Making Planetary Science more inclusive: an introduction to the work of the American Astronomical Society's Division of Planetary Sciences Professional Culture and Climate Subcommittee (PCCS)

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Introduction

The PCCS was established in 2016 "to work towards making the community of planetary scientists an environment in which professional merit is the only criterion that determines each person's success". The group's work builds from efforts of several AAS committees that have and continue to pursue the broad issues surrounding diversity and inclusion, such as the Committee on the Status of Women in Astronomy (1979), the Committee on the Status of Minorities in Astronomy (1997), the Committee for Sexual Orientation and Gender Minorities in Astronomy (2012), and the Working Group on Accessibility and Disability (2016).

The Professional Culture and Climate Subcommittee (PCCS), during their telecon

From Left to right and top to bottom: Julie Rathbun, Shawn Brooks, Catherine Neish, Edgard Rivera-Valentin, Cristina Thomas, Rebecca Schindhelm, Serina Diniega, Kathleen Mandt, Sarah Hörst, Jennifer Piatek, Alejandro Soto, Matthew Tiscareno.

What is the PCCS?

The PCCS is charged with promoting "community values and cultural norms" through mechanisms that enable inclusion guided by the diversity challenges within each community and ongoing inclusion efforts. Several of our recommendations have led to improvements including having a plenary lecture during the annual meeting on diversity and inclusion issues, facilitating networking events for underrepresented groups, working with session chairs to promote diversity and inclusion, and implicit bias training for the DPS committee and prize committee.

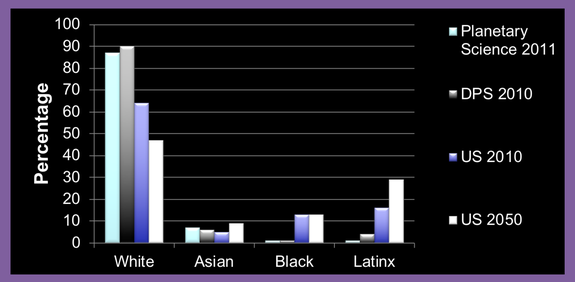
References: [1] Antonio et al, 2004, Psychological Science, 15, 507-510 [2] Page 2007 [3] Sommers 2007, Legal and Criminal Psychology, 12, 171-187[4] Phillips 2014 (https://www.scientificamerican.com/article/how-diversity-makes-us-smarter/) [5] Freeman and Huang 2014 [6] Herring 2009, American Sociological Review, 74, 208-224 [7] Forbes 2001 (http://images.forbes.com/forbesinsights/StudyPDFs/Innovation_Through_Diversity.pdf) [8] McKinsey 2015 (http://www.mckinsey.com/business-functions/organization/our-insights/why-diversity-matters [9] White, et. Al. 2011 (http://lasp.Colorado.edu/home/mop/files/2015/08/Report.pdf). [10] 2010 US Census Brief (https://www.census.gov/prod/cen2010/briefs/c2010br-02.pdf). [11] Passel, J.S. and Cohn D. (2008) [12] Rathbun, J.A. et al. (2015) DPS, 312.01 [13] Rathbun, J.A. (2016) DPS, 332.01 [14] Bernhard & Cooperdock 2018, Nat. Geoscience [15] Rivera-Valentin et al (2018) DPS

The importance of Diversity, Inclusion, and Equity in Planetary Science

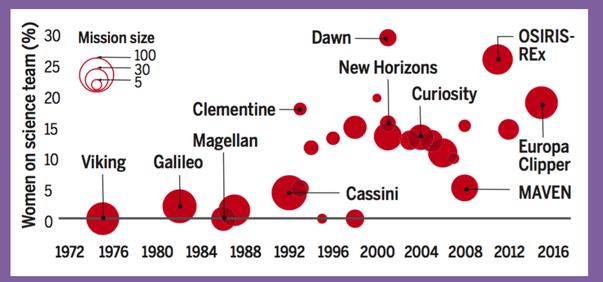
Research demonstrates that diverse groups are more capable of solving complex problems.

- Groups with diverse membership find more innovative and creative solutions and can outperform "high performing", homogenous groups [1-4]
- In scientific publications, diverse author groups receive higher citation rates and publish in higher quality journals [5]
- Industry studies show that companies with a more diverse and inclusive workforce return higher profits and demonstrate increased innovation [6-8]

Despite these advantages, significant barriers exist to achieving a diverse workplace:



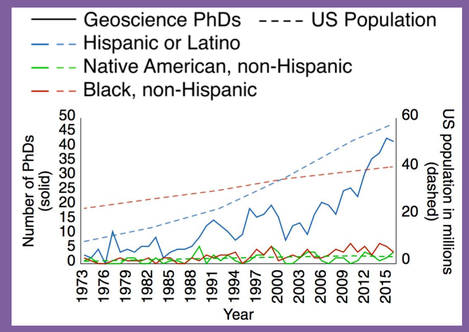
Racial demographic data for the planetary science workforce from the DPS 2010 survey and the 2011 Survey of the Planetary Science Workforce [9], compared to the US 2010 Census [10], the expected US population by 2050 [11]. *The current planetary science workforce does not reflect the US population.*



The problem isn't just getting into science. Women (and under represented minorities, URM) face additional barriers to success once they are in the field. The pre-2000 average % of women on science teams is <6%, and the 2001-2016 average is 15.8% - as compared to ~30% women in the planetary science field in 2010 [12, 13].

	Expected (census 2010)	Actual (DPS 2010 Survey)	Missing/ (over)
White Men	478	999	(521)
White Women	478	333	145
Asian Men	42	67	(25)
Asian Women	42	22	20
URM Men	227	56	**171**
URM Women	228	19	**209**

Racial and ethnic minorities are the most underrepresented group in Planetary Science. Scaled to 1500 Planetary Scientists URM includes Black, Latinx, Native American, and Pacific Islander



The number of Geoscience PhDs per URM vs. time do not correlate with population growth of these racial groups in the US [14].

The "Leaky" Pipeline

- The idea of the leaky pipeline puts the onus on the particular demographic group rather than on the culture.
- The significant underrepresentation of Hispanic and Black planetary scientists suggests something more than a "leak".
  - Even after accounting for error and the progressive "leak" between degree stages, these groups are significantly underrepresented.
  - Physics, Geology, and Planetary are far below representation for Hispanic and Black planetary scientists even when compared to the overall demographics in STEM.
- To promote diversity in the planetary science workforce we need to:
  - Help promote ethnic minorities in Physics & Geology – the primary feeder undergraduate/graduate degrees [15]
  - Help promote women, with an emphasis in physics (geology is approaching parity at the doctorate level).
  - Understand that the "pipeline" and "leak" analogies are insufficient as it encourages passivity. System-level and other barriers are affecting demographics and removing contributions from qualified scientists.

What is the PCCS doing in 2019?

- Helping to review the EPSC/DPS Code of Conduct and meeting guide
- Developing reading guide for diversity and inclusion resources
- Drafting recommendation to DPS, Planetary Science journals on justification for and process of dual-anonymous reviews
- Conducting demographic studies with available data
- Investigating guidelines for implementing a useful and anonymous demographics survey of the Planetary Science community by the AAS

What can you do to help?

- Attend Bystander Intervention or Implicit Bias Training
- Fill out demographic information requested by professional organizations and the NASA NSPIRES system
- Fill out post-meeting surveys and include good and bad comments
- Pay attention to other axes of underrepresentation in planetary exploration: besides gender, consider race, disability, sexuality, etc.
- Learn about issues affecting URMs (under represented minorities) in our community – check out our References!
- Note who is included and who isn't in your research groups and conference programs/program committees; actively seek out collaborations with URMs and MSIs (minority serving institutes)
- Get involved! Join and participate in professional organization leadership, committees, etc.
- Contact us with ideas and/or concerns (rathbun@psi.edu)

Why care?

- Diverse groups find more innovative, creative, and responsive solutions to complex problems. Promoting inclusion will achieve the best science!
- For every $1 a white man makes in academia, a white woman makes $0.80, a man of color makes $0.72, and a women of color makes $0.67 (McChesney, 2018). Such barriers discourage URMs from participating; acknowledgment of these types of issues is part of the battle.