

**STRATEGIES FOR EQUITABLE RECRUITMENT AND APPLICATION EVALUATION OF GRADUATE STUDENTS AND EARLY CAREER SCIENTISTS AND ENGINEERS IN NASA SCIENCE MISSION DESIGN SCHOOLS.** B. A. Rodriguez<sup>1</sup>, J. E. Scully<sup>1</sup>, L. L. Lowes<sup>1</sup>, T. L. Hudson<sup>1</sup>, K. L. Mitchell<sup>1</sup>, and A. E. Nash<sup>1</sup>.  
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**Introduction:** The NASA Science Mission Design Schools (SMDS) - Planetary Science Summer School (PSSS) and Heliophysics Mission Design School (HMDS) - prepare the next generation of engineers and scientists to participate in future NASA science missions [1]. PSSS and HDMS provide a bridge from participants' knowledge gained in graduate, postdoc and junior faculty positions to facilitate a head start into the world of planetary science missions. Ten years after its inception in 1989 in a lecture format, JPL evolved the PSSS experience to focus on the process of developing a robotic planetary exploration mission concept into reality through concurrent engineering, mentored by members of JPL's advance project design team (Team X) and by NASA scientists. The participants, guided by the mentor team, progressively refine their mission concept over the course of ten weeks to greater levels of detail following the frameworks of Concept Maturity Levels and Science Traceability Matrix.

These programs strongly encourage a diverse group of eligible students/early career professionals to apply, so that the next generation of scientists and engineers are equitably provided with opportunities to become involved in NASA science missions. To this end, JPL is employing two strategies for greater equity and representation across these programs.

**Recruitment:** For over thirty years, the PSSS program, and recently HMDS, carefully track participant demographics in order to track our DEIA goals of meeting or exceeding industry standards for underrepresented groups. Historically, the PSSS program in particular has seen greater than the academic rate for PhD's awarded for women across every scientific discipline. This is most pronounced, for example, in aerospace doctorates, which have historically seen no improvement for a decade, making up only 10-12% of PhD's awarded in that timeframe [2], compared to 40-50% of the PSSS participants.

However, recruitment of minorities has seen far less success, tracking the PhD award rates on average but in some years falling below the average 5-10% Latinx and African American presence in the program.

Ongoing efforts to improve participation include a focus on leveraging NASA DEIA organizations and programs, including Minority University Research and Education Project (MUREP) and Established Program to Stimulate Competitive Research (EPSCoR).

MUREP works with numerous minority-serving institutions to recruit underserved minorities, and has

existing inroads with faculty and student groups to allow for a novel audience to be introduced to these programs, and de-emphasizes recruitment from a pool of mainly predominantly white institutions. EPSCoR is directed at U. S. jurisdictions that have not participated equitably in competitive aerospace and aerospace-related research activities.

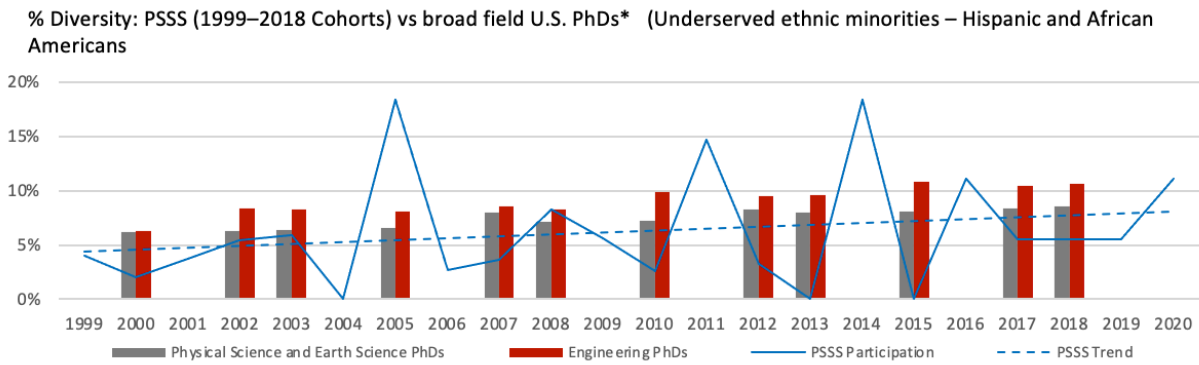
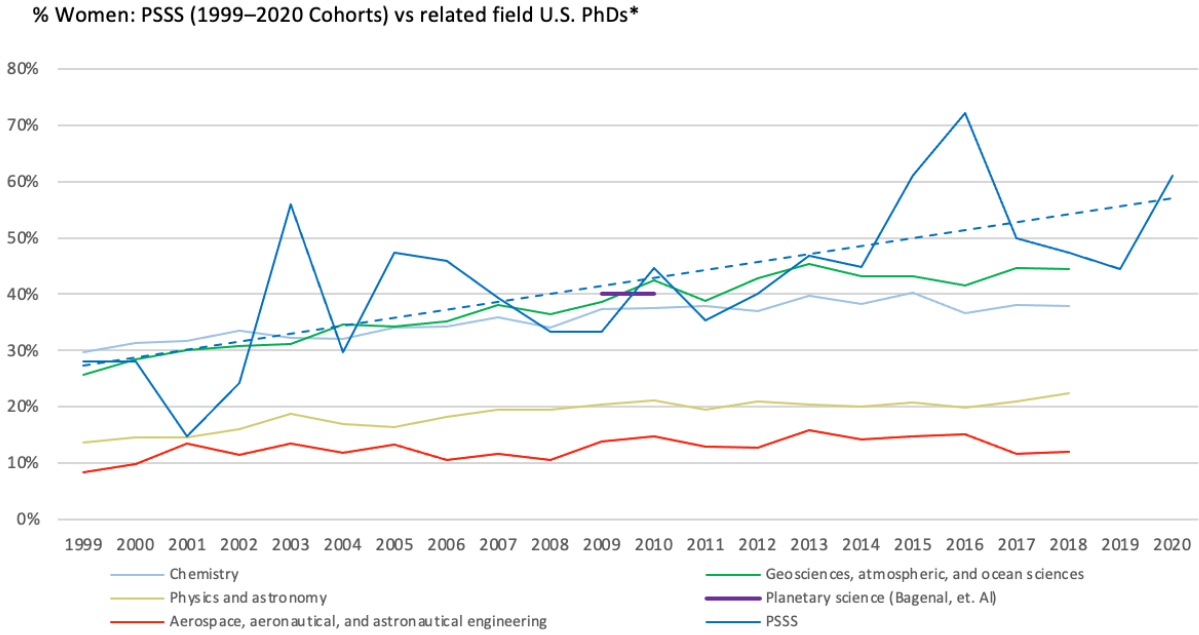
We also focused efforts for outreach to formal and informal professional organizations of underrepresented community members. But to better engage potential participants, we are seeking to build and maintain relationships with key organizations and individuals in that community. We plan to strengthen our outreach to SMDS alumni at minority serving institutions and in professional and student organizations, connect more directly with faculty and students, and improve program visibility at key conferences when budget allows.

**Application Evaluation:** Concurrently, the second prong of this effort includes a greater anonymization of applicant submissions. Due to the relatively small number of university programs in planetary science, the ability to maintain an unbiased evaluation of applicants introduces an opportunity for improvement. To do so, the PSSS and HDMS administrative team has anonymized applications in regards to name and gender, as well as in the use of identifying information pertaining to previous projects and collaborators that directly name experts in the field. Furthermore, the team has deemphasized the use of letters of recommendation to prevent overly-relying on existing relationships between partners being an implicit factor in determining the candidacy of an applicant.

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**References:** [1] NASA Science Mission Design Schools. Retrieved January 2021 from: <https://www.jpl.nasa.gov/edu/intern/apply/nasa-science-mission-design-schools/>

[2] National Science Board. *Science and Engineering Indicators 2018*. NSB-2018-1. Alexandria, VA: National Science Foundation. <https://www.nsf.gov/statistics/indicators/>.



\*Source: NSF National Center for Science and Engineering Statistics, 2018 Science and Engineering Doctorates Report