STEP 2013 Breakout Sessions: Schedules and Descriptions

Breakout Session I: Thursday, 10:45 – 12:15

I-1 Keynote: Continue the Conversation with Eduardo Padrón

Meeting Room: Harding

Eduardo Padrón, President, Miami Dade College

The plenary speaker will be available to answer questions and continue the conversation started during his presentation.

I-2 Introductory Research Experiences for At-risk Freshman-Sophomore STEM Majors

Meeting Room: Coolidge

Ginger Rowell, Chris Stephens, Tom Cheatham, Don Nelson, Elaine Tenpenny, Jennifer Yantz, Brittany Smith, Middle Tennessee State University

Undergraduate research (UR) is known to have many benefits for students including learning what a scientist does, intellectual development, and building relationships with team members and mentor. Unfortunately, UR experiences are more common for advanced undergraduates. The MTSU FirstSTEP program engages teams of at-risk, freshman-sophomore STEM majors in a 4-week research experience believing that the benefits mentioned above and others will help with maturity, retention and self-confidence. We will share our process, successes and failures, answer questions, and listen to alternative ways to engage young at-risk STEM majors in research.

I-3 Fostering Changes in Institutional Culture & Practice

Meeting Room: Hoover

Christos Zahopoulos, Northeastern University; Joseph Martin, Rutgers University; Verónica Guajardo, University of Washington; Curt Sears, Georgia State University (Moderator)

All STEP projects are faced with the challenge to leave a footprint on their institution that continues beyond the life of the grant. One of the more challenging parts of this footprint is to bring about sustainable changes in the institution's culture and practice, especially in large institutions. This session aspires to accomplish the following: 1) hear and discuss examples of changes in institutional culture and practice from three panelists; 2) give attendees the opportunity to share their own successes and challenges; 3) identify strategies that may be used in all institutions to bring about such changes

I-4 First-Year STEM Student Cohorts: Assessment and Best Practices

Meeting Room: Wilson A

Janet Callahan, Boise State University; Edmund Tsang, Western Michigan University

A key component of STEM student success lies with building student community. In order to effect sustained changes in STEM student success, our projects have focused on building student cohorts among first year STEM students through several different research-based strategies that range in scale from small to very large cohort groups. It is essential to assess the success and impact of these cohort-based strategies, in order to gauge return on investment. This interactive session will use case studies to introduce components of three cohort-building strategies we've used and engage participants in thinking carefully about how to both implement and assess similar activities in order to develop a framework suitable for implementation at their home institutions.

I-5 Identifying Deficiencies in Your STEP Program

Meeting Room: Wilson B

Melissa Dagley, Michael Georgiopoulos, Cynthia Young, University of Central Florida

Identifying and addressing deficiencies in one's STEP program is critical to future success. Many programs encounter challenges related to recruiting underrepresented groups, retaining first year students, or attracting undecided students to STEM. The EXCEL STEP project has been successful in identifying issues and leveraging institutional and industry support for improvements. For example, we created a women's STEM mentoring network that in two years has closed the gender gap. This workshop will showcase successful strategies for identifying deficiencies experienced by STEP grantees and discuss solutions to these problems.

I-6 Strategies for Promoting Faculty Engagement with Early STEM Students

Meeting Room: Wilson C

Claudia E. Vergara, Daina Briedis, Mark Urban-Lurain, Jon Sticklen, Michigan State University

Attrition of potentially qualified students from STEM programs is a universal problem faced by all institutions. Several studies conclude that a main concern relates to students feeling isolated, disconnected, and adrift. Faculty engagement with these students can make the difference between the students remaining in STEM or choosing "friendlier" career paths. The Connector Faculty (CF) program at Michigan State University is designed to directly engage engineering faculty with early engineering students. This workshop will briefly relate the key factors and lessons learned during the implementation of the CF program at our institution. We will discuss plans and strategies to develop student-faculty interactions and enhance student engagement that can be adapted to different institutions.

I-7 Working Smart: How to Build, Evaluate, and Sustain a Portfolio of Strategies

Meeting Room: Madison A

Karen Olmstead, Kristen Paul, Salisbury University

Increasing enrollments and success of STEM majors is unlikely to result from a single, large-scale change in practice. Instead, multiple, complementary strategies matched to the needs of prospective and enrolled students are more likely to result in the growth of STEM majors and graduation rates. Yet, it can be difficult to determine which of many strategies to implement and the costs and benefits of each. Our workshop will assist STEP program personnel in developing and evaluating a portfolio approach for their campus and will provide a format for discussing the challenges and synergies of implementing several strategies simultaneously.

I-8 Developing Effective Bridge Programs

Meeting Room: Madison B

John Reisel, University of Wisconsin-Milwaukee; David Tomasko, The Ohio State University; Roman J Miller, James Madison University, David Matty, Weber State University (Moderator)

The nature and purpose of various bridge programs will be discussed. Panelists will provide suggestions for attracting students to bridge programs, as well as the appropriate content and activities for the programs. The effectiveness of various strategies already in use will be explored. Discussions will focus on developing a set of best practices that can be implemented in bridge programs nationwide.

I-9 Strategies for Sustainability / Institutionalization

Meeting Room: Lincoln 3/4

Stephanie Ivey, University of Memphis; Vicki Pedone, California State University Northridge; Kenneth Simonson, University of Cincinnati; Gary White, NSF (Moderator)

A major challenge for STEP grantees is the continuation of the successful components of the grant that will support current and future STEM students once funding ends. A common approach is to take successful strategies—or parts of them--and institutionalize them through curriculum changes and/or incorporation into on-going campus initiatives. To facilitate this, the grant team should: 1) organize evaluation results that clearly demonstrate significant and positive impact/outcomes on students, faculty, and the institution and 2) determine the most favorable time and ways to engage those stakeholders needed for institutionalization of the project.

I-10 Successful Experiences in First Year Mathematics Courses

Meeting Room: Lincoln 2

Don Franceschetti, The University of Memphis; Jose Giraldo,Texas A&M – Corpus Christi; Dhushy Sathianathan, Penn State University; Joseph Grabowski, NSF (Moderator)

Topics will include: interventions through tutoring/mentoring, changes in teaching and learning paradigms that have impacted math performance of science students, mathematics used in engineering and science, and the effect of student and faculty communities changing students' attitude towards mathematics as well as academic performance.

I-11 Strategies for Promoting Diversity

Meeting Room: McKinley

Wendy Bohrson, Central Washington University; Lucy Casale, University of Washington; Matthew Ohland, Purdue University; Eun-Woo Chang, Montgomery College (Moderator)

A vigorous workforce relies on a diverse group of students coming through the nation's STEM pipeline. We will share strategies for recruiting and retaining underrepresented students in college STEM programs. We will describe collaborations we have developed both internal and external to our universities that enhance diversity. Policy choices affecting diversity will also be discussed.

I-12 Data Collection, Publishing, and Dissemination of Results

Eric Grodsky, Chandra Muller, University of Texas

This workshop is intended to help STEP projects develop effective research design strategies and bring their important finding to publication. We will share the strategies we have found most effective from a two-year project in which we partnered with four STEP Type 1 grantees to collect comparable administrative and survey data across sites. We believe this model of cross-site collaboration and data collection holds tremendous promise for future efforts aimed at learning from the important work of STEP Type 1 projects and will describe how grantees might implement these strategies in their own work. Finally, we discuss how to get the most from the data you collect by publishing in key journals and disseminating your results through conference presentations, issue briefs, NSF Highlights and other means.

Breakout Session II: Thursday, 3:30 – 5:00

II-1 Building Bridges for StTEM Success: Implementing Effective Summer Bridge Design

Meeting Room: Harding

Amy Freeman, Pennsylvania State University

Building Bridges to STEM Degrees is a one day workshop that will cover the design, implementation and management of first-year bridge programs for science and engineering students. The math-intensive 4- to 6- week summer bridge is one of the most effective retention tools for STEM students. Topics include program design, logistics, sustainable funding, staffing, and student group management. Participants will learn about customizing a bridge program for specialized audiences and unique campus cultures (commuter versus residential campuses, divers student populations, transferring students in 3-2 programs, and traditional students who arrive calculus ready).

II-2 Supporting Community College Transfers

Meeting Room: Coolidge

Carolyn Vallas, Wraegen A. M. Williams, University of Virginia; Patricia Harris, Chad Smith, Thomas Nelson Community College
Mary E. Darrow, Diane Rover, Iowa State University

Evaluators working with project faculty, staff, and administrators to examine the factors which influence engineering transfer student success. Team members have examined longitudinal data, administered the Laanan Transfer Student Questionaire (L-TSQ), and conducted focus groups and interviews with transfer students. Additonal topics to be discussed will include advising, articulation agreements, guaranteed admissions, transfer requirements as well as challenges related to student tracking.

II-3 Characteristics of Excellence in Undergraduate Research (COEUR): A guide for undergraduate research initiatives

Meeting Room: Hoover

Susan Larson, Concordia College; Beth Ambos, Council on Undergraduate Research

The Council on Undergraduate Research (CUR) (www.cur.org) supports and facilitates high-quality undergraduate student-faculty collaborative research, scholarship, and creative activity. The CUR publication Characteristics of Excellence in Undergraduate Research (COEUR) presents best practices in initiating, developing, and sustaining campus UR programs. The workshop will focus on the hallmarks of successful programs in UR, how the COEUR document might best be used by faculty and administrators, and how to address challenges to sustaining and expanding undergraduate research activities.

II-4 6 Steps to Your STEP Evaluation

Meeting Room: Wilson A

David Blair, St. Edward's University; Raymond McGhee, SRI International

On a national scale, tangible project results have become indispensable evidence with which to document project accomplishment. This presentation will provide assistance to project teams preparing for and in the process of implementing their evaluation plans by suggesting 6 steps to assist with the STEP evaluation process. Central to the presentation will be identification of key evaluation tasks based on NSF 3rd Year Review questions. Further incorporated will be suggestions on how to work together with the STEP project team, collect, analyze, and report data while keeping original goals in mind, mis-steps to avoid, and dissemination of results.

II-5 Developing and Sustaining a Successful Peer Mentoring Program: Positive Effects on Student Retention

Meeting Room: Wilson B

Summer Dann-Johnson, Warren Wagenspack, Austin Cooley, Louisiana State University

A successful peer mentoring program had modest beginnings with five upperclassmen engaged as counselors for 45 participants in the inaugural 2007 Encounter Engineering bridge camp. A peer leadership hierarchy was developed to effectively manage the numbers and coordinate the activities. Based on successes with the camp, peer mentors and leaders were employed to assist in the Introduction to Engineering freshmen course and in outreach to area high schools to assist with their First Robotics competition teams. This workshop will provide models for selection and training of mentors as well as a continued professional development and management of student leaders.

II-6 Amplifying the ripples: Disseminating your Educational Project to a Larger Audience

Meeting Room: Wilson C

Jose Herrera, NSF

The workshop will aspire to develop an interest and an understanding of variables and activities that affect the dissemination of educational projects and deliverables to a wider audience. Educational ideas are often not propagated (or taken up) with the same degree of zeal present in other parts of our scientific enterprise. This workshop should help individuals understand some of the elements in play with respect to dissemination and

offer some suggestions and commonly-used strategies aimed at increasing the impact of educational efforts to regional and national audiences.

II-7 STEM Education Organizations

Meeting Room: Madison A

Yolanda George, American Association for the Advancement of Science (AAAS); Ashok Agrawal, American Society for Engineering Education (ASEE); Myles Boylan, NSF

Representatives from prominent STEM education organizations will share their resources, experiences, current initiatives and funding sources. Opportunities for collaboration will be emphasized.

II-8 Sparking and Sustaining Active Student Engagement

Meeting Room: Lincoln 4

Tina Seelig, Stanford University; Jane Wolfson, Towson University; Lezlie Thompson, Chicago State University; David Matty, Weber State University (Moderator)

This panel will focus on sparking student interest and keeping them engaged, leading to successful graduates in STEM fields. Panelists will share diverse models working with different student populations, including two-year and four-year institutions. Attendees will be invited to share their own experiences, and will discuss opportunities and overcoming challenges to active student involvement.

II-9 Effectively Managing Your Project

Meeting Room: McKinley

Renata Engel, Penn State University; Veronica Guajardo, University of Washington; Kandethody Ramachandran, University of South Florida; Curt Sears, Georgia State University (Moderator)

STEP projects are known for broad engagement including members from the lead institution, partnering institutions, and community organizations. They also rely on a variety of strategies to collect input from the partners, to use resources wisely, and to handle personnel changes. Effective management practices are essential for maintaining focus and engagement. This session compares the management approaches of three STEP projects.

II-10 Preparing for Your 3rd Year Review

Meeting Room: Lincoln 2

Richard Kopec, St Edward's University; Karen Olmstead, Salisbury University; Bert Holmes, University of North Carolina – Ashville; Scott Grissom, Grand Valley State University

PIs from STEP projects that just completed their 3rd year review will share their experiences.

II-11 Collecting and Organizing Data: How and Why

Meeting Room: Lincoln 3

Chris Goedde, DePaul University; Rahman Tashakkori, Appalachian State University; Heidi Manning, Concordia College; Eun-Woo Chang, Montgomery College (Moderator)

This panel focuses on the methods and reasons for collecting data on student participants in STEP programs. The panelists will discuss their successes and challenges collecting data on student achievement, attitudes, and activities. We will also discuss the development of databases for organizing the data, as well as how we use (or plan to use) the data.

II-12 Type 2 Round-table

Meeting Room: Madison B

Matthew W. Ohland, Purdue University; Jon D. Miller, University of Michigan; Connie K. Della-Piana, NSF

The panelists will seed the discussion with stories of STEP Type 2 research on access, perceptions, performance, retention, and post-graduation plans. In particular, panelists will discuss how the findings of STEP Type 2 projects might help improve STEP Type 1 projects. The panel includes two researchers who study longitudinal datasets and an NSF Program Director.

Breakout Session III: Friday, 10:15 – 11:45

III-1 Keynote: Continue the Conversation with Philip "Uri" Treisman
Meeting Room: Harding

Philip "Uri" Treisman, University of Texas at Austin

The plenary speaker will be available to answer questions and continue the conversation started during his presentation.

III-2 Using Undergraduate Research and Internships to Recruit and Retain STEM Students
Meeting Room: Coolidge

David Clark, Alma College; Wei R. Chen, University of Central Oklahoma; Peter Tkacik, UNC Charlotte - Moderator: John Davis, Alma College

One strategy that has become widespread in the STEM community to increase recruitment and retention is the use of undergraduate research and internships. In this session, several strategies will be examined including the role of industrial internships, the use of a specific theme (motorsports) on engineering students, and how research experiences in the first-year have improved recruitment and retention. Attendees begin the session by visiting with the PIs at their posters. A facilitated group discussion follows.

III-3 Utilizing Peer Mentors in Supplemental Instruction
Meeting Room: Hoover

Maria Bautista, Kapi'olani Community College; Mark S. Filowitz, California State University, Fullerton; Bethany Bowling, Northern Kentucky University; Jennifer Sowers, James Madison University; Bert Holmes, University of North Carolina – Ashville (Moderator)

Peer Mentors take on multiple roles in our projects. Join us to discuss how to utilize them as facilitators in targeted courses to assist students in their understanding of key concepts. In addition to a formal classroom, we will discuss important ways mentors engage, motivate, and empower students to solve problems. We will also focus on the importance of faculty involvement in the process of recruiting, training, and utilizing them effectively in our STEP projects. Attendees begin the session by visiting with the PIs at their posters. A facilitated group discussion follows.

III-4 Learning Communities & Cohort-Building
Meeting Room: Madison B

Richard Kopec, St. Edward's University; Paige Smith, University of Maryland; Jane Wolfson and Annie McMahon, Towson University; Amy Chan Hilton, NSF (Moderator)

This session will include an overview of the process of creating and maintaining learning communities and forming cohorts. We will share our successes and failures, and provide advice on how to avoid problems and maximize success. Finally, we will discuss our plans to continue our projects after the funding periods end. Attendees begin the session by visiting with the PIs at their posters. A facilitated group discussion follows.

III-5 Increasing Student Success in STEM through Application-Based Math Instruction

Meeting Room: Wilson B

Nathan Klingbeil, Wright State University; Arcadii Grinshpan, Scott Campbell, University of South Florida

This workshop will disseminate two highly successful approaches to increasing student success in STEM through application-based math instruction. The first is Wright State's National Model for Engineering Mathematics Education. The model involves the introduction of EGR 101 - a first-year engineering course replacing traditional math prerequisites for core engineering courses - along with a more just-in-time structuring of the required calculus sequence. The second approach is the University of South Florida's Mathematics Umbrella Model which employs a project option for teaching calculus through engineering and science applications. This approach has grown over the course of 13 years culminating in more than 1,500 interdisciplinary projects involving the collaboration of hundreds of students, faculty, and community professionals from a variety of fields. Attendees will be able to: 1) describe the key elements of both models; 2) implement aspects at their own institutions; 3) generalize the principles to disciplines outside their own.

III-6 STEM Culture of Success: A Cultural Approach for Increasing Diversity and Inclusion in STEM

Meeting Room: Wilson C

Theresa M. Garcia, Eric Paminutan, San Diego State University; Rafael Alvarez, San Diego City College; Raga Bakhiet, Southwestern College

It takes a village to develop tomorrow’s STEM workforce. It takes educational pathways, academic support, guidance, opportunities for professional development and a community which values STEM careers. The STEP Partnership of San Diego (SPSD) , made up of MESA Programs in the San Diego area, embodies this STEM culture. SPSD immerses students in a culture that includes shared beliefs, practices, and behaviors designed for success in higher education and in life. The goals of the workshop are to introduce the STEM Culture of Success and its use in implementing strategies and acitivities that improve retention and graduation in STEM. Current strategies and activities will be shared along with measured results that show acheivement of project goals and student feedback.

III-7 The E-Portfolio: Using Technology to Increase Student Academic and Social Development

Meeting Room: Madison A

Anant Kukreti, Kristen Strominger, Yang Chi, University of Cincinnati

The goal of the workshop is to display how the E-Portfolio has been used to meet the STEP project goals by tracking student academic progress and program requirements. The E-Portfolio allows STEP students, faculty and staff to track student program requirements, academic progress, program participation and assess the impact of the program as a whole. The workshop will overview the purpose and function of the E-Portfolio, iinclude an interactive demo and foster feedback from the participants.

III-8 Improving Retention, Transfer and Successful Graduation

Meeting Room: Wilson A

Mary R. Anderson-Rowland, Armando (Tony) Rodriguez, Arizona State University; Rakesh Pangasa, Arizona Western College; Richard Hall, Cochise College

This Workshop is for faculty, administrators, and staff from community colleges and universities who are interested in the success of potential and currently enrolled STEM students, both transfers and non-transfers. The interactive Workshop will focus on successful solutions for retention, transfer and successful graduation for colleges and universities, small or large, with or without transfer students. The session will include topics such as community college recruitment, the transfer process, producing successful students (90-95% graduation rates), institutional support, an Academic and Professional Development Success class for both transfers and non-transfers, detailed time management, learning skills, engaging students in research and internships, mentoring, how to answer students,Äô critical questions, and increasing the percentage of graduated students going on to graduate school (over 50%).

III-9 Creating a Faculty Fellows Community: Developing Collaboration Through Facilitation

Meeting Room: McKinley

Ellene Tratras Contis, Jose Vites, Eastern Michigan University

For STEP projects, faculty development is key. Facilitation is much more about the process of the participants' experience than it is about conveying a certain body of knowledge or a set of skills. There is no "right" way to lead a group of STEM faculty, but there are some approaches that have been more effective than others for STEM faculty professional development. This workshop will provide suggestions for creating a faculty learning community by creating an atmosphere of collaboration, by offering activities to encourage collaboration, and by suggesting academic service-learning skills to develop interdepartmental STEM community-based experiential seminars.

III-10 Recruitment and Retention in Foundational Science Courses

Meeting Room: Lincoln 2

Lycurgus L. Muldrow, Morehouse College; Anne E. Egger, Central Washington University; Cristian Bahrim, Lamar University; Joyce Evans, NSF (Moderator)

This panel discussion will focus on best practices for recruitment and retention in foundational science courses. Three different types of foundational courses will be discussed: 1st the use of a research preparation course to recruit students into Earth Sciences; 2nd recruitment strategies for an elective Scientific Literacy course for at-risk STEM freshmen majors; and 3rd the infusion of engaging materials in foundational physics courses to induct and retain students in a physics program.

III-11 Planning for a Competitive STEP 1B Submission

Meeting Room: Lincoln 3

Tom Cheatham, Middle TN State University; James Dorsey, University of Washington; Lee Zia, NSF

Successful STEP 1B PIs will share their insights into best practices and what contributes to a competitive proposal. Topics include: building on current project success, effective strategies for project sustainability, how to promote institutional change and demonstrating broader impact.

III-12 Fostering Critical Thinking for STEM Students at Risk: Nuts, Bolts and Details

Meeting Room: Lincoln 4

Connie Russell, Tara Nowlin, Amanda Smiley, Angelo State University

SPURRS academic bootcamp occurs the week before classes begin in August. All participants have signed up for the SPURRS program as incoming freshmen STEM majors are students who show signs of being at risk. SPURRS Critical Thinking Seminar occurs during the first semester of the freshman year for selected STEM majors who show signs of being at risk. Details about the bootcamp and seminar will be shared, including the expanded schedule, classroom and lab experiences, references, team building events, pitfalls and logistics needed for a successful experience. Attendess will experience a lab designed to sharpen student observational skills.