

## **Panel Discussion: Global Engineering - What Does That Mean?**

### **Ms. Robyn Sandekian, University of Colorado Boulder**

Robyn Sandekian is the Managing Director of the Mortenson Center in Engineering for Developing Communities (MCEDC) at the University of Colorado Boulder (CU-Boulder). She joined the Engineering for Developing Communities Program (now known as the Mortenson Center) in spring 2004, just as the first EDC graduate track was approved. With MCEDC, her main duties have included student advising and academic program development.

Recently, she co-developed the curriculum for the new Minor in Global Engineering offered by the CU Boulder College of Engineering and Applied Science starting in fall 2016.

Ms. Sandekian earned B.S. and M.S. degrees in Aerospace Engineering Sciences at CU Boulder, a Specialist in Education (Ed. S.) degree in Educational Leadership and Policy Studies from the University of Northern Colorado, and expects to earn her Ph.D. in the Higher Education Student Affairs Leadership program from the University of Northern Colorado in 2017.

### **Dr. Bernard Amadei, University of Colorado, Boulder**

Dr. Amadei is Professor of Civil Engineering at the University of Colorado at Boulder. He received his PhD in 1982 from the University of California at Berkeley. Dr. Amadei holds the Mortenson Endowed Chair in Global Engineering and serves as a Faculty co-Director of the Mortenson Center in Engineering for Developing Communities. He is also the Founding President of Engineers Without Borders - USA and the co-founder of the Engineers Without Borders-International network. Among other distinctions, Dr. Amadei is the 2007 co-recipient of the Heinz Award for the Environment; the recipient of the 2008 ENR Award of Excellence; the recipient of the 2015 Washington and ASCE OPAL awards; an elected member of the U.S. National Academy of Engineering; and an elected Senior Ashoka Fellow. He holds five honorary doctoral degrees (UMass Lowell; Carroll College; Clarkson, Drexel, and Worcester Polytechnic Institute). In 2013 and 2014, Dr. Amadei served as a Science Envoy to Pakistan and Nepal for the U.S. Department of State.

### **Dr. Aaron Brown, Metropolitan State University of Denver**

Aaron Brown is an associate professor at Metropolitan State University of Denver in the Department of Mechanical Engineering Technology. His work is primarily focused in the realm of appropriate design and humanitarian engineering. He has worked on development projects all over the globe but his most recent humanitarian engineering project is focused locally in Denver where he is implementing the installation of solar furnaces he designed to help a low income community reduce their energy bills. This project was recently featured on NPR, the Denver Post and earned him the title "Community Game Changer of the Month" from CBS Denver. He also was recently nominated for the Carnegie U.S. Professor of the Year award and the Presidential Award for STEM mentoring, both related to this project. Previous to his academic career Aaron Brown worked in the aerospace industry on such projects as the Mars Curiosity landing mechanism and Hubble robotics mission.

### **Prof. Brent K Jesiek, Purdue University, West Lafayette**

Dr. Brent K. Jesiek is Associate Professor in the Schools of Engineering Education and Electrical and Computer Engineering at Purdue University. He is also an Associate Director of Purdue's Global Engineering Program, leads the Global Engineering Education Collaboratory (GEEC) research group, and is the recipient of an NSF CAREER award to study boundary-spanning roles and competencies among early career engineers. He holds a B.S. in Electrical Engineering from Michigan Tech and M.S. and Ph.D. degrees in Science and Technology Studies (STS) from Virginia Tech. Dr. Jesiek draws on expertise from engineering, computing, and the social sciences to advance understanding of geographic, disciplinary, and historical variations in engineering education and practice.

### **Dr. Stephen Y. Lu, University of Southern California**

Stephen Lu is the David Packard Chair in Manufacturing Engineering at University of Southern California. His current professional interests include design thinking, collaborative engineering, technological innovation, and education reform. He has over 330 technical publications in these areas. He directs the Master of Science of Product Development Engineering degree program at USC. He is a senior Fellow of ASME and CIRP, and the founding Director of the iPodia Alliance ([www.ipodialliance.org](http://www.ipodialliance.org)) – a global consortium of 11 leading universities that uses his iPodia pedagogy to create the “classrooms-without-borders” paradigm.

**Dr. Sylvanus N. Wosu, University of Pittsburgh**

SYLVANUS N. WOSU Associate Professor, Associate Dean for Diversity Affairs, Ph.D. in Engineering Physics, University of Oklahoma, OK, 1988 with specialty in nuclear medical physics. Professor Wosu's current research interests are in the areas of impact physics and engineering of new advanced composite materials, dynamic problems in composites failure, and energy containment and responses of dynamical systems. Dr. Wosu is nationally and internationally known for his work in penetration mechanics of composite materials. He established the dynamic impact and high speed imaging system at the University of Pittsburgh Department of Mechanical Engineering and Materials Science that is capable of simulating low and high strain rate penetration loading and capturing the dynamic event at 2 million frames per second. Special sample fixtures he developed are used to study perforation impact and single and multi-mode fracture tests and general characterization of materials failure. Professor Wosu is also interested in the experimental investigation of the dynamic failures and crack propagation of cylindrical composite storage tank with particular interests in the development of hydrogen storage tank, failure behaviors of hydrogen-diffused porous composite materials, and the containment of the associated hydrogen embrittlement. His other research interests include experimental nuclear medical physics, laser-based medical physics research in Cerebral Metabolic Pathways of Oxygen, petrophysics and petroleum fluid characterization of reservoirs. His engineering education research focuses on the Framework of Effective Diversity Programs in Higher Education. His most recent published work was on a “Model for Diversity and Equity: Diversity in Graduate Engineering Education” is the culmination of his over 20-year experience as an advocate for diversity and inclusion in higher education.

**Dr. John W Via III P.E., Drexel University (Eng. & Eng. Tech.)**

Dr. John Via III is currently the Associate Dean of Engineering for Online Programs, Department Head of Engineering Management, Director of the Engineering Management Program, Founding Director of the Vidas Program in Systems Engineering, and Teaching Professor at Drexel University. Dr. Via has ~30 years of industrial experience in the pharmaceutical, medical device and chemical industries spending the last 20 years at Alcon Laboratories where he served as Vice President of Manufacturing for both the Global Surgical and Global Pharmaceutical & Lens Care business units. Dr. Via taught for 13 years as an adjunct professor at Texas Christian University and Southern Methodist University for 13 years while working for Alcon. Dr. Via received a B.S. in Chemical Engineering from the University of Virginia, a M.S. in Chemical Engineering and M.S. in Engineering Management from Drexel University, a M.S. Manufacturing Systems Management, a Master of Liberal Arts and a Doctor of Engineering in Engineering Management from Southern Methodist University. Dr. Via also completed the Program for Management Development (PMD) at Harvard Business School.

## ASEE 2016 Panel Discussion: Global Engineering - What Does That Mean?

The term global engineering is still undefined even though it has been addressed by engineering programs for nearly two decades. Professional engineering organizations including the National Academy of Engineering (NAE), American Society of Civil Engineers (ASCE), ABET, and others have encouraged the expansion of global aspects of engineering (sometimes under the auspices of “professional skills”) but there are still questions regarding the body of knowledge, skills, abilities (KSAs), and attitudes needed to consider oneself a global engineer.

The purpose of this panel discussion will be to continue the process of defining the necessary KSAs through a conversation based on both a recent literature review and the personal experiences of panelists and attendees who have worked to develop global engineering competencies in their students at universities and colleges within the USA. Discussion topics will include how to encourage students and faculty to embrace the complexity and uncertainty inherent in global issues that today’s engineers face such as those highlighted in the new Sustainable Development Goals from the United Nations and the National Academy of Engineers’ Global Grand Challenges.

The premise of this discussion will be that there is no single definition of “global engineer,” but rather a range of perspectives and methods of facilitating the incorporation of global engineering concepts into individual engineers and the engineering academy (and industry) in general.

All listed co-authors have agreed to participate in this panel.

### **Suggested Layout of 90-minute Session**

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| Brief introductions of panel topic and panelists   | 5 minutes                                    |
| Overview of Individual Activities Managed by Panelists   | (7 minutes/person)<br>35 minutes             |
| Brief Q&A session to engage audience and panelists   | 10 minute                                    |
| Break into small groups for activities/discussion  | < 2 minutes                                  |
| Group activity #1: How do YOU define global engineering? <ul style="list-style-type: none"><li>• What should be included in a proposed body of knowledge?</li><li>• Participants write their ideas on large sheet of paper</li><li>• Representative at each table collates list of thoughts, and then someone from each table reports out</li><li>• Was there consensus within groups/across groups?</li></ul> | 7 minutes to write;<br>8 mins for report out |
| Group activity #2: What does YOUR institution do to promote global engineering? <ul style="list-style-type: none"><li>• Representative at each table collects lists of activities from each school, then reports out</li></ul>   | 7 minutes to write;<br>8 mins for report out |
| Group activity #3: Participants identify one actionable item they can take back with them to increase the discussion regarding global engineering at their institutions  | 3 minutes                                    |
| Bring all participants back together to discuss findings – any “ah ha!” moments or thoughts? Any unique methods of engaging students in a global environment?  | 5 minutes                                    |