



## LETTERS

Edited by Jennifer Sills

## Support PhDs building deep-tech ventures

PhDs in science, technology, engineering, and mathematics (STEM) increasingly pursue start-ups as a full-time career choice. Between 2012 and 2023, an average of 13% of recent Massachusetts Institute of Technology (MIT) PhD graduates worked at start-ups, and an average of 4% of graduates per year cofounded companies (1). The percentage of PhD founders backed by venture capital firms has also increased (2). However, educational programs in entrepreneurship often leave behind this growing cohort of would-be entrepreneurs (3).

Most entrepreneurship programs focus on “dorm-room” start-ups created by undergraduates or MBAs with software ideas that can be tested in short sprints. This model fails to address the needs of laboratory-based endeavors—referred to as deep-tech ventures—that transform scientific research into market-ready innovations. Intellectual property founded on breakthrough science requires more attention to technical, market, regulatory, and production risks.

To prepare PhDs to become founders of ventures based on their own research, universities and innovation ecosystem partners must establish dedicated training for and must remove barriers to the deep-tech venture pathway (4). Although some programs, such as the National Science

Foundation Innovation Corps (I-Corps) program (5), address specific gaps in the traditional PhD experience, most existing programs do not scale to thousands of scientist-entrepreneurs, do not provide a full suite of support, or remain inaccessible until after graduation. An effective program must scale while supporting STEM PhDs through three distinct phases: initial venture curiosity, serious exploration of a laboratory-based project (during their program), and the creation of a so-called “spin-out” company.

Early-stage support should focus on deep-tech venture-building skills. For example, MIT’s Engine Lab course (3) and Harvard’s Lab to Market online course (6) ensure that students undertake projects to build entrepreneurial skills, network, and find role models. Beyond universities, venture firms, such as Flagship Pioneering, offer summer fellowships (7) for PhDs and postdocs to learn the venture-building process.

If PhD students want to commercialize a specific project, educational programming should help them evaluate specific market opportunities and assess commercialization risks. The Engine’s Blueprint program (8) provides this guidance, and more broadly, the suite of facilities at programs such as the Cornell Tech Runway Startup Postdocs program (9) and University of California Berkeley Postdoctoral Entrepreneurship Program (10) offer essential infrastructure that supports translational activities.

After they graduate, PhDs need help building their companies. Fellowships,

Scientists hoping to convert research into market-ready products can benefit from specialized training.

such as those offered by Activate (11) and Breakthrough Energy (12), give recent PhDs the freedom to pursue applied research with the goal of commercialization. These programs combine stipends, curriculum, research and development funding, networks, and low-cost access to experimental equipment and facilities—essential elements for scientist-entrepreneurs transitioning discoveries to market.

The future of US innovation depends on a robust academia-to-venture pipeline for STEM PhDs. Implementing a comprehensive support system for ambitious scientist-entrepreneurs can substantially increase the likelihood that scientific advances achieve real-world impact.

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### COMPETING INTERESTS

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