



Students learn techniques for prioritizing ideas at a Business of Science course run by SciPhD.

and volunteer opportunities. Watt, for example, participates in a student consulting group that partners with biotech start-ups to offer scientific advice at reduced consulting fees. Others gain experience by volunteering in their university's technology-transfer offices, which help to commercialize research discoveries.

One of the boldest and riskiest ways to gain real-world experience is to start a company based on a scientific discovery. This approach, experts say, is best after some formal business training and with hands-on mentoring from successful entrepreneurs (see 'Helping hands').

#### ON THE JOB

To ensure that its graduate students find a clear path to business careers and have opportunities to gain on-the-job experience, Johns Hopkins University School of Medicine in Baltimore, Maryland, established the Biomedical Careers Initiative (BCI). Peter Espenshade, a cell biologist, explains that the initiative grew out of a lack of career-development resources for trainees at a time when the job market was being squeezed.

Many graduate programmes have begun to showcase non-academic career options, but the BCI has taken steps beyond that. Its website curates and promotes non-science courses on campus, including those that help to build skills and knowledge in business.

The BCI also facilitates a three-month industry internship programme in which late-stage graduate students take a leave of absence from their research to work at companies or organizations. Students can do internships at companies with which the BCI has connections, or find their own opportunities. Two crucial components help to ensure buy-in from faculty advisers. One is that the BCI pays the student's graduate stipend during the internship; the other is a memorandum that all parties sign that documents the student's

interest, the start and end dates of the placement and an agreement between the student and adviser that certain research priorities must be completed first. This arrangement minimizes disruption to laboratory work.

In the BCI's first year, students completed internships at places such as MedImmune, Eli Lilly and the American Society for Biochemistry and Molecular Biology. Espenshade, who has trained a dozen PhD students in his own lab, says that he will count the BCI a success if it keeps even one student from "going reflexively into a postdoc as the next step". Ideally, graduate students would investigate non-academic career options from the beginning of their PhD programme, he says.

Gregory Cherryholmes did just that. Like Watt, he entered graduate school with an eye towards a biotech business career, and he completed the Keck certificate programme

**"We see this real valley – a skills gap – between basic research skills and skills needed for industry."**

and did some freelance marketing consulting along the way. As a post-doc studying cancer immunotherapy at University of Washington in Seattle, he wants to help researchers in his field to ferry their cancer vaccines to the market.

He draws an analogy between most biomedical trainees' lack of business skills and a business concept called the 'valley of death' — the difficult stretch between having a good scientific idea and convincing investors to commercialize it.

"PhDs have all these skills — super bright with great critical thinking — but they don't have the business know-how to know where they want to go," he says. "These micro-opportunities can help bridge that valley." ■

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#### GRADUATE STUDIES

## US education appeals

First-time enrolments of international students in US graduate schools rose for five consecutive years from 2009 to 2014, finds a report from the Council of Graduate Schools in Washington DC. The biggest year-on-year increases were in the physical and Earth sciences, up 20% to 16,235 first-time enrollees in 2014.

The largest increase per nation was in the number of students from Brazil, which almost doubled its number of first-time US graduate-school enrolments to 1,134; India was up 27% to 21,889.

However, first-time enrolments from Canada and China each fell by 1%, after previous annual increases of 3% and 5%, respectively. Jeff Allum, author of the report, says that the dip in enrolments from China might be a result of the nation's students taking advantage of their home country's investment in graduate schools. Meanwhile, a report from the Institute of International Education in New York found that overall international enrolments in US graduate schools rose by 6% to about 330,000 from 2013 to 2014. Nearly 80% of students from India were enrolled in science, technology, engineering and maths studies, as were 42% from China and one-fifth from the United Kingdom.

#### RESEARCH FUNDING

## Wellcome change

The Wellcome Trust, the United Kingdom's largest biomedical-research charity, is rebalancing its funding priorities to focus on early-career scientists, collaborations and high-risk, high-reward projects. The London-based trust, which spends more than £700 million (US\$1.1 billion) a year on biomedical research and outreach, plans to boost funds for postdoctoral fellowships and to introduce small 'seed' grants to support research on innovative ideas for which few preliminary data are available. Separate programmes for new and senior investigators will merge, with candidates' career stages considered in grant-application evaluations — a move designed to favour early-career researchers. The shift comes after lengthy consultations with grant applicants, according to Jeremy Farrar, who took the reins at the foundation in April 2013. In a statement, he said that the new framework would help to channel more resources to the most promising questions. "We want to make sure that as we increase our funding, the right opportunities are available," he said. For an interview with Farrar, see *Nature* <http://doi.org/xdk> (2014).