CEP) at Argonne National Laboratory (ANL). He is the facility manager for the 2 MeV van de Graaff accelerator in Building 203 and serves on the Accelerator Safety Review Committee as deputy chair. His background is in analytical chemistry research and he has managed educational activities for university faculty, graduate students and undergraduate students at Argonne. Currently, he leads programs in Science Education and Technology within CEP. Dr. Ettinger has extensive research experience in analytical and physical chemistry, as well as in science education. He received a B.Sc. from Dalhousie University and a Ph.D. from the University of New Mexico.



**Student Breakout Session**

**10:30- 11:30 a.m.**

**(Salon E)**

**Helping Students Identify a Strong Mentor and Prepare for Success**

*Cristina Moreira*  
*Bennett College*

**Luncheon Keynote**

**11:30– 12:45 p.m.**

**(General Session Room)**

**11:45- 12:00 p.m. Announcements and Introductions**

*Crystal Porter*  
*Associate Director for Special Projects*  
*Louis Stokes Midwest Center of Excellence*

**12:00- 12:45 p.m. Keynote Presentation**

**Stop Paying for Failure and Transform Education**

We are in the midst of an education crisis. The system is failing. Nearly 40% of Native students never finish high school. Only 4% of minority students nationwide come to college prepared for science and engineering. Organizations are concerned about finding the talent they need to stay competitive. Mothers and fathers are concerned for the future of their children. K-12 students are eager and bright but are often denied the inspiration, guidance, and opportunity that leads to success. College students are not graduating in the numbers necessary to meet the demand in science and engineering.

People have been working hard to solve this problem for 50 years with little improvement. This is denying students access to education and economic opportunities. We are convinced that there is enough money in the system to foster success for many many more students. But the money in the system is not always spent in a manner that leads to success. We are paying for failure.

We need to raise the bar and focus early in the academic pipeline on preparing students academically and socially with the tools they need for success in college and beyond.

*Herb Ilisaurri Schroeder*  
*ANSEP Endowed Chair*



**1:00- 2:00 p.m. Panel Discussion**

**LSMCE Building Partnerships for Broadening Participation**  
**Panelists**

*Crystal Porter (moderator)*  
*Meridith Bruozas*  
*LeRoy Jones, II*  
*Rebecca Pitkow*  
*Pamella Shaw*





## Breakout Sessions

2:15- 3:15 p.m.

(Salons A-D)

### Salon A

#### **Building Partnerships: Extending the Pathway from Community College**

Connecting the pathway from community colleges to four year STEM institutions requires a great deal of negotiations about academic course transfer and continuation of financial support. Participation from the audience is encouraged to enrich the discussion.

*Lezlie Thompson, Chicago State University*

### Salon B

#### **Faculty Mentoring & Retention**

Mentoring URM students requires patience, listening skills and time. The group will explore challenging situations and how a faculty can keep the mentee on tasks.

*Rafael Bahamonde, IUPUI*

### Salon C

#### **Partnering and Other STEM Initiatives**

While funding is often the greatest challenge to the faculty to maintain their involvement with student research, there are various external and internal resources that may assist the growth of programs for URM students.

*Kim Nguyen, IUPUI*

### Salon D

#### **Advancing to PhD**

LSAMP provides URM students with academic opportunities and research experience to complete not only the baccalaureate degrees but graduate levels in STEM fields through its secondarily targeted bridge to the doctorate program.

*Pamella Shaw  
IU School of Dentistry*



## Student Breakout Session

2:15- 3:15 p.m.

(Salon E)

### **How to prepare a Scientific Poster**

*Mariah Judd IUPUI*

Creating and presenting a scientific poster can be intimidating and overwhelming, and often results in a poorly crafted poster that fails to connect with the audience leaving their poster forgotten and overlooked. This session will present simple, straight-forward techniques, tips, guidelines and advice for creating a strong and effective poster as well as how to present said poster with confidence and poise.



**Tuesday, October 22**



**Closing Remarks**

**3:15- 3:30 p.m.**

**(General Session Room)**

*LeRoy Jones, II*



# SAVE THE DATE!



**2014 LSMCE Conference**

Chicago, Illinois

October 18, 19 & 20 2014

Hosted by:  
Chicago State University  
Indiana University - Purdue University - Indianapolis  
Argonne National Lab



## Joan Ferrini-Mundy

Joan Ferrini-Mundy began her career as a high school mathematics teacher, and received her B.S. in mathematics education and an M.S. in mathematics from the University of New Hampshire, where she completed her Ph.D. in mathematics education in 1980. She taught mathematics and co-founded the SummerMath for Teachers program at Mount Holyoke College, and served on the mathematics faculty at the University of New Hampshire from 1983 through 1999. From 1999 through 2010 she was at Michigan State University, serving as Associate Dean for Science and Mathematics Education in the College of Natural Science. Joan was a faculty member in the MSU departments of mathematics and teacher education, and was named a University Distinguished Professor of Mathematics Education.

Ferrini-Mundy has had a number of public policy-related positions, including as Director of the Mathematical Sciences Education Board at the National Research Council (1995-1999), and in various positions at the National Science Foundation (program officer in Teacher Preparation and Enhancement, 1989-91; and inaugural director, Division of Research on Learning in Formal and Informal Settings, 2007 – 2010). Currently Joan is the NSF Assistant Director for Education and Human Resources, a position she has held since 2011, serving as a member of the U.S. Government Senior Executive Service.

Ferrini-Mundy was an ex officio member of the President's National Mathematics Advisory Panel, and co-chaired its Instructional Practices Task Group (2007-08). She was co-chair of the Federal Coordination in STEM Education Task Force which produced the 2013 Federal Science, Technology, Engineering, and Mathematics (STEM) Education 5-Year Strategic Plan. She has been a member of the Board of Directors of the National Council of Teachers of Mathematics, the Board of Governors of the Mathematical Association of America, and the American Mathematical Society's Committee for Research in Undergraduate Mathematics

education, Black male college access and achievement, and college student engagement. He has published nine books and more than 75 peer-reviewed journal articles and other academic publications. Harvard University Press is publishing his newest single-authored book, *Exceeding Expectations: How Black Male Students Succeed in High School and College*. He is editor-in-chief of the Routledge book series on Race and Racism in U.S. Higher Education. Several associations have praised Dr. Harper's scholarship, including the Association for the Study of Higher Education (2008 Early Career Award), the American Educational Research Association (2010 Early Career Award), and the National Association of Student Personnel Administrators (2012 Robert H. Shaffer Award for Faculty Excellence). Professor Harper earned his bachelor's degree from Albany State, a historically Black university in Georgia, and his Ph.D. in higher education from Indiana University.

## Dr. Herb Ilisaurri Schroeder

Dr. Herb Ilisaurri Schroeder founded the Alaska Native Science & Engineering Program (ANSEP) with a single student in 1995. The program has evolved into a national model for excellence in engineering and science education by engaging students from sixth grade, extending through middle school, high school, the undergraduate years to graduate school and the PhD. At each step of the way the focus is on creating excitement and empowerment around careers in engineering and science. There are now 1,250 Alaska Native students and alumni. ANSEP components have been replicated in 12 states with other Indigenous groups. Dr. Schroeder received his Ph.D. in civil engineering from the University of Colorado Boulder. He is currently a professor of engineering and the Vice Provost for ANSEP and Founder at the University of Alaska Anchorage. In 2009, Dr. Schroeder was honored by the creation of an endowed chair in his name at the University of Alaska Anchorage with \$4.4 million in donations from the ANSEP partner organizations. He is the recipient of the White House 2004 Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring; the Alaska Federation of Natives 2005 Denali Award, the greatest honor presented by the Federation to a non-Native; the National Action Council for Minorities in Engineering (NACME) 2009 Reginald Jones Award, and ANSEP was recently honored by Harvard University as one of the top 25 Innovations in Government.



## Panel Member Bios

**October 21, 1:30 – 2:30**

### **Moderator:**

Dr. Shaw is currently the Associate Dean for Diversity, Equity, and Inclusion at Indiana University School of Dentistry. This important leadership role includes development of programs and activities to help increase the recruitment and retention of underrepresented minority students, faculty, and staff. She previously served as an Assistant Provost at Purdue University where she directed and managed two multi-campus alliances supported by the NSF Broadening Participation initiative. The LSAMP Indiana and the Midwest Crossroads Alliance for Graduate Education and the Professoriate (AGEP) target underrepresented minority students in STEM disciplines. The programs work to increase student success at the baccalaureate and doctoral levels.



### **Shira Ruggs Dancy, IU School of Dentistry**

Shira Ruggs Dancy is a second year dental student at Indiana University School of Dentistry. She received her Bachelor's degree in Biology from Purdue University and completed the Dental Post-Baccalaureate program at the University of California- San Francisco. Shira was an LSAMP and SROP scholar at IUPUI.

### **Trina Fletcher, Purdue University**

Trina is a doctoral student at Purdue University studying Engineering Education and the recruitment and retention of minorities and women in S.T.E.M. She was the inaugural President of the HBCU-UP/NSF STEM Scholars Academy in undergrad and a two-term President for the National Society of Black Engineers chapter. Trina holds a Bachelor's degree in Industrial Technology from the University of Arkansas at Pine Bluff and a Masters degree in Engineering Management from The George Washington University. She was a research intern for Norfolk State University and completed engineering based internships with Lockheed Martin, Caterpillar and Kellogg's.



### **Trevor Grand Pre, DePaul University**

Trevor is a fourth year Physics major at DePaul University. He is a McNair scholar and LSAMP Scholar. Last summer conducted research with DePaul Physics Professor Eric Landahl at Argonne National Laboratory and presented his research at the National University of Maynooth, Ireland and attended the Euroscience Open Forum (ESOF) in Dublin, Ireland. This summer he completed a Summer Research Opportunity Program (SROP) at University of California, Berkeley in Physics. He hopes to be enrolled in a Physics Ph.D. program next fall.

### **Pablo Guzman, California Institute of Technology**

Pablo E. Guzmán graduated from Chicago State University with a B.S. in Chemistry in May 2006. As an undergraduate, he served as an ILSAMP scholar. In 2007, Pablo began his graduate studies at the University at Buffalo, The State University of New York as a NSF Bridge to the Doctorate Fellow. After completing his M.A. in Chemistry, Pablo moved to Atlanta, Ga. where he earned his Ph.D. in Organic Chemistry from Emory University. Currently, Pablo is a postdoctoral fellow in the laboratory of Professor Robert H. Grubbs at the California Institute of Technology.



### **Mariah Judd, Indiana University – Purdue University Indianapolis**

Mariah currently holds a joint appointment in the Biology Department and the Center for Teaching and Learning at IUPUI. She earned her Ph.D. in molecular genetics from Purdue University and her B.S. in Biology from the University of Tulsa in Oklahoma. While at Purdue, Mariah was an AGEF Scholar where she worked with LSAMP students and served as a mentor and teacher. As an undergraduate, Mariah participated in the REU program which got her interested in research and was a GAANN Fellow at Purdue which got her interested in teaching.

### **Sannah Ziama, University of Kentucky**

Sannah is presently a Lyman T. Johnson Postdoctoral Fellow at the University of Kentucky's Physics and Astronomy Department. He acquired both BSc in Physics and MSc in Mechanical Engineering from IUPUI in 2008. During his four year study at IUPUI he was fortunate to receive scholarships from both the LSAMP and the Norman Brown Diversity and Leadership programs. The experiences he gained from participating in undergraduate research activities, some of which were sponsored by LSAMP, imbued him with a strong desire for graduate school.







*Professor (retired)  
Department of Biological Sciences  
Chicago State University  
Chicago, Illinois  
Former Executive Director for the Illinois LSAMP*

**Dr. Marian Wilson-Comer** has solid credentials as a biology professor, science researcher, university administrator and program manager. She completed a Baccalaureate degree in Biology/Chemistry from Roosevelt University, a Master of Arts degree in Teaching Biology from Indiana University in Bloomington, and a Doctor of Philosophy degree in Botanical Sciences from the University of Illinois, Urbana. She was awarded a post-doctoral Rockefeller grant and studied Higher Education Policy and Practices for a year as a Fellow of the American Council on Education and she also received a National Institutes of Health Extramural Associate Research Development Award permitting in-depth study of the grant processes at various government agencies in Washington D.C.

Her leadership in developing innovative educational programs is nationally recognized. Dr. Wilson-Comer has administered major comprehensive and cooperative grants under the auspices of the National Science Foundation, the U.S. Department of Education, U.S. Department of Labor, National Institutes of Health, National Aeronautics and Space Administration, and the State of Illinois. Having acquired more than 16 million dollars in external funding for the support of student development programs, she has had a major impact on the quality of university program offerings and institutional enhancement.

In 2007, she retired after thirty-three years from the tenured position of Professor of Biological Sciences including thirteen years as Executive Director of the Illinois Louis Stokes Alliance for Minority Participation, a collaborative of 19 statewide institutions including universities, colleges and Argonne National Laboratory. Upon her retirement, she was awarded "Professor Emerita" status, a "Dr. Marian Wilson-Comer Endowed Scholarship" for biology students was established in her name, and a native Sycamore Tree was planted on campus to honor her distinguished career. Dr. Wilson-Comer is a life-long resident of Gary, Indiana.



## **Benjamin C. Flores, University of Texas System LSAMP (1992), University of Texas at El Paso**

Dr. Flores is the Dean of the Graduate School at the University of Texas at El Paso (UTEP). He earned his Ph.D. in Electrical Engineering from Arizona State University. Dr. Flores is an expert in retention strategies for non-traditional undergraduate and graduate STEM students. Since 2005 he has directed the UT System Louis Stokes Alliance for Minority Participation. He is also the Director of the UTEP PUENTES Program, promoting post baccalaureate opportunities for Hispanic Americans. In 2010, Dr. Flores was recognized by President Barack Obama with the Presidential Award for Excellence in Science, Mathematics, and Engineering Mentorship.

## **Arlene Maclin, Washington/Baltimore/Hampton Road LSAMP (1993), Howard University**

Dr. Maclin is a physicist by training and has spent the past 30 years in a combination of academic and government service positions. She earned her PhD in theoretical physics from Howard University. She is currently Executive Director of the Mid-Atlantic Consortium-Center for Academic Excellence, which is a consortium of four HBCUs in the Mid-Atlantic. She has also provided technical support to the WBHR-LSAMP Program since its inception in 1993. She is internationally recognized and recently chronicled in The Historymakers for her outstanding achievement as an educator, researcher, administrator and mentor. She has more than 50 technical papers published in refereed journals and more than 250 presentations.

## **Ernest Chavez, Colorado LSAMP (1996), Colorado State University**

Ernest L. Chavez is Professor of Psychology and past Department Chair at Colorado State University. He currently serves as Interim Co-Director of the Colorado State University STEM Center. His research has focused on issues related to Latino children and adolescents in particular drug use and education. Dr. Chavez was one of the original members of the NIDA Hispanic Task Force and reviews for NIDA. Most recently Dr. Chavez has been working with graduate students in their research and helping them to publish. He is also co-PI on the NSF funded Colorado Alliance for Minority Participation grant and the director of the CSU STEM Center.

## **Herb Schroeder, Alaska Alliance-Alaska Native Science and Engineering Program (ANSEP) LSAMP (2001), University of Alaska Anchorage**

Dr. Schroeder received his Ph.D. in civil engineering from the University of Colorado Boulder. He is currently a professor of engineering and the Vice Provost for Alaska ANSEP and Founder at the University of Alaska Anchorage. He founded the Alaska Native Science & Engineering Program (ANSEP) with a single student in 1995. The program has evolved into a national model for excellence in engineering and science education by engaging students from sixth grade, extending through middle school, high school, the undergraduate years to graduate school and the PhD. There are now 1,250 Alaska Native students and alumni.

## **Sheila Edwards Lange, Pacific Northwest LSAMP (2008), University of Washington**

Dr. Lange received a doctorate from the University of Washington in educational leadership and policy studies. She was appointed Vice President for Minority Affairs and Vice Provost for Diversity at the University of Washington effective July 1, 2007. She has helped develop creative faculty recruitment initiatives and has been active in mentoring students, especially in science, technology, engineering and mathematics (STEM). Dr. Lange is the project manager for an alliance between colleges in Washington, Oregon and Idaho that work collaboratively to increase the number of underrepresented students earning degrees in STEM.



Barrena's professional interests have been focused on the development, implementation, and evaluation of programs to broaden participation in the sciences and health professions. In pursuit of these interests, in 1986, she founded the Science Educational Equity Program (SEE) at CSUS, a comprehensive academic support program for students who face barriers to careers in the sciences and health professions, and served as the program's Director from 1986-2011. Although the SEE Program was initially established primarily as a retention program for 4-year college students, her successful efforts to secure grant funding also enabled the development of outreach programs for community college and K-12 students. In addition, she has served as Co-Pi or PI on ten LSAMP Bridge to the Doctorate Activities.

# LSAMP

Louis Stokes Alliances for Minority Participation

This DVD includes two video programs:

**LSAMP: Aiming High and Making a Difference** tells the story of Louis Stokes Alliances for Minority Participation Program, including the program's history, theoretical underpinnings, programmatic structure, and outcomes. The story is told primarily by LSAMP administrators, faculty, staff, current students, and alumni who were interviewed for the production. Although this video is suitable for student audiences, it is intended primarily for an audience that includes University leaders, STEM educators, policy makers, and others who are positioned to promote and support efforts to meet the nation's need for a diverse and able STEM workforce.

**Becoming a Scientist or Engineer:** Your Pathway to the Future with LSAMP is intended primarily for high school and lower division college students from racial/ethnic groups historically underrepresented in STEM fields. The goal of this video is to motivate these students to pursue majors and careers in STEM, and to encourage them to seek out LSAMP or other programs that provide support and enrichment experiences to help facilitate their success.

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Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.



## AIMING HIGH and Making a Difference



### **Community College Pathways to STEM Degrees: Challenges and Opportunities to Broadening Participation (Salon A)**

*Lindsey Malcom-Piqueux,  
The George Washington University*

Community colleges act as the entry point to postsecondary education for a wide range of students, including those who are racial minorities, low-income, first-generation, or of non-traditional age, due in part to their lower costs, geographical accessibility, less arduous admissions policies and more forgiving, remedial and credit-bearing curriculum. As demand for higher education continues to grow along with rising college costs, community college enrollments will remain high. In recent years, a growing emphasis has been placed on the role of community colleges as institutional pathways to STEM degrees. There is now widespread recognition of their importance to a comprehensive approach to broadening participation in the sciences, mathematics, engineering, and technological fields. This presentation will highlight the role that community colleges currently play in providing access to STEM degrees for historically underrepresented populations. In particular, the presentation will identify critical differences in the effectiveness of community college pathways across the STEM disciplines by presenting results from an analysis of national datasets. Additionally important state-level differences will be highlighted. The unique barriers that students encounter as they traverse community college pathways to STEM degrees will be characterized. The presentation will conclude by offering recommendations for policy and practice to smooth the pathways from the community college to STEM bachelor's degrees.

### **Developing and Leveraging Resources to Sustain Undergraduate Research Initiatives at Your University (Salon B)**

*Randy Duran,  
Louisiana State University*

Few would argue that the entry point to undergraduate research for most students, including those who are racial minorities, low-income, first-generation, or of non-traditional age is via an early research experience at their home institution. The presenter will make the case that thoughtful alignment of the professional development of faculty mentors at your institution with undergraduate research experiences is a useful starting point. Participants will be asked to think through factors and priorities regarding internal/external institutional support, research-for-credit/research for pay, and on-campus/off-campus research in the context of their own setting.

The above factors will also be discussed in the context of potential financial resources from private, federal, state, and institutional sources.

### **Defining STEM Majors in Community Colleges for WebAMP Reporting: Guidelines and Recommendations for Practice (Salon C)**

*Mary Darrow, Iowa State University  
Cynthia Bottrell, Hawkeye Community College*

This session will present proposed guidelines and recommendations to identify STEM majors and "General STEM" students at community colleges for reporting and tracking purposes within LSAMP and the WebAMP System. This paper proposes a "General STEM" major category based upon community college student course taking



patterns. It also suggests that the WebAMP System add a "General STEM" category of majors for the purpose of community college reporting. The goal of this paper is to introduce and discuss a systematic process for identifying STEM community college students programmatically and within WebAMP enabling more targeted programming and systematic tracking of these students towards bachelor's degree completion and beyond. This process has been developed through the efforts of administrators and institutional research professionals at Des Moines Area Community College, Eastern Iowa Community College, Hawkeye Community College, Iowa Valley Community College, IINSPIRE LSAMP Leadership Office, and Iowa State's Office of Community College Research and Policy (OCCRP).

The Iowa Illinois Nebraska STEM Partnership for Innovation in Research and Education (IINSPIRE) is a relatively new (entering its third year) NSF LSAMP alliance among sixteen two-year and four-year colleges and universities working together to broaden the participation of underrepresented minorities in science, technology, engineering, and mathematics (STEM) education in the Midwest. The IINSPIRE LSAMP Alliance colleges and universities collaborate to support students, increase their success, and provide students in the alliance with academic, research, training, and mentoring opportunities. The alliance consists of six two-year colleges, seven private bachelor's degree-granting institutions, and three public state universities.

### **The Trajectory of Aspiring African American Engineers and Computer Scientists: A Mixed Methods Understanding of Success (Salon D)**

*Christopher B. Newman  
University of San Diego*

The pathways for African Americans toward careers in engineering and technology are rife with obstacles. Very often, students are blamed for their lack of preparation, disengagement, and underachievement with little accountability for K-12 or higher education institutions. Colleges and universities can play a key role in developing, recruiting, and retaining talented African American students. This presentation will highlight a longitudinal national study focused on African American who entered college with the intention of majoring in engineering or computer science and the factors leading to degree persistence. A key finding in this longitudinal study suggests that African Americans who attend an institution designated as a "Top 50" producer of African Americans with baccalaureate degrees in engineering are more likely to complete a bachelor's degree in engineering or computer science than a student who did not attend one of these institutions. The presenter will pair this finding with a discussion of a multiple case study of two predominantly White Public Research Universities characterized as a "Top 50" producer. The presentation will conclude with recommendations for policy and practice to begin institutional transformation to enable the success of African Americans in STEM fields.



### **A Stem of Enrollment, Retention, Graduation and Advancement in STEM: A Transformative Broadening, by Design, of the Participation of Minorities (Salon A)**

*Diola Bagayoko, Luria Young, Saleem Hasan, and Ella L. Kelley, Southern University and A&M College in Baton Rouge*

Longitudinal studies and critical process analyses have established that students' awareness of careers in science, technology, engineering, and mathematics (STEM) and the rigor of their precollege preparation, with emphasis on Mathematics, are a stem for their *enrollment, retention, progression and graduation in college STEM disciplines as well as for their success in graduate school and advancement in STEM related careers*. With twenty years of enabling quantum leaps in the academic preparedness of high school students in its intensive, summer academic enrichment programs, the Timbuktu Academy has demonstrated a way of compensating for the significant shortfalls of some schools. At the college level, the Ten-Strand Systemic Mentoring Model of the Academy and of the Louis Stokes Louisiana Alliance for Minority Participation (LS-LAMP) has been validated in practice through the achievements of their scholars and several publications. The 2011 Report of the National Academies on Expanding Underrepresented Minority Participation does so indirectly. This comprehensive, research-based model embodies the four pillars of student retention: *financial support and academic, social, and professional integrations*. We discuss how the best practices of by LS-LAMP and its pre-college feeder programs, like the Timbuktu Academy, lend themselves to adaptation and replication for a transformative broadening of the participation of underrepresented groups in the STEM enterprise of this country. We note the innovative way in which the bridge to the doctorate (BD) activity of LS-LAMP's ideally contributes to this broadening.

### **Promoting Intercultural Competence, Global, and International Experiences with Underrepresented Minority Students Pursuing Science, Technology, Engineering and Math (Salon B)**

*Simone Gbolo  
University of Minnesota Twin Cities*

In response to an increasingly globalized environment, many higher education institutions have internationalized curricular and co-curricular efforts on campuses to foster students' development of intercultural, global, and international competencies—competencies necessary to thrive in a global workforce. Concerns that higher education programs in science, technology, engineering, and mathematics (STEM) fields are lagging behind in their globalization efforts are renewing calls for STEM higher education institutions to incorporate themes of international and intercultural competency into their programming efforts.

Due to financial obligations and rigorous coursework, underrepresented minority (URM) STEM students are less likely to study abroad compared to their peers; yet, domestic internationalization programs and activities hold the potential to provide global, international, and intercultural development for STEM URM students. In comparison to formal study abroad programs, which are time-intensive, costly, and prohibitive to STEM students, internationalization-at-home (IAH) efforts may be the key toward enhancing the global and intercultural competencies of STEM students; yet, little knowledge exists regarding the frequency with which STEM students engage in global/international initiatives, whether there are differences in participation rates between (URM) STEM students and their peers, and the extent to which global/international initiatives are associated with URM and non-URM STEM students' development of critical global, intercultural, and international competencies. Domestic international engagement opportunities hold the potential to meaningfully engage URM



STEM students in global/intercultural development—a factor especially important given that URM students do not participate in study abroad opportunities with the same frequency as their peers.

Using a multi-institutional survey of college students attending seven large, public research universities in 2012 ( $n = 45,000+$ , of whom 17,000+ were STEM students and 2,200+ were URM STEM students), this study seeks to address the gap in knowledge regarding the participation rate of STEM (versus non-STEM) students in global/international activities, whether there are differences between non-URM and URM STEM students with regards to participation in global/international activities, and whether IAH and global activities are effective in promoting non-URM and URM STEM students' development of global, intercultural, and international competencies.

### **Making Racially Minoritized Students Matter: A Student Developmental Perspective for STEM Undergraduate Education (Salon C)**

*Lori Davis-Patton  
Indiana University-Purdue University  
Indianapolis (IUPUI)*

The literature is replete with examples indicating the struggles that underrepresented minorities endure while pursuing STEM majors in college. Feelings of isolation, negative interactions with faculty, lack of academic preparedness, and experiencing sexism and racism, represent a few of the many challenges and barriers that prevent these students from persisting to graduation in STEM majors. Postsecondary institutions and various funding agencies have, in recent years, increased their support of programs and services geared toward supporting underrepresented students. The purpose of this presentation is to provide participants with strategies, grounded in student development literature, to support racially minoritized students. Participants

will have an opportunity to consider methods that they can implement to enhance retention and graduation among these student populations. In particular, emphasis will be placed on culturally relevant teaching and the significance of creating support systems that are less about changing students and more concerned with disrupting toxic learning environments.

### **Improving Retention Rates in STEM (Salon D)**

*Andrew Grosovsky  
University of Massachusetts*

Retention and graduation rates are of national concern in the US, particularly in STEM disciplines, since current data show them to be below those in other fields. The College of Science and Mathematic (CSM) at UMass Boston is a minority-majority college with large numbers of first generation and low-income students. We have experienced a 400% increase in freshman enrollments during the past six years. In light of our commitment to our public research university mission, we developed a strategic priority to increase the diversity as well as the number of Science, Technology, Engineering, and Mathematics (STEM) graduates. We revamped advising, academic support, and orientation strategies, and incorporated a major-centered, co-enrollment cohort approach (Freshman Success Communities) as the centerpiece of our strategy. The FSC's launched in Fall 2009, with 46 students in two cohorts, and have grown to 13 communities for Fall 2013, serving nearly 60% of incoming freshmen. FSC retention is 89%, more than 10 points higher than UMass Boston overall. Students complete, on average, a full year of STEM courses with mean GPAs over 2.9. These results are persistent; over 70% of upper division FSC students remain enrolled, predominantly in STEM majors, and on-track for timely graduation. The 4-year graduation rate for the first cohort of FSC students was 41%, already equivalent to the average national 6-year graduation rate in STEM; an



additional 25% of the group are still enrolled and moving towards graduation within the next year. Based on our projections from these data we anticipate a dramatic transformation of our historic degree completion rates.

### **LSAMP – Digital Library (LSAMP-DL): Best Practices and Input from the Community (Salon A)**

*Rebecca Pitkow and Carl Mitchell  
Guardians of Honor, LLC*

The LSAMP program has a proven track record of successful investments and vast intellectual capital in developing partnerships and practices that increase STEM interest, prepare students for the 21st century workforce, and broaden participation by groups traditionally underrepresented in STEM careers. The LSAMP-DL seeks to facilitate the continued excellence of the LSAMP program by increasing the accessibility and retrieval capabilities of the LSAMP program's historical records, reports, publications, and best practices. Come discuss knowledge sharing and sustainability and share your vision for the LSAMP-DL. Representatives from LSMCE subawardee Guardians of Honor, LLC will share lessons learned and best practices and describe how this insight is being used to inform the LSAMP-DL. Attendees will have the opportunity to participate in a moderated discussion about the importance of information and knowledge management for sustainability.

### **Mentoring & Retention Strategies: A Panel Discussion (Salon B)**

*Rafael Bahamonde, Randall Roper, and Subah Packer, IUPUI  
Cristina Moreira, Bennett College*

Sound faculty mentoring is extremely important in student retention. The intent of this workshop is to provide a brief overview of research based best practices in student mentoring and retention. Additionally, the session will bring experienced faculty

mentors that will share positive and negative experiences in mentoring and their successes

### **PLTL: A student-faculty partnership for transforming the learning environment (Salon C)**

*Pratibha Varma-Nelson,  
Lin Zu, IUPUI*

Peer-Led Team Learning (PLTL) provides students with opportunities for intellectual and personal development as well as a restructuring of their content knowledge. This approach preserves the lecture and introduces a weekly two-hour workshop where students interact to solve problems under the guidance of a trained peer leader. Each weekly PLTL workshop centers around carefully constructed problems and activities selected by the instructor in order to address common misconceptions and develop conceptual understanding. An overview of the PLTL model will be presented with emphasis on leader training and assessment of the impact of PLTL on students.

We will also introduce the theoretical and practical elements of the model and describe how technology can be used to promote cyber learning through PLTL. Cyber PLTL (cPLTL) is an online, synchronous, collaborative environment for conducting PLTL workshops. Technology involved and the effectiveness of cPLTL in duplicating the proven benefits of the traditional (face-to-face) PLTL method will be described and preliminary results will be presented. Training of students and peer leaders to work effectively in PLTL workshops will be discussed as well. This work is supported by the National Science Foundation, the Bill and Melinda Gates Foundation, and the William and Flora Hewlett Foundation.



## Globalization-expanding Opportunities for Diverse Students (Salon D)

*Sheila Edwards Lange, Cathryne Jordan, and Stephanie Gardner, University of Washington*

Study abroad provides numerous benefits to undergraduates. Traditionally underrepresented students have not participated for a number of reasons-family, finances, and fears are some of the most common. But there has also been minimal direct outreach to these communities. The partnership between the University of Washington (UW) College of Engineering and the Pacific Northwest Louis Stokes Alliance for Minority Participation (PNW LSAMP) program at the UW has changed the way students from underrepresented backgrounds think about study abroad. Through intensive outreach, fundraising, and leveraging campus and industry partners, underrepresented students on the UW campus now have the opportunity to study and research abroad.





## Student Breakout Sessions

**10:30-10:45**

### **Structural Dynamics of the S4-S5 linker in the Activation of Voltage-Gated Channels**

*Annie P. Clark, Southern University and A&M College*

Eukaryotic voltage-gated sodium channels ( $\text{Na}_v$ ) are large transmembrane proteins that regulate the electrical conduction system of the heart.  $\text{Na}_v$  dysfunctions are associated with disturbances underlying cardiac arrhythmias. Understanding the relationships between the structure and functions of  $\text{Na}_v$  will further enhance therapeutic treatment for cardiac dysfunctions. However, structural information availability is limited due to inherent difficulties associated with high-level expression, purification and crystallization of eukaryotic membrane proteins. NaChBac, a voltage-gated sodium channel discovered in the halophilic bacterium (*Bacillus halodurans*), is a homotetramer of separate 6-TM subunits. It activates in response to depolarization and shows strong homology to  $\text{Na}_v$ . The ease of expression and purification makes NaChBac an ideal candidate to obtain structural and functional information in  $\text{Na}_v$  channels. The goal of this project is to understand protein motions associated with channel activation, with particular emphasis on the S4-S5 linker which connects the voltage sensor to the channel pore. Upon membrane depolarization, the S4-S5 linker couples outward S4 movement to the opening of the channel pore. The study involved NaChBac protein expression, purification, site-directed spin-labeling, membrane reconstitution, and electron paramagnetic resonance spectroscopy (EPR). Presently, we found that the S4-S5 linker in the activated channel takes up a conformation at the lipid-water interface. Future studies will focus on this region in the resting state of the channel. Together, this will provide an understanding of the activation mechanism in  $\text{Na}_v$ .

**10:50-11:05**

### **Annual Energy consumption in a community lab and analysis of the electricity energy flow**

*Esdras Misael Murillo, Shan He, and Ulrike Pässe, Iowa State University*

In order to achieve net-zero energy buildings, the electricity energy flow throughout a whole year needs to be analyzed because net-zero energy buildings requires the utility meter gain a zero balance throughout an entire year. This can be achieved with improving energy consumption efficiency and renewable energy production. A community lab designed to be a net-zero building was set up to study the balance between the electrical energy consumption and solar electrical energy production; it was set up with an advanced data acquisition system collecting the electrical energy consumption every minute. An advanced data acquisition system monitors the energy flow among all the appliances and mechanical systems in this house. With real time and history data, the energy consumption proportion of different terminals is analyzed. By analyzing the different percentages of energy consuming terminals and the energy production all year round, it is revealed that the system design and operation of the solar house has great potential to achieve net-zero. The air conditioner and the hot water heater are the biggest energy consumers in the house. Suggestions are made to improve the energy efficiency. With this study house users will be able to understand and better manage the energy flow for a net-zero energy building, and researchers can design the structures and mechanical systems of buildings with higher energy efficiency.

NSF Project # HRD-1102461

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11:10-11:30

### **Analysis of Anti-*Clostridium difficile* Activity of Paired Antibiotic Combinations**

*Emanuel Fordjour, The University of Texas at Arlington*

*C. difficile* is a gram-positive, anaerobic, intestinal bacterium that causes severe to fatal diarrhea, killing over 14000 individuals annually in the US. The emergence of the hyper-virulent B1/NAP1/027 strains of *Clostridium difficile* has increased the severity and recurrence of *C. difficile*-associated diarrhea (CDAD), prompting the search for alternative treatments. Antibiotic monotherapy for CDAD often fails and this has generated considerable interest in multi-drug therapy. This project investigates whether paired combinations of different anti-*difficile* antibiotics could have synergistic or antagonistic effects against *C. difficile*. Recently, Mathur et al. found partial synergistic activity/additive effects of ramoplanin-actagardine combinations against 61.5% of *C. difficile* strains tested. Following suit, we have selected an array of membrane active agents, DNA, RNA, and protein synthesis inhibitors for in vitro combination studies. We assessed the minimum inhibitory concentrations (MICs) of these antimicrobials singly and in paired combinations against ten *C. difficile* clinical isolates. Based on these MICs, we determined fractional inhibitory concentrations (FICs) and consequently, the synergistic or antagonistic properties of these antimicrobial combinations. Experimental studies have identified fusidic acid-rifaximin, ramoplanin-novobiocin, and novobiocin-metronidazole combinations as fully synergistic ( $FIC \leq 0.5$ ) and fusidic acid-daptomycin combinations as antagonistic ( $FIC > 4.0$ ). Of fundamental interest in this study are the biochemical interactions of anti-*difficile* combinations. Synergistic combinations enhance antimicrobial activity of either antibiotic while antagonistic combinations reduce the efficacy of multi-drug therapy. This work will elucidate which molecular pathways can be simultaneously altered to kill *C. difficile*. Future research will examine the effects of synergistic

combinations on sporulation and toxin production to reduce disease recurrence and severity respectively.



*Names to note*



## Salon A

10:30-10:45

**Grinnell Science Project***James Swartz, Grinnell College*

The Grinnell Science Project (GSP) addressed a failure of Grinnell students of color, women students, and first-generation college students to succeed in introductory science courses and pursue STEM majors, despite matriculating with an avowed interest in pursuing these majors. Armed with local statistical and qualitative data, faculty and student life and academic administrators, developed a program addressing barriers to success in the sciences.

- **A pre-orientation** to address social barriers;
- **Changes in pedagogy and curriculum in science/mathematics courses** to address learning style barriers;
- **Early exposure to research inside and outside the classroom** to provide context and role models.
- **Establishing a Science Learning Center and peer mentoring** to provide students with both content support and assistance in how to effectively learn in the Grinnell College environment.

Since its inception, the number of students of color graduating Grinnell with science and math has increased nearly threefold and women more than doubled. We will reflect on the transformations GSP has brought to facilities, pedagogy, and attitudes toward inclusivity, and the key elements that created long-term success. The project won a 2009 Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring.

10:50-11:05

**NSF LSAMP Nation: Innovative Retention Methods for "Technologically Amplified" Scholars***Diana Lizarraga, University of California Berkeley*

Technological advancements over the last two decades have resulted in hyper-connected college students who are extreme-learners. These "millennials" have capitalized on micro-learning moments where their classroom has expanded to the world. New methods in retaining such technologically amplified individuals may need to be layered on top of existing traditional models. Strong retention starts with solid communication. This talk is meant to engage program staff and faculty and provide a forum for discussion about technology-based and innovative models of retention that include a variety of effective practices currently used by the NSF LSAMP-CAMP Alliance and others in attendance. A few student-centric approaches that will be highlighted include tizing-text advising, phizing-phone advising, skyzing-skype advising (including computer screen sharing and virtual office hours), dream mapping-developing custom giant poster size LSAMP Scholar road maps for success, wufooing-utilizing powerful on-line forms that has the ability to text you when submissions are made, and iclicking-instant opportunities for scholar polling and data collection. Community building and networking elements (examples: diversity ecosystem posters, the research poster angel project, and diversity foosball tournaments) will also be included. These options can be a powerful and often cost-effective way to help programs work more strategically while developing deeper ties with their scholars and thus increasing retention rates. Additional information and packets will be provided on how to blend in some of these techniques to an existing LSAMP program along with the people power needed for such efforts.



**11:10-11:30****Retention and Advancement of URM Students in STEM Disciplines in Liberal Arts Colleges and Universities: Role of Undergraduate Research and Integrated Core-Chemistry Laboratories***Surendra Mahapatro, Regis University*

Retention and advancement of under-represented minority (URM) students in the STEM disciplines in primarily liberal arts private colleges and universities present both challenges and opportunities for innovation. Toward this end, at Regis University undergraduate research and integrated core-chemistry laboratories have played a necessary and critical role.

Undergraduate research experience has been an integral part of our effort. Research projects range from synthesis and characterization of hypervalent chromium(V) complexes, molecular basis of diazonium ion toxicity, redox chemistry of nitroxyl (HNO) including its reaction with the mitochondrial terminal enzyme (cytochrome c oxidase) and greener approaches to the reductive detoxification of nitroaromatics such as TNT. Undergraduate research has resulted in major publications in ACS journals.

In the first-year core-chemistry instructional laboratories (General Chemistry, Chemistry in Context, Environmental Chemistry and Chemistry for Health Related Sciences) we have taken a new and fresh approach by designing laboratories based on the premise that no experiment is an end in itself but should provide a logical opening to others. Several experiments when grouped together reinforce a fundamental chemical principle and its relevance to society. For example, students using a smoking machine detect ppm levels of NO in cigarette smoke indirectly as nitrite. The analysis of nitrite, nitrate, and sulfate serves as a relevant model for "acid rain." Determination of dissolved oxygen in water (Biological Oxygen Demand; BOD) by the Winkler method provides an introduction to the rich diversity in manganese chemistry.

The oxalic acid -Cr(VI) reaction has provided us with an opportunity to study reaction stoichiometry, ion-exchange separation of Cr(III) -oxalato complexes, and demonstration of short-lived Cr(V) intermediates by electron paramagnetic resonance (EPR) spectroscopy. Given the current and heightened concern with chromium in drinking water, the chromium project has excited student interest.

**Salon B****10:30-10:45****Engineering and Science Summer Academy (EESA) Bridge Program as a Component of the Scholars Program Retention Initiative***Theodore Caldwell,  
Michigan State University*

The Diversity Programs Office (DPO) in the College of Engineering in collaboration with the Michigan Louis Stokes Alliance for Minority Participation (MI-LSAMP), other campus units and departments and corporate and alumni partners hosts the Engineering and Science Summer Academy (ESSA) bridge program annually. ESSA is a six week, summer residential program designed to serve as a "bridge" for incoming freshmen students to better prepare them to do well academically and transition both socially and environmentally to MSU. Intentionally, this preparation and transition would lead to increased retention and, subsequently, graduation rates. Students take college preparatory courses and gain exposure to the College of Engineering and Natural Science. ESSA also provides information on support units and systems across campus and exposure to and academic skills for courses that are critical to the success of all college students but, in particular, students in STEM majors.



**10:50-11:05**

## **Upstate Louis Stokes Alliance for Minority Participation**

*Tamara Hamilton, Syracuse University  
Tomicka Wagstaff, Rochester Institute of  
Technology*

**11:10-11:30**

## **Recruitment, Mentoring, Retention, and Advancement: Successes and Challenges**

*Tuncay Aktosun,  
University of Texas at Arlington*

The University of Texas at Arlington participates in the University of Texas System LSAMP Program Alliance. Even though we are not the lead institute in our alliance, since 2009 we have been able to make various changes in the management of the LSAMP program on our campus to expand it and run it effectively by including more students and helping to change culture for undergraduate research on campus. We will share our best practices and challenges on recruitment, mentoring, retention, and advancement. We ran the LSAMP Bridge-to-Doctorate Program during 2010-2012, and we will share its effect on our graduate programs in STEM fields. We organized the UT System Annual LSAMP Conference in 2011, and we will discuss how that has affected the undergraduate research culture and mentoring undergraduate students on our campus. We closely collaborate with the McNair Program and the Honors College on our campus, and we will show how that collaboration benefits all the three programs. We will discuss how we collaborate with the Tarrant County College, our community college partner that has recently joined the UT System LSAMP Program, and we will indicate how we deal with the challenges and are making improvements for the benefit of all the parties involved. We discuss how the LSAMP Program has affected other mentoring, recruitment, and scholarships programs on our campus, especially various such programs run in the

Department of Mathematics, which has been awarded the 2013 Exemplary Program in a Mathematics Department by the American Mathematical Society.

Salon C

**10:30-10:45**

## **PEERS A successful retention program for URM science students**

*Tama Hasson,  
University of California, Los Angeles*

The Program for Excellence in Education and Research in the Sciences (PEERS) is a two-year freshman/sophomore program for students at UCLA. All PEERS students are underrepresented physical and life science majors who have had more than typical life challenge hurdles to overcome to reach UCLA. PEERS' goal is to bring these students into the scientific community by helping them maintain a science major and encouraging them to try undergraduate science research. The PEERS program involves individualized academic and career counseling, "Pathways in Science" seminars tailored to freshman and sophomore needs, collaborative learning workshops, research seminars by UCLA professors, and the opportunity to both be exposed to and to be deeply involved in undergraduate research. In an effort to increase knowledge about program effectiveness and outcomes, the research team initiated a longitudinal controlled study to evaluate grades, retention, and research participation among cohorts of PEERS versus non-PEERS students during their first two years at UCLA. Findings demonstrate that PEERS students have higher grade point averages and take more science courses, on average, than control group students. In addition, PEERS students earned higher grades in many core science and math courses compared to the control group, with the help of collaborative learning workshops. PEERS students are also retained in science majors at higher rates than students in the control group. This pilot study suggests that the



components of PEERS have a positive impact on retention in science for URM students.

**10:50-11:05**

## **Bridge to Baccalaureate: Men of Color in STEM**

*Joel Mixon, University of Minnesota*

Minnesota's Louis Stokes Alliance for Minority Program (LSAMP) proposed a new initiative to focus specifically on creating a recruitment pipeline for underrepresented minority male students pursuing science, technology, engineering and math (STEM). As a successful LSAMP program in the first funding cycle, the program's leadership pursued the Association of Public and Land-grant Universities (APLU) grant to support minority males pursuing bachelor's degrees in STEM. As a way to respond to the challenges of recruiting minority males and to increase the number of minority men completing degrees in the STEM fields at the University of Minnesota Twin Cities (UMN) a partnership was formed with Minneapolis Community and Technical College (MCTC). MCTC was chosen due to their high enrollment of minority male students interested in transferring to the UMN and due to their successful Student African American Brotherhood (SAAB) organization.

**11:10-11:30**

## **Community College, An overview of the success in learning math approach**

*Mary Johnson, University of the District of Columbia Community College*

The presentation addresses a description of the Success in Learning Math Approach(SILMA) and the positive impact it has had on low achieving/failing students (grades K- graduate school levels) who entered the program and became motivated and highly successful in learning math. The presenter is also the Director/Founder of the Success In Learning Math Center(over 30 years), and Math Specialist(grades K-12) for the D.C. Washington Tennis & Education

Foundation(over 12 years), Founder of the Math Science Technology Public Charter High School, and author of *A Formula for Success in Learning Math*. Implementing SILMA in these capacities provided an opportunity to teach thousands of students individually or in small groups settings sitting side -by- side with them. In these settings, the presenter gained first hand valuable information on how students think in learn mathematics and to continuously finding solutions that enabled students to master mathematics, insights on how they were taught mathematics and opportunity to incorporate updates and latest research findings on the teaching and learning of school /college level mathematics. Knowledge gained has led to the current form of the Success in Learning Math Approach which addresses how to motivate students to learn mathematics and develop critical thinking skills which so many students lack

Salon D

## **Research Opportunities at Argonne**

*Meridith Bruozas and Deon Ettinger  
Argonne National Laboratory*

*Abstract on pg. 4*





### **Costa Rica Ecology Trip leads to further Research**

For two years we have taken an LSAMP Scholar Study Tour in Costa Rica. Each year we take 10 Scholars on a trip to Central America for 10 days. This brief but highly educational experience meets the unique needs of our population of students. When we first became a senior LSAMP Alliance, we tried to interest students in research study abroad with an application and a list of STEM-based study-abroad opportunities. These were multiple-week programs, and we had funds to pay for four to six students. No one applied! We discovered that the lack of participation resulted more from a hesitation to travel than from a lack of funds. It wasn't just about the money, but a fear of the unknown that was keeping students from taking part in these beneficial opportunities. So we came up with this shorter, less-expensive, less daunting study-abroad experience. For this trip we wanted a big enough group to give the students a cohort to be with. Also, one of us from the LSAMP leadership staff and/or faculty would attend as well so students would feel more comfortable being accompanied by someone they know and trust. We ran fundraisers to help give each student enough money to make the trip worthwhile. The students were amazed by what they heard, saw and experienced in Costa Rica. They learned about the flora and fauna and how biologists, ecologists and conservationists work in the rain forests. They also learned about the history and culture of this wonderful country. The next summer, many of these students have done or are planning to do research abroad. They are instilling in their classmates the courage and desire to study abroad as well, in Latin America, Europe, and even China. We are changing the culture of what it means to go abroad and study science for the LSAMP Scholar.

*Joy Erickson and Mary Ann Ruud, University of Connecticut*

### **CSU-LSAMP International Research Experience**

International activities and involvement in study abroad are now an accepted part of high-impact educational practices<sup>1</sup> that foster student learning and contribute to student engagement. These opportunities allow students to develop global awareness as well as prepare them for opportunities and careers beyond this nation's borders. Recent studies have shown that such experiential learning leads to increased retention and graduation rates<sup>2,3</sup> particularly for students in our target population. The GLOSSARI project, a decade long study in the University system of Georgia, found strong evidence that African-American students who study abroad have significantly higher graduation rates than similar students who did not<sup>4</sup>. Despite this, data from the Institute of International Education and the US Department of Education shows that participation by minority groups in study abroad is significantly lower than for Caucasians. Indeed, it was recently shown that in 2010/2011 Hispanics/Latino(a) represented only 6.9% of study abroad participants while African-Americans make up 4.8% of the students<sup>5</sup>.

Given this background, the California State University (CSU)-LSAMP consortium looked for mechanisms to engage our students in international study. A pilot program was offered during summer 2009 in Innsbruck, Austria, using one-time discretionary funds from the state. The program was brief (18 days) and was designed to offer a mix of social and cultural activities with scientific research and seminars with the aim to increase the global awareness of the students. Following the success of this program CSU-LSAMP, committed to global awareness opportunities for consortium students through research. We have added programs in Costa Rica and Thailand in addition to a second, longer, program in Innsbruck. Funding for these programs comes from the lead institution and individual campuses can offset marginal costs for students. Initial findings indicate increases in student confidence, knowledge of STEM issues and topics, and clearer educational and career goals. Additionally, the consortium is seeing stronger links across campuses and programs.

*Christina Goode, Jessica Brown, and Juanita Barrena, California State University*



### Upstate LSAMP Research Opportunities

The Upstate Louis Stokes Alliance for Minority Participation (ULSAMP) is designed to recruit, retain, and graduate an increasing number of underrepresented minority (URM) students in Science, Technology, Engineering, and Mathematics (STEM) fields and to provide early student research experiences to foster graduate school enrollment. ULSAMP is a partnership between seven institutions in upstate New York. Established in 2007, ULSAMP has launched initiatives for URM STEM students to focus on further increasing their enrollment, retention, graduation, and graduate school participation. As a result of the work of ULSAMP, there has been an increase in the number of URM students entering the STEM pipeline, receiving STEM degrees, and enrolling in graduate programs.

In summer 2013, 40 students participated in ULSAMP funded research experiences, including students from local community colleges. To increase the number of URM students participating in summer research experiences, funding for additional URM students was supplemented by university dollars, other grant programs such as the Collegiate Science and Technology Entry Program, the Ronald E. McNair Program, NSF REU programs, and corporate sponsors. The ULSAMP REUs range from 8-10 weeks and outside of working with faculty in the laboratory, the programs provide students with workshops, community building, and opportunities to present research at a closing symposium. Workshop topics include scientific writing, presentations skills, relationship building with mentors, and the graduate school application process. Faculty advisors are also invited to give research talks and critique presentations. In certain instances, students are able to continue their research during the academic year.

*Drake Harrison, and Vincentica Valdes, Onondaga Community College  
Tamara Hamilton, Syracuse University*

### Best Practices Proven to Broaden Participation in STEM

Mentoring has proven to be an effective mechanism for ensuring student retention and success in STEM fields. Specifically, select mentoring programs for women, minorities, and underrepresented groups have shown significant gains in increasing the presence of students from various backgrounds in the STEM fields. Previous recipients of the Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring Program (PAESMEM) are very knowledgeable of mentoring program development and practices. Therefore, PAESMEM recipients could serve as national resource for others interested in mentoring. This research study shares information on best practices and prior experiences of PAESMEM recipients, that have been implemented to help women, minorities, and members of other underrepresented groups to successfully navigate STEM fields.

*Lesia L. Crumpton-Young, University of Central Florida*

### Individualized Research-Oriented College Credit (iROCC) Summer Program Profoundly Affects Students Perceptions of Science and Scientific Skills

The jobs of the future are going to require more people to be educated in science, technology, engineering, and math (STEM) fields. To increase interest and preparation of minorities in college STEM degrees, Marian University hosted summer programs for middle and high school students to do work associated with a science fair project. We evaluated the students to see how they perceived the process of science as well as how they grow in terms of communication, confidence, motivation, self-esteem, and time management. We have found that by developing and executing a science fair project that the students understand the process of science better. Then through the development of a poster and proposal for the science fair that they have increased their ability to effectively communicate science. Furthermore students were more confident and motivated to engage in STEM topics.

*Kristy J Wilson, Marian University*





### **IINSPIRE-LSAMP – An Alliance Modeling How to Broaden Participation in Changing Midwest Demographics**

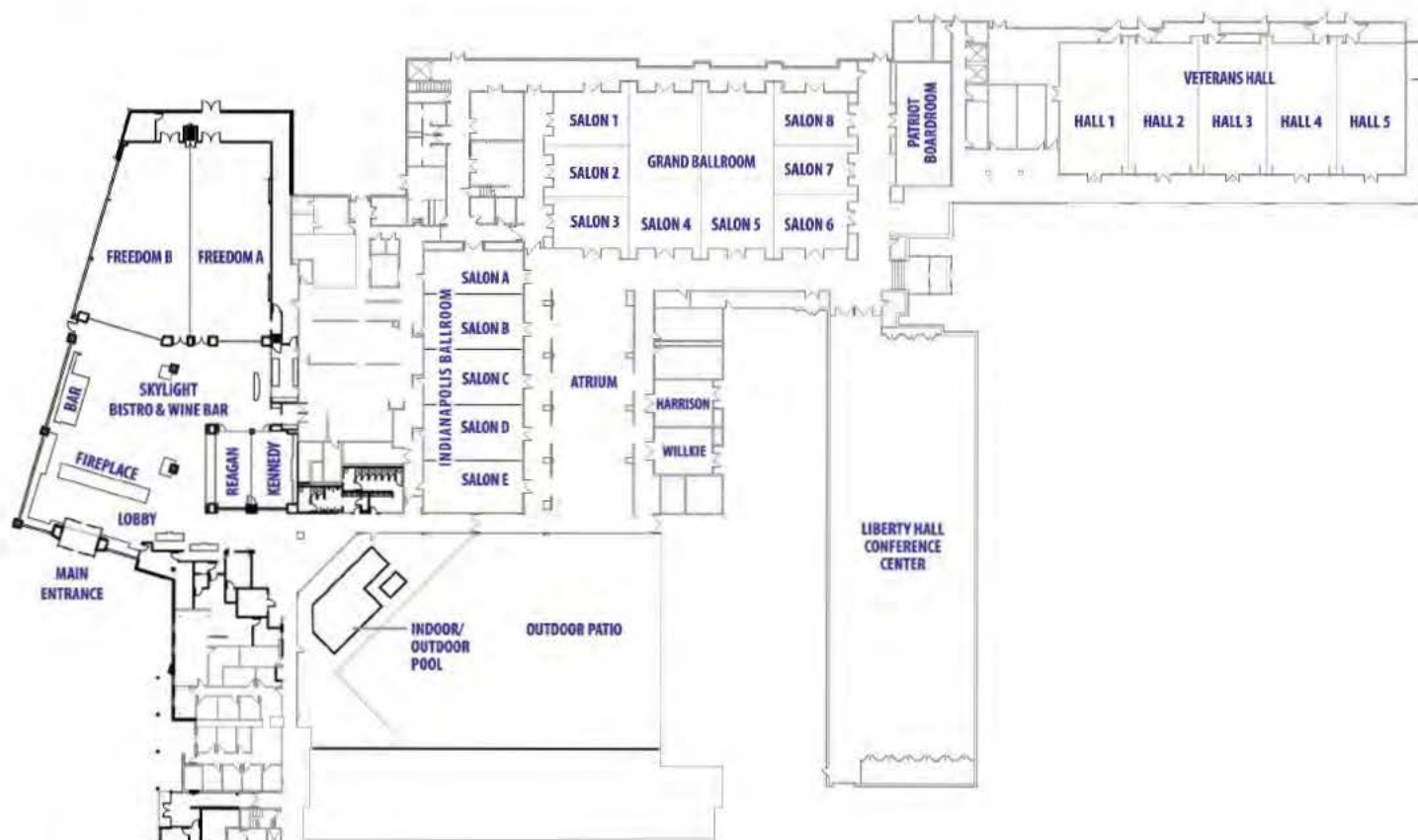
The Iowa Illinois Nebraska STEM Partnership for Innovation in Research and Education (IINSPIRE) is an NSF LSAMP alliance among sixteen two-year and four-year colleges and universities working together to broaden the participation of underrepresented minorities in science, technology, engineering, and mathematics (STEM) education in the Midwest. The IINSPIRE Alliance colleges and universities collaborate to support students, increase their success, and provide students in the alliance with academic, research, training, and mentoring opportunities. Refer to the IINSPIRE website for a list of alliance institutions: [www.iinspirelsamp.iastate.edu](http://www.iinspirelsamp.iastate.edu).

The IINSPIRE Alliance goal is to double the number of underrepresented minority (URM) STEM graduates in the alliance within five years to 350 graduates and to build a foundation for greater increases in future years. Because students from populations historically underrepresented in STEM disciplines are a growing segment of the region's population, there is statewide urgency to remove the barriers to progress in developing a diverse STEM workforce. This will be accomplished by focusing on the following: (1) community-based and student recruiting, (2) bridge programs and transition, (3) faculty engagement and inclusive pedagogy, (4) student research opportunities, mentoring, and training, (5) mentor training, (6) project management, communication, and institutional integration, and (7) assessment and evaluation.

IINSPIRE-LSAMP reaches out to and works with a number of industrial and governmental partners. Partners offer various types of opportunities and support to the program, including interfacing with state-level policies and activities, supporting K-12 outreach, and providing internships and other financial support.

*Diane T. Rover, Mary E. Darrow, and Danielle R. Mitchell,  
Iowa State University*





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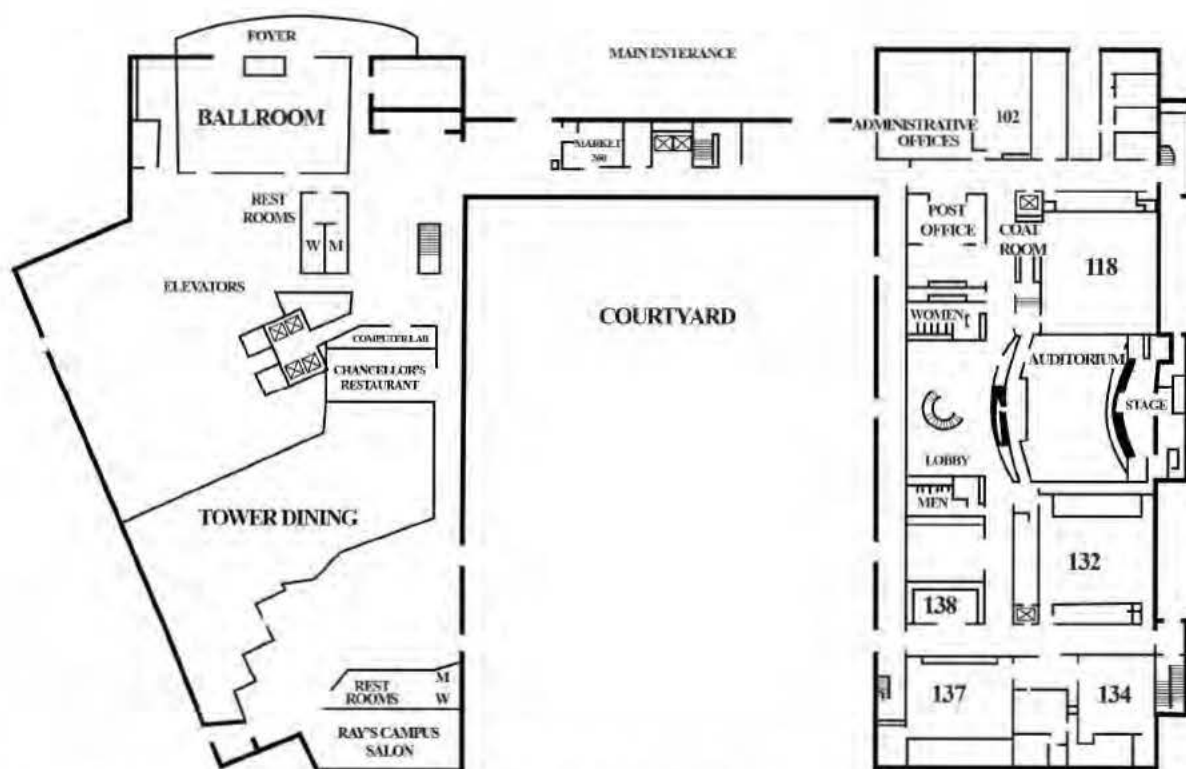




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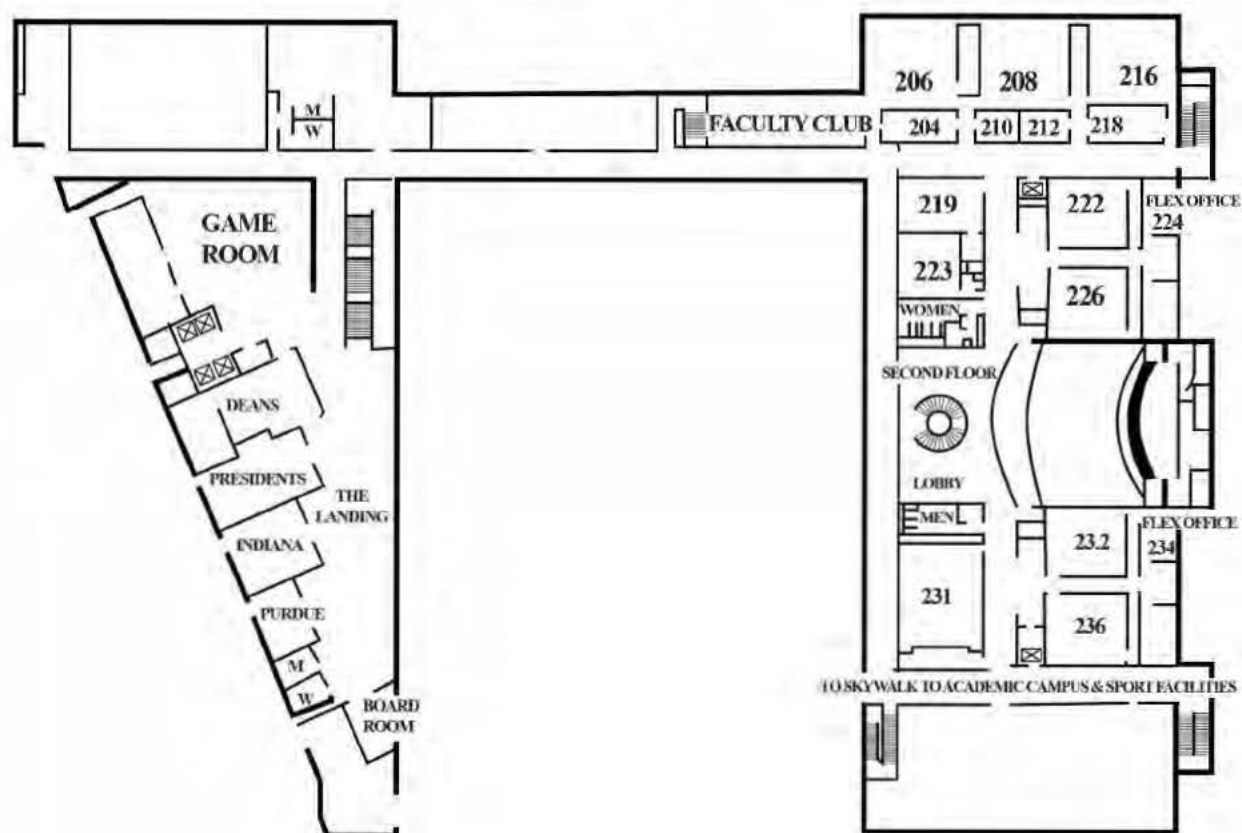
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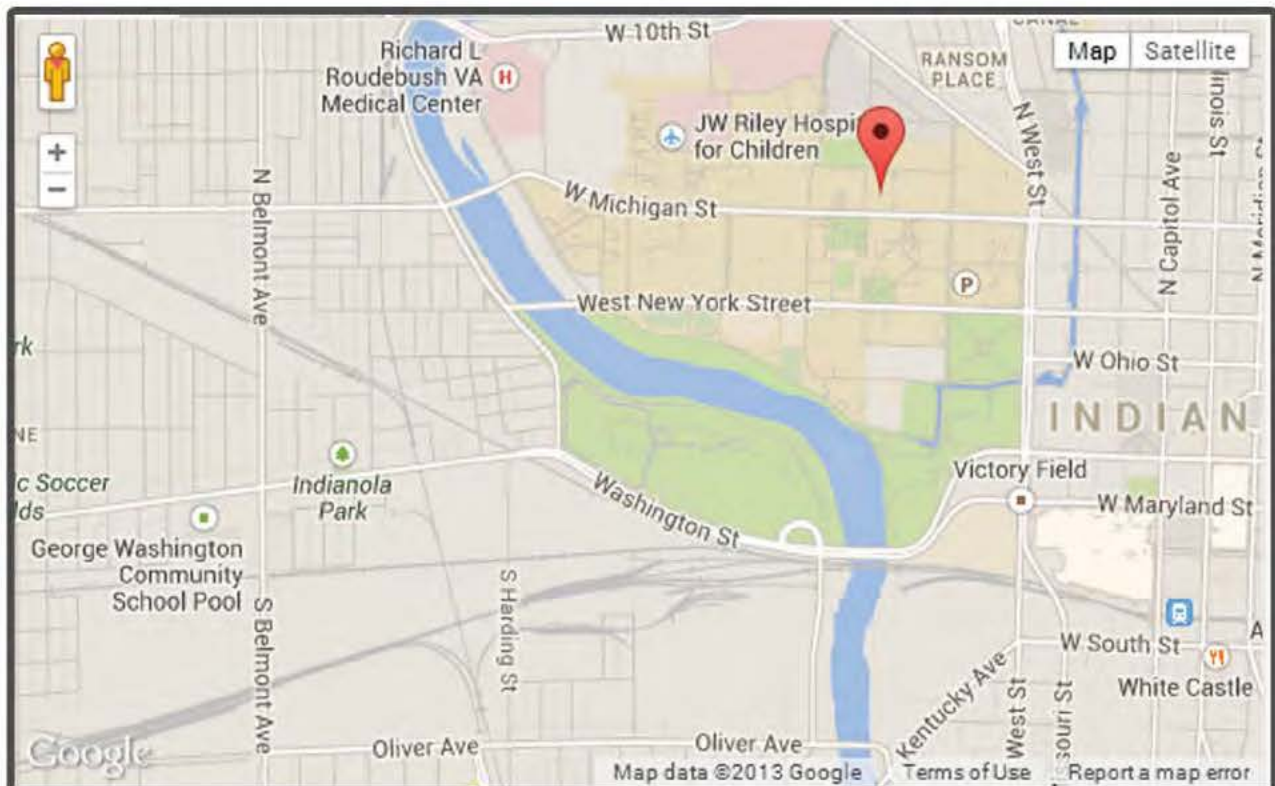
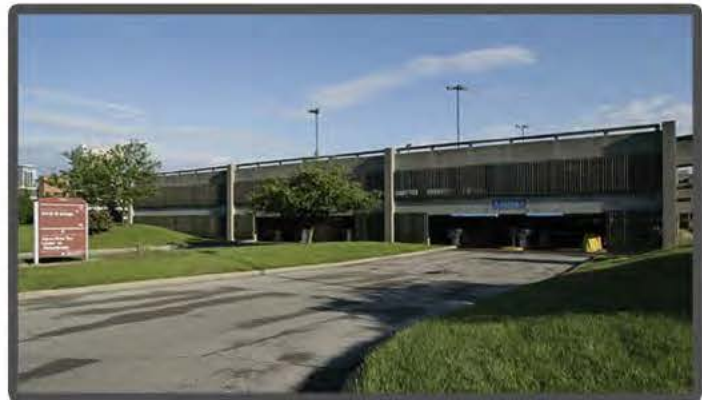


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The conference program is accessible on the LSMCE conference program webpage.  
<http://lsmce.org/annual-conference/conference-planner/>

Conference reference for posters/presentations from the conference:  
Poster presented at: [2013 LSMCE A Call to Action: LSAMP Model for Broadening Participation in STEM Conference]; 2013 October 20-22; Indianapolis, Indiana.  
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