

## **Building a Portal to Facilitate Academia-to-Industry Career Transitions**

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This pre-proposal seeks support to advance creative ways to facilitate transition of early career scientists from the field of High Energy Physics and Astrophysics (HEPA) to careers in industry.. This will enable a stronger pipeline of diverse STEM workforce for industry and a greater engagement of industry in sciences via the alumni community. This topic has received extensive consideration in the Community Engagement Frontier of the APS/DPF Snowmass2021 Community Self Study. [\[arXiv\]](#).

While organizations such as the APS and national lab user groups [1, 2] can tailor and offer programs that meet specific goals, it is clear that a more broad and systemic approach to the marketing of and access to career opportunities for early career physicists is needed beyond the efforts of such organizations if more optimal outcomes at both the structural and personal levels are to be achieved for HEP physics as well as the wider society. A strong networking can address the lack of awareness of the broader world of opportunities available outside of traditional HEPA. It is the single most powerful enabler bridging the non-traditional HEPA industries and employers to the pool of highly skilled HEPA physicists entering the job market. Initial support from the APS Innovation fund to establish a networking portal based at Brookhaven National Laboratory could be pivotal to springboard careers of a diverse workforce in industry and transform the landscape. We discuss below the motivations and proposed ideas.

A majority of HEPA early career scientists inevitably transition out of pursuing traditional HEPA careers like faculty and scientist positions at universities and national labs. This is attributable to the structural disparity between the relatively few traditional HEPA career positions available in any given year and the much larger number of available HEPA early career scientists desiring to fill those positions. Personal and financial factors, such as the larger salaries potentially available in industry and negative factors, such as burnout, can also contribute to the desire of early career scientists in this transition. The HEPA community has both a pragmatic need and an ethical obligation to connect early career HEPA job seekers with the resources and relationships which will allow them to identify promising careers and obtain stable positions that will allow them to advance professionally as well as personally. A clear and successful career pipeline path will also attract more diverse talent to HEPA itself. This proposal identifies ways to develop methods where each major milestone along the path from undergraduate to post-doctoral researcher can be empowered with the information they need to develop an informed and realistic perspective on the full breadth of opportunity available to them for in-field and non-traditional careers.

A recent survey by early career researchers on the HEPA community during the Snowmass2021 process has demonstrated as in Figure 1 below that networking and mentoring relationships with earlier generations of HEPA physicists is the single most effective tool in communicating career opportunities to junior scientists [\[arXiv\]](#). Very clearly and self-evidently, this is a highly effective strategy given that nearly every physics student, when approaching a career transition point such as graduation or the end of a postdoctoral term, seeks to emulate their direct supervisor and immediate colleagues by tenaciously pursuing a traditional HEPA career to the exclusion of all else. The survey has also shown that it is possible to break out of this self-reinforcing dynamic through a variety of mechanisms which can nurture and develop bonds and help establish more broad communities of interest between mid- and late-career HEPA scientists in non-traditional careers than has been the case throughout much of the history of HEPA in the United States. Mechanisms such as alumni networks and opportunities for internships in non-traditional HEPA settings have achieved great success in structurally connecting early career job seekers with both the information and the opportunities which they need in order to effectively pursue a career that is ultimately both professionally and personally rewarding. In addition, private employers reap the significant economic benefits of employing HEPA physicists skilled in both STEM disciplines and related skills such as technical writing and collaborative working, while the wider society benefits from

the diffusion of highly talented physics professionals from academia into the overall economy, strengthening, both, society at large as well as improving quality of life for everyone.

This portal will help us achieve the following:

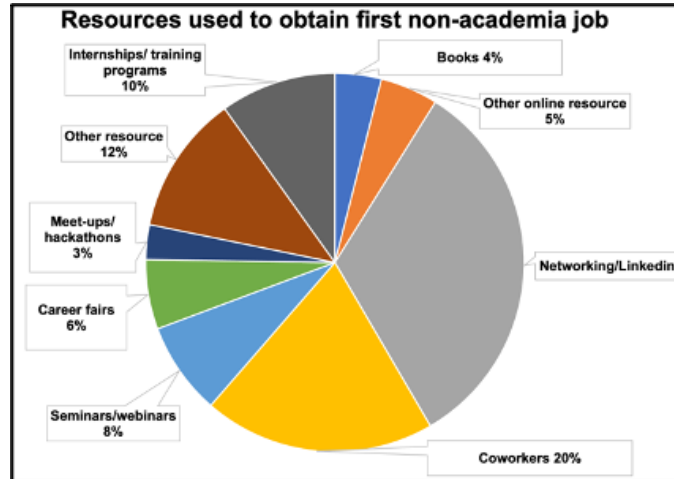


Figure1. Resources used by early career researchers who are seeking non-academia employment.

### 1. *Networking*

The best career opportunities often come from connections such as former classmates and co-workers. Reaching out to alumni, mentors, and peers to get advice and information about career opportunities puts one at an advantage. An organized framework like [3,4,5] serving as a hub is required to serve the community of early career and alumni for jobs as well as mutual connections in the US. The US based HEP community includes neutrino and dark matter detector collaborations, besides those on the several LHC experiments, and shares common skills with astrophysics and related fields like nuclear and gravitational physics. A small amount of investment to create a database of alumni and technical and personnel support to develop and maintain it is needed. One of us, S.Malik, has played a key role in such efforts [6,7].

### 2. *Engagement of HEPA supervisors and mentors*

Engagement of HEPA supervisors and mentors is essential in facilitating industry transition. Although HEPA supervisors may not themselves be sufficiently knowledgeable to advise or mentor transition pathways toward industry jobs, a reluctance to be involved in the process may also arise from research commitments and related priorities. The proposed portal can be used to organize workshops to sensitize, guide and train mentors.

### 3. *Job search process*

Alumni are a relatively low cost yet very valuable asset with an abundance of experience transitioning from HEPA. Through such a portal, one can share information or organize workshops on writing CVs targeted for industries like finance, defense, tech, software and would be required to have their own experience. Projects and internships in industry that might be useful and available to early career researchers can be advertised or designed by alumni. Ideas on how this might happen can be discussed.

### 5. *Collaborations*

It will also encourage and engage alumni to be proactive and create new collaborations with HEPA projects that will be mutually beneficial.

**References:**

- [1] 2022 AIP: Career Resources <https://www.aip.org/career-resources>
- [2] 2022 Fermilab Student & Postdoc Association (FSPA): Career Activities <https://fspa.fnal.gov/career-activities/>
- [3] 2022 The CERN Alumni Network <https://alumni.cern/>
- [4] 2022 CERN @ Career fairs <https://careers.cern/cern-career-fairs>
- [5] 2022 Events for the CERN-based community <https://indico.cern.ch/category/12583/>
- [6] 2013 Networking Event for CMS Alumni, Students, And Postdocs <https://indico.cern.ch/event/280839/> and <https://cms.cern/index.php/news/networking-event-cms-alumni-students-and-postdocs>
- [7] 2016 The 4th ALICE, ATLAS, CMS and LHCb Career Networking Event <https://home.cern/news/news/experiments/4th-alice-atlas-cms-and-lhcb-career-networking-event>