

**PLANTING SEEDS: A NEW PROFESSIONAL DEVELOPMENT ECOSYSTEM FOR PLANETARY SCIENCE.** G. M. Beaudoin<sup>1</sup> and C. Shupla<sup>1</sup>, <sup>1</sup>Lunar and Planetary Institute ([gbeaudoin@lpi.usra.edu](mailto:gbeaudoin@lpi.usra.edu), Houston, TX – USA).

**Introduction:** The Lunar and Planetary Institute's Science Engagement team has initiated a new program that strives to identify and address the professional development needs of postdoctoral researchers and early career scientists in the planetary science community. Intended components of this program include (a) an online, centralized hub where students and scientists can locate vetted resources and relevant opportunities, (b) informational seminars and skill-building workshops led by experts, and (c) supporting scientists and community members in efforts to create a professional peer network.

**Background and Motivation:** Professional development involves the acquisition – or refinement – of skills, knowledge, and connections by individuals who have entered the labor force. It is a multifaceted enterprise that includes short- and long-term goals. For scientists, professional development typically focuses on an exploration of career paths across different employment sectors and the cultivation of “soft skills,” including proficiencies like written and oral communication, teamwork and mentoring, and the management of personnel, projects, timelines, and budgets.

These non-research-oriented competencies are often not emphasized – or even introduced – as a part of graduate academic training [1-3], which prioritizes research experience, technical acumen, publication record, and teaching [4]. All crucial skills for securing positions at academic institutions and/or leading successful research projects. However, when graduate students and early career scientists are motivated to build a broader range of skills and explore different career paths, a number of challenges may arise. First among them is the limited and discontinuous nature of the professional development landscape across academic institutions [1, 3]. Programs vary widely in the staffing and funding of career services centers, the availability of training opportunities (workshops, job fairs, informational interviews), and the extent of alumni and employer networks. Among those institutions that do offer formal career preparation programs, the majority of them focus exclusively on preparing students for a future in academia [1].

The number of PhDs awarded has significantly outpaced the number of available full-time, tenure track position [5] and the majority of STEM PhDs in the US find employment in non-academic sectors (industry, government, non-profit) [1, 3, 6, 7]. Despite these trends, PhD students are often not aware of di-

verse career options and do not receive formal training in the skills relevant to such positions during their graduate education [1-3]. One way that this misalignment can be remedied is by organizing professional development opportunities for STEM professionals in postdoctoral and early career positions.

Postdoctoral researchers and early career scientists entering a competitive field, such as planetary science, can benefit from professional training in aspects of employment like interviewing and negotiating, working on multicultural and multidisciplinary teams, managing budgets and timelines, and communicating with broad audiences. The development of these skills can help early career STEM professionals identify their strengths and weaknesses, set career goals, and be more competitive in the pursuit of career advancement across diverse job sectors [2]. This is especially true for those individuals seeking employment in non-academic positions, where such skills are expected [1, 2].

**Challenges:** One major challenge facing the planetary science community is the absence of a professional society that represents all disciplines of the field [8]. Organizing professional development programs, disseminating resources and opportunities, connecting members across disparate careers and sub-disciplines, and evaluating the needs of the planetary science community are made more difficult by the lack of a centralized society. The broad dispersion of members and resources among various societies means individuals are often unaware of relevant opportunities and uncertain of viable career paths, creating additional obstacles to professional advancement, especially for those in early career stages.

Beyond the difficulty of lacking a centralized hub through which to promote information sharing and assembly, many STEM professionals – including planetary scientists – struggle to prioritize non-research-oriented pursuits [8], for themselves, their peers, and those they supervise. The real, or perceived, lack of approval by peers and supervisors can discourage students and early career scientists from participating in career exploration and professional development activities. Cultural barriers are not the only obstacles that can reduce participation. As the program grows and matures, issues relating to program funding and staffing, scheduling, content and speaker selection, accessibility, evaluation, and sustainability will need to be assessed in an iterative and thoughtful process that aligns with the community's changing needs.

**Approach:** A new initiative to provide relevant information and trainings for the students and early career planetary scientists began to take shape in 2022, with the launch of a series of virtual programs. Throughout the year, the LPI offered four events (addressing networking, presenting at conferences, and exploring mission science careers) geared toward meeting the perceived needs of students and postdocs and gathering feedback from attendees. These efforts were supported, in part, by the ChemCam instrument team on MSL.

Participation numbers, evaluation data, and survey results from these events, as well as interviews with scientists at different career levels, revealed several key findings. First, the target audience was motivated to attend this kind of offering and eager to identify additional opportunities to engage. Second, stakeholders (including organization leadership, representatives from multiple job sectors, senior scientists, post-docs, and graduate students) were supportive of the program. And third, respondents reported a lack of awareness about information and opportunities for career advancement that could be addressed not only through future events (webinars and workshops) but through the development of a centralized hub of information and/or a professional network.

To address the lack of awareness of opportunities for students and post-docs, we have created a new webpage that features more than 40 items across six categories (Workshops and Events; Internships and Fellowships; Scholarships and Awards; Opportunities to Participate; Resources; Additional Information). These items are vetted, regularly updated, and curated for students and post-docs in planetary science, Earth science, and space science.

On January 5, 2023, the LPI hosted the first event in its new series of webinars, “Professional Development for Planetary Scientists.” This event focused on mental resilience and recognizing the signs of stress fatigue to avoid occupational burnout. Drawing more than 80 synchronous attendees and more than 200 recording views (in the first five days), the webinar was a successful first offering that also helped to highlight areas for improvement. Future programs will strive to better serve our community by (a) providing specificity about the relevance to planetary scientists and STEM professionals and (b) clearly identifying practical skills and takeaways from each session.

Moving forward, the LPI is working to build a formal professional development program that meets the unique needs of the planetary science community. To do so in a transparent, responsible, and equitable way, we request feedback from members of the community to answer questions like the following: *Are the*

*PD needs of early career scientists being met? If so, what organization is providing these services? What obstacles do you face in pursuing your PD goals? What topics are you most interested in? How should these topics be presented (i.e., lectures, workshops, self-guided)? How much time would you be willing to devote to a PD training (including homework)? How often should trainings be provided? What would incentivize you to take part in a PD program?*

**Implications:** We believe that this program will benefit postdoctoral researchers and early career scientists by providing information, tools, and support about non-research-oriented topics that are relevant to building confidence, investing in professional growth, and achieving their individual career goals. Empowering the personal and professional development of early career scientists benefits the broader planetary science community as these individuals become better equipped to support the next generation of students and scientists, policies, technologies, and missions from positions across all employment sectors.

**References:** [1] Denecke, D. et al. (2017) *Council of Graduate Schools Report*. [2] Ganapati, S. and Ritchie, T. (2021) *PLoS One*, 16 (12), e0260328. [3] Clair, R. et al. (2017) *PLoS One*, 12, e0177035. [4] Campbell, S. et al. (2005) *Frontiers in Ecology and the Environment* 3, 153–160. [5] Cyranoski, D. et al. (2011) *Nature*, 472, 276–279. [6] Sauermann, H. and Roach, M. (2012) *PLoS One*, 7, e36307. [7] Zolas, N. et al. (2015) *Science*, 350, 1367–1371. [8] Frank, E., Byrne, P. et al. (2021) *BAAS*, 53, (4).