

HEP Industry partnership and mobility

Authors: Yangyang Chen (Cornell University), Sudhir Malik (University of Puerto Rico Mayaguez), Julie Hogan (Bethel University), Aneliya Karadzhinova-Ferrer (Ruđer Bošković Institute), Amr El Zant (British University in Egypt)

With an increasing movement to industry by our postdocs, could we be proactive in partnering with industry in order to develop skills and profiles that are sought after in those fields? Such a partnership could prepare HEP postdocs better for getting, and succeeding in, industry jobs. Acquiring some of these industry-valued skills on the job (during the PhD or postdoc) might be easier if one is based, during the formative PhD or postdoc years, at a national lab with extensive resources rather than at a university. But there could also be an internship program (most likely during the PhD or even as a Master's degree student) at an industry where young trainees could eventually find a job.

An example of a program involving such a partnership with the high-tech computing sector is ongoing at University College London's Centre for Doctoral Training in Data Intensive Science. There, even HEP and cosmology theorists get internships in industry during their PhD, greatly facilitating the transition to employment in this sector for those who want or need it (<http://www.hep.ucl.ac.uk/cdt-dis/>). Such internships can even be beneficial for hirings at the HEP labs. It would, in addition, encourage participation of postdocs and PhD students in HEP hardware projects, with increased motivation emanating from the knowledge that the experience can help them land jobs.

The goal of this LOI is to explore and recommend further possibilities to scale up this effort with ideas for internships in partnership with industry that work on HEP projects.

Challenges, Skills and Mentoring in labs and industry

National labs and industry partners cover areas like Accelerator Technologies, Computers & Information Science, Detector and Engineering Technologies and also Environment & Safety. Obviously these areas pertain to work in HEP experiments like building accelerators, particle detectors, collecting data and physics analysis. Most of this work is led and done by lab scientists and engineers.

Non-lab (university) PhD students and postdocs face a challenge in acquiring the skills related to these technologies (especially hardware), since such a partnership in HEP is likely to happen at a lab. Many students at institutions not directly related to projects with HEP labs may completely miss out on these opportunities.

This may entail two things: first, a formal education mechanism at the Master/PhD level, whereby a student can benefit from these partnerships hosted at the lab --- or at a partnering industry --- by spending a semester or two there learning the skills offered; and, second, for a PhD student or postdoc to be partially based at the lab to sharpen skills in order to directly target a career at the

partnering industry. This latter path is particularly suitable for those who already have leanings towards such a career.

It is nevertheless invariably important that the skills to be learned are aligned with the goal of the experiment or project at the core of the student or postdoc work (otherwise it is very difficult to do this as a skill-development over and above that work). The supervisor can play a key role here: providing forthright guidance and orientation as to the student's career prospects, setting up semester/internship opportunities, assigning postdocs to appropriate HEP-industry partnership projects (aligned with their core postdoc work) and rewarding and recognising a postdoc's innovative work (example: [CPAD awards](#)). From the side of industry employees, some of those working on HEP projects can also work at labs, as short-term employees or interns, to contribute to discovery science.

[1] <https://www.innovationnewsnetwork.com/exploiting-high-energy-physics-technology-at-iarc/6104/>

[2] <http://mc-pad.web.cern.ch>

[3] <https://www.triumf.ca/home/about-triumf/partners/commercial-partners>

[4] https://ec.europa.eu/research/infocentre/article_en.cfm?&artid=49811&caller=other

[5] <https://iopscience.iop.org/book/978-0-7503-1444-2/chapter/bk978-0-7503-1444-2ch1>