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INTERNSHIPS

Mind wide open

An innovative US National Institutes of Health programme aims to expose junior scientists to different career paths.

BY PAUL SMAGLIK

Internships are not just for undergraduates any more. With fewer than one-third of US life-science PhD graduates destined for tenure-track positions, most graduate students and postdoctoral researchers need to prepare themselves for life outside the academic laboratory.

In 2013, the US National Institutes of Health (NIH) launched the Broadening Experience in Scientific Training (BEST) programme, after being faced with a number of reports suggesting that the US graduate-education system trains scientists for faculty positions that do not actually exist (see go.nature.com/buk6km). The initiative began as a five-year pilot to offer biomedical graduate students and postdocs supplemental skills to help to prepare them for non-tenure-track career options.

Since its launch, BEST has offered enhanced career training, including internships, to about 10,000 graduate students and at least 4,000 postdocs. The 17 universities that received NIH grants to participate in the pilot programme act as a collective laboratory, exploring different approaches to redefine graduate training and craft internships for highly trained young scientists. The approaches may include partnerships with industry and other sectors; participant institutions are sharing their experiences to determine best practices. So far, BEST trainees have engaged in projects such as working in the universities' technology-transfer offices, teaming up with professional science writers and lobbying state legislature.

Patricia Labosky, who is the programme leader for BEST at the NIH in Bethesda, Maryland, says that neither career training nor internships are an entirely new endeavour for graduate schools. However, she adds that the agency's approach is innovative — it could transform graduate internships and career training from an ad hoc approach to a more-systematic, data-driven one.

The best of the BEST projects will probably be adopted by more universities once the pilot expires in 2018, says Kathy Gould, a biologist who runs the BEST programme at Vanderbilt University in Nashville, Tennessee. "What we're seeing is an experiment in progress," she says. Labosky predicts that market forces could speed up adoption because BEST universities use the initiative as a student-recruiting tool.

FACULTY FIRST

Faculty-member buy-in to the programme is essential because many principal investigators (PIs) look at students' or postdocs' time away from the lab as detrimental — especially if those young scientists are funded under the PI's grant. But some have come around, says Ambika Mathur, who teaches paediatrics at Wayne State University in Detroit, Michigan, and is dean of its graduate school. When her institution surveyed science faculty members to gauge reaction to off-site internships for trainees, most PIs said that they were favourably or very favourably inclined.

One solution to objections from PIs is to fund trainees who are on internships from departmental money or training grants, which are not tied explicitly to research outcomes. Some BEST universities reimburse PIs for the time that their trainees spend away from the lab. But such a change does not happen quickly or easily. "Shifting trainees off research grants is going to take a long time to accomplish," says Nael McCarty, who manages Emory University's BEST programme ▶

in Atlanta, Georgia. And tweaking funding sources alone will not address PIs' need for young scientists to get experiments done. "Our entire careers are resting on the backs of our trainees," he points out.

SPLIT THE DIFFERENCE

Emory is quelling some faculty members' objections by casting internships as separate, independent projects with flexible hours. The university also sets a low bar on the schedule and time requirements for internships. BEST advisers first sign off on their students and postdocs joining the programme, with the understanding that the trainees will spend at least 50 hours each semester or during their summer academic break away from the lab. Those hours could be compressed into a month or even a week, or they could be spread out over a semester or a year. Once trainees find potential placements, they negotiate their internship schedules with their PIs.

This negotiation was a fraught process for Chelsey Ruppersburg. As a PhD student, also at Emory, she created a public-policy internship for herself in Emory's office of government and community affairs that required 20 hours a week at the Georgia State Capitol, where she advocated to the state legislature on behalf of the university.

"It started with a frank conversation with my PI — that I would be out of his lab during traditional hours," she says. "I was going to do everything on my end to make sure this wouldn't harm my PI and my work in his lab." They agreed that she could spend two or three days each week at the Capitol from January to April during Georgia's legislative session. She made up lab hours at nights and on weekends, hustling to finish her doctoral dissertation on cell biology while learning the ropes of advocacy. The extra work paid off: Ruppersburg started a post last month as a fundraising staffer in the political campaign for US senator Johnny Isakson.

The PI is not the only one who can pose an obstacle to crafting a useful internship. Finding employers who offer the kind of flexibility that graduate- and postdoc-level interns require can be tricky, says Gould. She advises trainees to think carefully about what they want from an internship, and she asks prospective partners to plan projects that are appropriate for a graduate student or postdoc's skill level and training needs. "Some people in industry, on the surface, are very enthusiastic," she says. But they often prove unable to write a job description for a PhD-level scientist.

"It started with a frank conversation with my PI — that I would be out of his lab during traditional hours."

To sidestep these challenges, some BEST trainees create internships through their own university, like Ruppersburg did. Most universities can offer opportunities in areas such as science writing and intellectual-property management. Many BEST schools have found it easier to place students in internships on campus than offsite, especially if they are not located in or near a major technology hub, says Labosky.

For example, the BEST programme at New York University (NYU) works with the university's technology-transfer office. A formal internship charges the trainee with drafting a business plan around a particular piece of technology. A less-formal option pairs graduate students and postdocs with companies to write marketing summaries, gather competitive intelligence and perform outreach. Neither option requires fixed hours, but before graduate students or postdocs can participate, they must complete a technology-commercialization course. At this point, about 40 students and postdocs have interned with NYU's tech-transfer office in one of these capacities.

Other approaches to internships will arise as the BEST programme adapts to the needs of trainees, PIs and internship sponsors, says Keith Micoli, director of NYU's medical school and co-PI of its BEST grant. Short internships can be effective if they help a trainee to choose or rule out a particular career pathway, he adds. By encouraging trainees to explore different options — even through simple things such as job shadowing — these programmes could help to ease the bottleneck of graduate students and postdocs who do not know what they want to do once they complete their programme, he adds (see 'The rule of threes'). "One of the most frustrating things I see," he says, "is graduate students who complete their PhDs and say, 'I suppose I should do a postdoc and figure out what I need to do.'"

As the BEST model expands, Micoli and others hope to hear that less often. ■

Paul Smaglik *is a freelance writer in*

BEST CALCULATIONS

The rule of threes

Douglas White knows how to work the numbers — and how to make them work for him. About halfway through his doctoral programme in biomedical engineering at the Georgia Institute of Technology (Georgia Tech) in Atlanta, he realized that the odds of landing a tenure-track position were not on his side. To prepare for a career with better chances of employment, White turned to the US National Institutes of Health's Broadening Experience in Scientific Training (BEST) programme.

Today, thanks to three internships, White works as a project manager at Takeda Pharmaceuticals, a Japan-based drugmaker with a presence in Atlanta, Georgia. "People always talk about how internships lead to job opportunities, but I didn't believe it," he says.

BEST offered flexible internship opportunities that allowed him to experience different paths over about 18 months. First, he completed a writing apprenticeship sponsored by the philanthropic W. M. Keck Foundation in Los Angeles, California, which paired him with two professional science writers, put him in touch with about a dozen science-writing students around the country and sent him to a scientific conference where he reported on its proceedings and was critiqued by professionals.

He learned that he loves writing, but did not want to pursue it as a career. Equally important, he learned how to tailor his message for people from different backgrounds and with various levels of scientific knowledge.

Next, he decided to look into the government sector, and the Atlanta BEST office came through with an application for an internship at the US Defense Forensic Science Center, about 24 kilometres from Georgia Tech in Forest Park.

During the interview, White was excited to learn that the centre used a technology he was interested in. However, after two months, he realized that the hours out of the lab were cutting into his dissertation research and that he was spending little time on the aspects of the work that were most relevant to his training and research needs.

The experience gave him a crash course in negotiating an early exit. He also learned that he needed to consider work–life balance, so when he landed an interview for his next internship with Takeda, he told them that he was scheduled to defend his dissertation in a few months and was getting married a week after that. He won the internship, defended his thesis and left for his honeymoon — and when he returned, his department had been restructured and his new boss offered him a job as a project manager.

White says that the three internships changed his life by allowing him to explore multiple career options in a relatively short amount of time — and landed him a full-time job in the process. "I would not be where I am if it wasn't for the BEST programme," he says. P.S.