Increasing Diversity in Earth and Space Sciences

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Abstract. In this interactive discussion, panelists shared their perspectives from working with diverse audiences, including Native Americans, African Americans, Hispanic/Latinos, and girls and women. Among the objectives of the panel discussion was to identify and discuss the challenges to engagement of specific audiences, learn strategies for connecting to various audiences, and understand how to adapt engagement for different educational settings with various audiences.

1. Introduction

The NASA Science Mission Directorate (SMD) Education and Public Outreach (EPO) Forums offer professional development opportunities for community members. In 2014, the Forums offered professional development opportunities related to issues of diversity. As part of that effort, the Forums hosted a plenary panel discussion as part of the 2014 Astronomical Society of the Pacific (ASP) annual meeting.

2. Panel Members

The panelists who participated in the plenary discussion included: Annette Lee, Assistant Professor, St. Cloud University; Karen Kenney, Executive Director, Girls Inc. of the Island City; Gibor Basri, Vice-Chancellor for Equity and Inclusion, University of California, Berkeley; and Salvador Acevedo, Principal, Contemporanea.

The panelists touched on a few topics during the sixty minute discussion. The discussion and topics were guided by moderator Bonnie Meinke and audience questions. Each panelist was able to focus on a few key points, including a description of his or her keen interest in serving diverse audiences in STEM.
2.1. Salvador Acevedo, Principal, Contemporanea

Salvador Acevedo is a consultant at Contemporanea. As such, his expertise is in helping others communicate with and engage new and diverse ethnic audiences. Conducting market research, finding opportunities, and forging partnerships are all part of his strategy, and he regularly works with museums, science centers, and corporations. Contemporanea has evaluated several informal education efforts to reach Latino/Hispanic audiences, such as the NASA-funded “Calendar in the Sky” project. During the discussion, Salvador described how he consulted on urban development by laying out the elements of an effective partnership, refining the definition of engagement, and dealing with the challenges of internal culture. One important distinction is engagement versus outreach. Engaging a particular community carries the implication of collaboration—it involves listening to what the community needs and developing relationships—whereas outreach can imply more of a one-way communication flow.

Salvador Acevedo is, first and foremost, a dot-connector. He is always looking for ways to connect and communicate the insights he discovers in the communities he works with and finds opportunities for growth and evolution. He is most interested in finding ways in which we are connected to each other, through common experiences, shared perspectives or points of arrival, parting from a multicultural perspective to arrive into an intercultural experience. For the last 20 years he has found ways to connect the social capital of organizations with business opportunities for growth as an executive, consultant, and researcher. Acevedo has worked with many informal education institutions, corporations and foundations in projects ranging from consumer intelligence to organizational transformation, always with the goal of adapting practices and policies to the changes in society. Being bilingual and bicultural has been extraordinarily helpful in achieving a perspective of common ground understanding. Salvador earned a masters degree in Communications from Universidad Iberoamericana in Mexico City, a diploma in marketing from University of California, Berkeley, and is certified by Research in Values and Attitudes, Inc. (RIVA, Inc.) as a qualitative market researcher. He received the 2008 Latino Business Leadership Awards from the San Francisco Hispanic Chamber of Commerce, San Francisco Business Times, and Wells Fargo.

2.2. Gibor Basri, Vice-Chancellor for Equity and Inclusion, University of California, Berkeley

As the Vice Chancellor of Equity and Inclusion at the University of California, Berkeley, Gibor Basri works with the U.C. Berkeley Center for Science Technology, Engineering, and Mathematics (STEM) Innovation, Leadership, and Diversity, which prepares Berkeley’s talented and diverse STEM graduates for the ever-changing demands of the STEM workforce. They serve underrepresented minorities, women in science, low-income, and first-generation college students who combine solid academic performance with strong leadership potential. They accomplish this through a few key best practices:

1. Create a community of scholars. In some ways, this is the most important component. There is a physical space where students can study and socialize

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1 http://www.contemporanea.us/
2 http://stem.berkeley.edu/about_us.html
together, with quick access to staff members who have academic, institutional, and life skills advice. They see that others like them can succeed; this helps with the strong “stereotype threat” that hampers underrepresented populations in STEM fields.

2. **Near-peer and vertical mentoring.** The students help each other over “rough spots,” help each other learn, and support each other to achieve success. Those who have already overcome obstacles can guide younger students through them. This can and should extend up through graduate students, postdocs, and faculty.

3. **Provide academic support.** For “gateway” courses (like Calculus or Chem 1) there are special discussion sections led by trained TAs in which students actually work harder but in a supportive environment. These help them understand what help is needed for full academic success. Later there is academic advising which assumes that students can succeed rather than assuming that they probably will not.

4. **Foster research opportunities.** This is essential for the continuation of students in STEM fields. They must find the passion for and rewards of creative investigation. It also positions them to have stronger letters of recommendation and a stronger academic record.

5. **Preparation for graduate school or career.** Many students will not have had role models or family members who could show them the way forward after college. They must be encouraged to continue and be shown the way to succeed after they graduate. This includes making them aware of or plugging them into the appropriate networks.

**Gibor Basri** received his PhD in Astrophysics from the University of Colorado, Boulder in 1979. An award of a Chancellor’s Postdoctoral Fellowship brought him to U.C. Berkeley that year, where he joined the faculty of the Astronomy Department in 1982. He has worked on stellar magnetic activity and low mass stars (including the Sun) throughout his career. He was an active user of the Lick and Keck Observatories as well as a number of space telescopes. He was a pioneer in the discovery and study of magnetospheric accretion onto newly forming stars. He was a co-discoverer of brown dwarfs, and found and helped characterize the death of stellar chromospheres at the bottom of the main sequence. He has pioneered several means of directly measuring stellar magnetic fields, and studied their role in the angular momentum history of stars and brown dwarfs. Recently he has been utilizing stellar data from the Kepler mission to learn more about starspots. Back on Earth, he will soon step down from several years as the founding Vice Chancellor for Equity and Inclusion at U.C. Berkeley.

**2.3. Karen Kenney, Executive Director, Girls Inc. of the Island City**

Karen Kenney focused on how she helps build “strong, smart, bold girls” through Operation SMART as part of the Girls Inc. National *Eureka!* Program. The *Eureka!* program focuses on STEM, leadership, college-readiness, health, and the personal development of girls. The program provides this through the experience of job shadows.

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3http://www.girlsincislandcity.org/
Ms. Kenney also discussed the NASA-funded Five Stars Pathway program, which is a partnership between Girls Inc. and U.C. Berkeley’s Space Sciences Lab. The key to that program’s success is that it engages a multigenerational audience. In this model, girls and women from five “generations” engage in science together in an afterschool setting, with each “generation” representing one stage in the pathway of pursuing a career in STEM. The five “generations” are elementary school girls, middle school girls, undergraduate students, graduate students, and professional scientists. By providing opportunities for girls to interact with female role models in physics and astronomy, they learn about what it means to be a scientist while simultaneously gaining STEM content and skills.

Karen Kenney joined Girls Inc. of the Island City in 2005 as Executive Director. Previously, Karen was the Dean of Students at U.C. Berkeley. She worked at U.C. Berkeley for 28 years as a college instructor, recreation program developer and student affairs professional. Karen has received numerous recognitions including U.C. Berkeley’s highest staff award, the Berkeley Citation. Karen earned her Bachelor of Arts degree and Master of Arts degree in Physical Education from San Diego State University. Areas of emphasis were sociology of sports and history of sports. She completed post-graduate course work at U.C. Berkeley in women’s socio-cultural history.

2.4. Annette Lee, Assistant Professor, St. Cloud University

Annette Lee is an Associate Professor of Astronomy and Physics at St. Cloud State University (SCSU) in St. Cloud, Minnesota, Director of the SCSU Planetarium, and Director of Native Skywatchers research and programming. Her Native Skywatchers research and programming focuses on the revitalization of indigenous star knowledge (Ojibwe and Dakota) and bridging this knowledge with western science/astronomy. There are many successful branches of this work she discussed during the panel: the research (interviewing elders/community members); the connections with STEM, particularly building pathways and motivation; art; planetarium/public outreach; K–12 curriculum designing; educator workshops; and community wellness. Among the ways Annette Lee has engaged Native American communities is balancing cultural astronomy with astrophysics, leveraging a large state comprehensive university equally with a small tribal community college, allowing the native voice to take the lead, and working collaboratively with elders, community members and educators. This work is also propelled by the Minnesota, State Science Standards (2009), which require K–12 teachers to include “how people from diverse cultures have contributed to science.” Specifically, one benchmark states “Ojibwe and Dakota use of the stars to plan and predict.” (Minnesota Department of Education 2010)

Annette Lee is an Associate Professor of Astronomy and Physics at St. Cloud State University in St. Cloud, Minnesota, Director of the SCSU Planetarium and Director of Native Skywatchers research and programming. The confluence of Astrophysics and Art meet in the studio of Annette Lee. An artist-scientist of Native American ancestry, Lee’s interdisciplinary work has reconnected the Dakota and Ojibwe tribes with the star knowledge her forefathers have shared for millennia. Her Native Starwatchers Project holds great meaning to the people of the Dakota and Ojibwe tribes, who see the stars as their pathway to the spirit world. Lee’s work has touched the hearts of students like Jeffrey Tibbetts, Title III project director at Fond du Lac Tribal and Community College in Cloquet, Minnesota, where Lee taught art, mathematics and astronomy from 2001 to 2005. “I used to look up and see the Greek constellations, like the Big Dipper,
or Leo the lion,” Tibbetts says. “But now I know that there are stars up there that are ours. It does something to me inside, to have that relationship with the stars. It’s like finding a long-lost relative.”

2.5. Bonnie Meinke

Panel moderator Bonnie Meinke is an Outreach Astronomer at the Space Telescope Science Institute in Baltimore, Maryland. Having grown up in Texas, where “the stars at night are big and bright,” she was inspired to pursue a career as a planetary astronomer. Through her work coordinating NASA Science4Girls and Their Families, Dr. Meinke is committed to bringing Earth and space science to underserved and underrepresented audiences via libraries. Beyond engaging girls in STEM, Dr. Meinke is interested in new technologies and partnerships to reach rural and economically-struggling communities via NASA Science4Girls. She is part of a team from the NASA SMD EPO Forums charged with exploring diversity issues in our work as EPO practitioners.

References
