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## Workshop Abstracts

### **W01: Characteristics of Excellence in Undergraduate Research: A Framework for Best Practices**

*Linda Blockus—University of Missouri*

"Characteristics of Excellence in Undergraduate Research" (COEUR), developed by the Council on Undergraduate Research (CUR), is a summary of best practices that support and sustain highly effective undergraduate research environments at all types of institutions. COEUR is organized in sections that correspond to various functions or units of a typical college or university campus. In CUR's experience, successful programs exhibit many of the characteristics enumerated in this document. Further, many of the characteristics described in this document overlap and are important elements in an integrated, synergistic approach to enhancing undergraduate research.

This workshop will walk participants through the 12 sections and along the way ask participants to evaluate successes and challenges related to those sections in their own institutional or programmatic context. Participants will then be organized into smaller groups to discuss common interests and challenges identified in COEUR. Suggestions on how participants might utilize COEUR on their campus to frame discussions and leverage change will be discussed.

Information on resources that CUR can provide will be shared along with information on a new annual award, the CUR Campus-wide Award for Undergraduate Research Accomplishments (AURA). This award recognizes higher-education institutions that have both successfully implemented some of the characteristics of excellence and have devised exemplary programs to provide high-quality research experiences to undergraduates. The depth and breadth of the institutional commitment to undergraduate research as well as the innovative nature of a sustained, exemplary program are important criteria for award selection.

Undergraduate research experiences are a common intervention activity and a necessary professional/scientific development experience for students to successfully pursue an advanced research degree. The COEUR summary provides a framework for institutions and programs to discuss and self-evaluate the extent to which their environment supports this high impact educational practice. Of specific interest to UI attendees will be sections on administrative support, professional development, student-centered issues, curriculum, summer research programs, and assessment. Additionally, program directors and proposal reviewers may wish to utilize this framework to develop and review grant proposals that involve undergraduate research components. Intervention researchers may find COEUR helpful in framing the components of undergraduate research as an intervention. Additional information and a free download of COEUR can be found at [http://www.cur.org/publications/publication\\_listings/coeur/](http://www.cur.org/publications/publication_listings/coeur/)

### **W02: Understanding Interventions Index: A Resource for Scholars, Evaluators, Program Directors, Policymakers, and Students**

*Angela Ebreo and Phillip J. Bowman—both of University of Michigan; Daryl E. Chubin—Independent Consultant; and Anthony L. DePass—Long Island University*

This two-part 90 minute workshop will provide an overview of the construction of the Understanding Interventions Index, an annotated bibliography that will be integrated into the Understanding Interventions website. The Bibliography is intended to be a non-exhaustive resource for members of the UI community, providing: background information about broadening participation and diversity efforts, citations related to recent and significant scholarship related to research career interventions, and access to salient policy-relevant reports and existing

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bibliographies. Workshop participants will be introduced to various aspects of the Index, covering what content will be available, how it can be used, and who might apply it to their work. In addition, participants will have the opportunity to contribute to the development of the Index by proposing keywords, search terms, and topic descriptors that will facilitate online interrogation of the database.

In the first part of the workshop, the presenters will offer background on the origins of this initiative. Following this brief historical introduction, the presenters will describe the proposed content for this resource, including its organization. Current plans for the bibliography include three major sections: a) existing bibliographies; b) policy-relevant reports, and c) scholarly publications. A general description of the content that will introduce each of the major sections will be shared, along with the rationale for the systematic selection of initial material that will appear in each section. The presenters will also discuss their plans for adding content, including strategies for conducting searches of academic databases. Presenters will also share the methodology used for identifying Index content, given the multidisciplinary and interdisciplinary nature of UI work

The second part of the workshop will be designed to elicit feedback and suggestions for improving the utility of the Index to various members of the UI community. Workshop participants will engage in small group discussion of the search capabilities of each section of three sections of the bibliography (i.e., existing bibliographies, reports, and scholarly publications). The small groups will be presented with the keywords proposed to search the database. Due to the various citation conventions and terms for concepts used by persons/organizations representing different disciplines, participants will have the opportunity to critique and recommend additional key terms to facilitate the retrieval of information.

### **W03: Student Mentoring in Community College**

*Eugenia Paulus and Michael Birchard—both of North Hennepin Community College*

In the Gallup-Purdue Index Report, supported by Lumina and published in May 2014, involving a study of more than 30,000 college students across the U.S., and providing insight into the relationship between students and their college experience, students who felt supported in college because they had a mentor who encouraged them to pursue their goals and dreams are thriving in all areas of their well-being. The patterns of participation in postsecondary education are very much shaped by race and sex; underrepresented women and minorities are more heavily concentrated in community colleges. An article on STEM persistence highlights the crucial role of undergraduate institutional faculty and peer interactions among women and minorities for their successful graduation from the community college. These students need mentoring; they need a mentor to help them stay in college, to persist, to complete and perhaps even to move on to higher education.

This workshop aims at sharing mentoring strategies that have been used with success at the community college. Mentoring potentially starts the day that the course commences. The mentor-mentee relationship is established when the student sits down with the mentor and discusses personal goals. The first task is to create a Plan A and a Plan B, with a timeline. Underrepresented students may need assistance with preparation for the program of their interest and experienced alumni mentors can help students with planning and organization towards their goal. Successful peers can help students in several ways. They may provide advice on classes to take or pathways to follow, offer information on available resources or methods of study and they can act as a role model or a personal coach. The educator who is involved in mentoring may help the mentee with resume writing, presentation skills, writing skills, pre-professional exam guidance and networking. These are often some of the most challenging skills for a community college student to acquire and yet they are the most desired proficiencies in the academic and workforce environment today.

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#### **W04: The Meyerhoff Scholars Program: Changing Minds, Transforming a Campus**

*Diane Lee, Keith Harmon, and Mitsue Wiggs—all of University of Maryland, Baltimore County*

The Meyerhoff Scholars Program, established in 1988, has been at the forefront of efforts to increase diversity among future leaders in science, technology, engineering, and mathematics (STEM). The major achievements in recruiting and graduating African American students in STEM at one of the highest rates among the nation's institutions of higher education is built on the premise that, by assembling a strong concentration of high-achieving students in a tightly knit learning community, students continually inspire one another to excel in this strengths-based approach. Building on this underlying principle is the assumption that every affiliated student is capable of succeeding in STEM when given appropriate opportunities and resources. This concept and university commitment has ignited major institutional transformation and systemic change at the University of Maryland, Baltimore County (UMBC). The programmatic additions scaled for the campus community include the Collegiate Success Institute (CSI) Summer Bridge Program, First Year Seminars (FYS), Introduction to Honors University (IHU), Transfer Student Seminars (TRS), Living Learning Communities (LLC), New Student Book Experience, Supplemental Instruction (SI), Honors Orientation, and the Undergraduate Research Awards. The actions and experiences of the UMBC community yield clear lessons practitioners can use to influence change that can lead to increased student engagement and success. This interactive workshop will identify and dissect these best practices, innovations and the rationale behind critical components that impact institutional culture, climate, and support systems on underrepresented students' success, and their potential as catalysts for effective interventions.

#### **W05: Harnessing the Power of Longitudinal Qualitative Data**

*Robin Remich, Remi Jones, and Christine Wood—all of Northwestern University*

The central goals of most STEM interventions are to promote student interest and retention over time. Longitudinal qualitative analysis is one of the most powerful ways to describe and explain change over time. Qualitative data from open-ended survey questions, in-depth interviews, focus groups, and even participant observation can help us understand the processes and factors that influence behaviors and decision-making. Using longitudinal methods, we can capture the changes and consistencies in subjects' thinking and actions over time. By collecting and analyzing qualitative data longitudinally, program evaluations and research studies are able to capture the complex factors and conditions that lead to a particular outcome, such as a career decision.

One major benefit to longitudinal qualitative approaches is the ability to capture a subject's thinking and decision-making in vivo, giving us a chance to understand more deeply the contexts, feelings, and thoughts that factor into a subject's decisions or actions. Qualitative interviews and other open-ended methods conducted at successive time points are able to capture evolution and change. Although qualitative evaluation and research are typically conducted with small sample sets, some studies utilize larger samples, requiring different techniques of data reduction and display to reveal changes and trends over time. The size of a sample and the complexity of analyzing qualitative data over time can lead to hesitation and frustration when trying to gather and make sense of the data.

This workshop will introduce participants to the fundamentals of longitudinal qualitative data collection and analysis and will cover techniques of how to gather, display, and analyze findings. We will provide practical strategies for those interested in designing a study using longitudinal qualitative data, as well as for those who have gathered data and are wondering, "What do I do with the data now that I have it?" We will use our large research project on career decision-making, started in 2008 and ongoing with over 200 participants, to show concrete examples as we discuss methods and techniques of longitudinal qualitative analysis. The workshop will include

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time for participants to describe their own data strategies and dilemmas, and bring up issues for discussion and shared learning.

The workshop will include:

1. An introduction to longitudinal qualitative methods as a way to capture the complex processes and mechanisms that underpin certain outcomes, including explanation and examples of the various ways of collecting and organizing qualitative data;
2. A focus on the strengths and limitations of conducting longitudinal analysis using qualitative methods;
3. A discussion of an ongoing longitudinal study on career decision-making in the biomedical sciences and a step-by-step explanation of how to code, display, and analyze a large sample of interview data using an approach we have developed;
4. A list of articles and resources on designing and executing longitudinal qualitative research.

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### **W06: Success Strategies from Women in STEM: A Portable Mentor**

*Christine S. Grant—University of Guelph; and Peggy Pritchard—North Carolina State University*

An important question that is often asked by aspiring professionals in Science, Technology, Engineering and Mathematics (STEM) fields is: “What are the important skills that I need to climb the ladder while successfully managing my career (both academic and professional)?” Mental toughness, personal style, networking, mentoring, transitions, time stress, leadership, balance, and negotiation are all core skills required to succeed in STEM fields. In this contribution, the co-editors of *Success Strategies from Women in STEM: A Portable Mentor, Second Edition* highlight the critical aspects of the above skills (which are also the chapter titles in the book) crucial for growth as a STEM student and a STEM professional. The second edition of their book, originally entitled, “*Success Strategies for Women in Science*” is a comprehensive and accessible manual containing career advice, mentoring support and professional development strategies from leading women in STEM fields. The presentation will draw from the numerous career management anecdotes and vignettes to illustrate the practical applications of the lessons contained in the book.

While the interventions recommended in the book focus on empowering women (and men) with knowledge needed to navigate the STEM waterway; this conference contribution will connect these personal strategies for success with research recommendations to broaden STEM participation. There are also implications for positive change (e.g., retention) that could result from the coupling of collegiate and early STEM career interventions (skills development focused on women and diverse groups) with broadening participation research.

There is, however a disconnect in the academy. Our programs for broadening participation and STEM diversity are often operating in silos and not well “integrated” in the fabric of an institution. As an administrator in a college of engineering, the presenter has seen firsthand the difficult choices that are made in fiscally challenging times. These challenging decisions that attempt to meet the best interests of the institution, can often appear to be “at odds” with the interventions that UI researchers recommend for positive change. An even more pressing question is, “How do we move the research findings and the established passion on these topics (and even results from federally funded programs on our campuses) into the threads that tie the academy together?” Understanding: (i) the priorities of the faculty and departmental leadership “in the trenches”, (ii) the guiding principles and best practices to broaden participation in STEM and (iii) the perspectives of an underrepresented STEM professional (who is also a Woman of Color) will provide unique insights into positively impacting actual practices.

In this session, we will also explore the implementation of the core skills, with an emphasis on mentoring/coaching, to help the various stakeholders and beneficiaries in the academy

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understand which interventions can be successfully applied to their own institutions. Specifically, how we can utilize strategically “placed” allies to connect with and coach university leaders and faculty to implement interventions routed in scholarly research.

**W07: National Research Mentoring Network: “Steps toward Academic Research” Fellowship Program (NRMN STAR)**

*Harlan Jones—University of North Texas Health Science Center*

This workshop provides information about an ongoing professional development activity for faculty from minority serving institutions and an opportunity to discuss the program outcomes with participants.

**Learning Objectives:**

1. Program for career development for diverse faculty
2. Learn about best practices in delivering grantsmanship and grant writing skills
3. Learn about mentored research development in health disparities
4. Learn from previous STAR fellows about how being a STAR fellow helped their career development

**Learning Outcomes**

At the end of the workshop, participants will know about a unique fellowship program for junior investigators catered to train them in health disparities.

**W08: Evaluation as a Tool to Strengthening Programs:  
A Primer for the Non Evaluator**

*Anthony L. DePass—Long Island University; and Elisabeth Russell-McKenzie—Temple University*

For many, success of training programs that employ interventions that promote research related careers is often in the numbers of students that enter doctoral programs or attain the PhD. These metrics often serve as the primary measures for success or failure. This workshop will explore ways that a non-evaluator can think about and use appropriate evaluation strategies to measure broader institutional impact as well as cognitive and non-cognitive student development.

As STEM educators move towards more integrative and active modes of teaching and learning, how can they ensure that the experiences they are designing are leading to the intended student learning outcomes? How are evaluation and assessment methods being designed in ways that connect quantitative and qualitative data to help refine learning environments so that all students benefit from high-quality, high-impact practices? We will examine the links between program design and program evaluation, to illustrate how assessments might be designed, data collected, and findings used to both advance student success and contribute to faculty scholarship, promotion, and tenure.

**W09: NSF INCLUDES: Empowering All Youth for STEM**

*Claudia Rankins, Jessie DeAro, Jermelina Tupas, and Sylvia James—all of the National Science Foundation*

The National Science Foundation’s (NSF) 2016 budget request includes a new bold initiative related to broadening participation in science, technology, engineering, and mathematics (STEM) called NSF INCLUDES (Inclusion across the Nation of Communities of Learners that have been Underrepresented for Diversity in Engineering and Science). This workshop will be a part of a broad effort to engage various communities and stakeholders to help inform the NSF INCLUDES investment. Discussions will be facilitated in small groups and large groups toward the



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identification of a set of “bold visions” for broadening participation in STEM. INCLUDES is envisioned as a comprehensive national initiative that uses a collective impact approach to increase the preparation, participation, advancement, and contributions of all scientists and engineering students, including those who have been traditionally underserved and/or underrepresented in STEM. This includes underrepresented ethnic/racial groups, women and girls, and persons with disabilities.

The INCLUDES initiative is currently planned to have two pilots in fiscal year (FY) 2016: 1) Networks for STEM Excellence; and 2) Empowering All Youth for STEM. This workshop will focus on the Empowering All Youth for STEM pilot that will be led by the Directorate for Education and Human Resources in collaboration with the other NSF Directorates and the Office of Integrative Affairs. Through this initiative NSF anticipates supporting proposals to design, implement, and assess models that provide engaging STEM learning opportunities for youth in the middle grades that build on students’ innate curiosity and experiences. The initiative will build on the literature on important variables such as grit, collaborative problem solving, growth mindset, and motivation. INCLUDES projects are expected to propose ways of empowering youth and building their capacity to seek out existing or to develop new local, regional, national, and international resources for STEM.

NSF is interested in consulting the STEM research and education community and stakeholders in order to develop the “bold visions” for broadening participation that will be used to guide INCLUDES efforts. Bold visions can focus on addressing challenges and barriers to the full participation of diverse learners in STEM experiences or articulated as STEM education goals for youth. NSF anticipates that community organizations, informal learning enterprises, developers of technology, and cyberlearning experts will participate in INCLUDES and that creative partnerships with business and industry could be leveraged with this initiative