Plenary Abstracts

Plenary I: Scientific Workforce Diversity: Opportunity for Enhancing Research Excellence

Hannah Valantine, MD—National Institutes of Health

Diversity is known to benefit learning, teamwork, and productivity, yet large sectors of the U.S. population are not members of the biomedical research engine of innovation. Dr. Hannah Valantine, recently appointed the NIH Chief Officer for Scientific Workforce Diversity, will describe NIH's research-based, integrated set of approaches and programs that address diversity as a scientific issue ripe for exploration and new opportunity.

Plenary II: Are We Measuring and Interpreting What We Value about Programs?

Clifton Poodry—Howard Hughes Medical Institute; Kelly Mack—Project Kaleidoscope; Daryl E. Chubin—Independent Consultant; Anthony L. DePass—Long Island University-Brooklyn

Regardless of the interventions utilized, success for many programs designed to broaden participation in science and research related careers often is judged by progress toward the outcomes mandated by the funder of the program. For several programs, the ultimate goal has been the increase in diversity of those in the PhD ranks that has been translated to be the number underrepresented students entering doctoral programs by the end of the program's funding period. This principal metric has, especially in the past, been the measure upon which grant reviewers and programs have relied on to determine the effectiveness of a program. With the obvious pressure for funding renewal, some PIs have employed extreme tactics that include undergraduate students signing contracts under the threat of repayment of program support if the student decides not to pursue doctoral study.

The utilization of this primary metric has also led many to question the efficacy of many programs as the number of PhDs from underrepresented groups in many science disciplines remains low. This plenary session will explore measures that would appear to counter some of the current efficacy interpretations. It will shed light on progress toward increasing diversity in the scientific workforce that might have been missed. In sum: Are we asking the right questions? Are we misinterpreting the reality of our programs based on the data we choose to acknowledge? Would different metrics better reflect what we value while serving both programs and their students?

Plenary III: Student Transitions from 2- to 4-Year Institutions

Moderator: Anthony L. DePass

Shifting Students' Stereotypes of Scientists to Enhance Science Identity in a Diverse, Community College Context

Jeff Schinske, Amanda Snyder, Heather Perkins, Mary Wyner, Monica Cardenas, Jahana Kaliangara—all of De Anza College

Bandura's (1977) social learning theory suggests that seeing role models with characteristics similar to oneself succeed at a task increases one's own self efficacy in regards to that task. Further, gender/ethnic-matching may be particularly important in the establishment of effective role models (Haas, 1985). The relative lack of prominent gender/ethnic-matched role models for many traditionally underserved STEM students may therefore present a disadvantage to such students in connecting with STEM and building a science identity. Indeed, numerous studies have uncovered connections between a sense of belonging in science, scientist stereotypes, science identity, and students' persistence/success in STEM. We tested a series of weekly metacognitive homework assignments ("Scientist Spotlights") to introduce students to diverse scientist role models in a non-majors/general education biology class at a diverse community college. We matched scientists' work to the schedule of course content and attended to numerous axes of diversity in selecting scientists to highlight, including ethnicity, gender identity, socioeconomic status, age, academic history, interests outside science, neurotype, etc. Students learned about the scientists through podcasts, TED Talks, and academic articles, among other resources, and were instructed to reflect on what they learned by recording their interests/confusions surrounding the scientist's work, generating questions about the biology content discussed, and reporting what the assignment told them about the types of people that do science. Based on previous studies we hypothesized:

1) Students would initially hold stereotypical images of scientists and would initially report a lack of personal connections with scientists.
2) After completing Scientist Spotlights, students would hold more non-stereotypical images of scientists.
3) After completing Scientist Spotlights, students would feel they could personally relate to at least one scientist.
4) Students would tend to cite gender/ethnic-matched scientists as those to whom they could most closely relate.
5) Self-reported ability to relate to a scientist would correlate with achievement in class.

We evaluated these hypotheses by analyzing beginning-of-class and end-of-class student surveys. Surveys consisted of a constructed-response assessment regarding scientist stereotypes and a Likert assessment with constructed-response explanation

regarding ability to relate to scientists. Assessments were piloted and validity was examined in a prior class that did not include Scientist Spotlights. Results provided evidence in support of Hypotheses 1, 2, 3, and 5. While some students wrote about the importance to them of hearing from gender or ethnic-matched scientists, there was over-all a poor correlation between students' genders/ethnicities and those of scientists to whom they said they could relate. As Scientist Spotlights require virtually no class time and can be graded simply for completion, this intervention provides an effective way for all educators to enhance science identity and shift stereotypes in a broad range of STEM classrooms while complementing existing curricula and lessons.

Hostos Community College-The City University of New York Joint Dual Engineering Degree Program: A Successful Marriage

Yoel Rodríguez; Felix Cardona—both of Hostos Community College and Anthony L. DePass—Long Island University—Brooklyn

Hostos Community College (HCC), located in the South Bronx, is one of seven community colleges in The City University System of New York (CUNY). With classes offered in English and Spanish, HCC serves a student population that is over three quarters Hispanic (For spring 2014 the students profile was Hispanic 59.5%, Black 22.1%, White 2.1%, Asian 3.4%), reflecting a local community of Puerto Ricans and new immigrants from the Dominican Republic and Central America. In 2003, HCC established its first Joint Dual (JD) Admission Engineering Degree A.S./B.E. Program in *Electrical Engineering* with the Grove School of Engineering (GsoE) of CUNY's flagship senior college, The City College of New York (CCNY). The program has since been expanded to A.S./B.E. in *Civil Engineering* (2005), A.S./B.E. in *Chemical Engineering* (2007), A.S./B.E. in *Mechanical Engineering* (2011), and A.S/B.E. in *Environmental Engineering*, approved in spring 2014. Students in the JD program complete freshman and sophomore courses at HCC, reflecting the engineering curricula at the senior college with opportunities for any necessary remediation. A number of key interventions are also employed to promote retention and enhance academic performance for students that would not have been directly admitted into the CCNY engineering programs. These interventions include: 1) an intense advisement schedule that begins with 'Engineering Orientation Day' activities where the students are informed about the program expectations, the requirements necessary to remain in the program, and the admission criteria to transfer to CCNY's GsoE after successful completion of the A.S. in Engineering at HCC; 2) an Advisement Council comprised of 17 faculty from the Mathematics and Natural Sciences departments; 3) 'Celebration of the Conversation Days' where juniors and seniors in engineering and engineering alumni share their journey to earning their engineering degree and how they navigate(d) academic and life challenges; 4) *STEM Institutes* that enhance preparation for gatekeeper courses; 5) career oriented-STEM seminars where engineers and scientists present their research and talk about their careers; 6) 'Transfer Orientation Day" at CCNY's GsoE, where the students who are about to take ePermit classes as well as transferring are informed about senior college life and expectations; 7) STEM related field trips to national laboratories and research intensive universities, science museum visits, and 'Math and Physics Days' that engage the local community. Students in the program are also encouraged to leverage other CUNY programs that promote undergraduate research training.

As of fall 2014, 109 students (13 percent female) have graduated from HCC with A.S. in Engineering degrees. Ninety-two students have transferred to CCNY's GsoE, some of whom transferred before the A.S. degree. Thirty-five students from the program transferred to CCNY but switched to other majors or discontinued. Based on a five-year enrollment period (fall 2007/spring 2012), about 41% of HCC students who have transferred to CCNY's GSOE have graduated with the B.E., with an additional 14 percent matriculated in CCNY's GsoE. When more recent data is considered, the senior college retention rate is 66% (this is for the period covering fall 2007/spring 2012) and retention within major is currently 83% for the fall 2014 compared to 17% for spring 2010. Three of program alumni are currently pursuing their PhD and MS degrees in Princeton, Pennsylvania and Stanford Universities.

Plenary IV: The Importance of Understanding Human Behavior: Stereotype Threat and Implicit Bias in the Academy and in Business

Lydia Villa-Komaroff—Cytonome/ST

While conscious biases and outright discrimination are still painfully present in our country, on the whole, our society agrees that discrimination does not serve the best interests of scholarship or business. Despite this general agreement and a great deal of well-intentioned activity in both the academic and corporate worlds, under-representation of women and people of color remains a vexing reality in both sectors. This is a complex and multifaceted problem. Factors in this very slow progress may include the failure to adequately incorporate current understanding of stereotype threat and implicit biases in the development of programs as well as resistance to the ideas that all humans harbor implicit biases and that stereotype threat can lead to underperformance in a variety of settings. In this plenary, the role that stereotype threat and implicit bias play in underrepresentation in STEM in academia and business, as well as strategies that help to compensate for these deeply ingrained aspects of human behavior will be discussed. A substantial portion of the session will be devoted to audience discussion. and questions.