

## PROFESSIONAL OUTCOMES

# PhD career paths hold promise

*Most people studying for science doctorates land a job that they enjoy after graduating.*

BY CHRIS WOOLSTON

As universities around the world award science PhDs at an ever-increasing rate, some doctoral students might wonder whether the degree is still worth all the time, effort and sacrifice.

But two recent projects tracking the journeys of PhD holders in the United Kingdom and Canada offer reason for optimism: graduates in the sciences and other fields are highly employable, even if they don't always end up where they expected. "There's a lot of pessimism about an oversupply of PhDs," says Sally Hancock, an education researcher at the University of York, UK, who led the study in her nation — one of only a few of its kind worldwide. "These data can help demystify what happens next."

Using information collected by the UK Higher Education Statistics Agency, Hancock analysed the job outcomes of more than 4,700 people throughout the United Kingdom who graduated with a PhD in either the 2008–09 or 2010–11 academic years. All respondents were surveyed 3.5 years after graduation.

Hancock's analysis, funded by the UK Society for Research into Higher Education and yet to be published, suggests that around 2% of graduates across all fields were unemployed, and nearly 80% had full-time jobs. Close to 10% worked part-time. The rest were mostly pursuing further studies or doing volunteer work.

Nearly 30% of those with full- or part-time jobs ended up in academia. Of those, about 70% worked as teaching professionals and 30% were university researchers. Around 20% worked in industry, often as researchers or managers. Another 20% held medical jobs, including as practitioners and medical scientists.

PhD holders, at least in the United Kingdom, are hardly on the poverty line, says Janet Metcalfe, head of Vitae, a non-profit science-career advocacy organization in Cambridge, UK. "It's been like that since the 1970s," Metcalfe says. "They've always been highly employable. They've always had a premium over those who hold master's and undergraduate degrees."

Previous Vitae surveys, Metcalfe notes, have found that roughly 80% of postdocs want to remain in academia — many more than actually do so (see *Nature* 550, 549–552; 2017). "There's a complete mismatch between career aspirations and the potential for getting academic positions," she says.

Although many people with PhDs end up changing course from their original career plan, that hasn't drastically eroded career satisfaction:

more than 95% of respondents across all sectors in Hancock's analysis said that they were at least somewhat satisfied with their careers, including 48% who said they were very satisfied. "Satisfaction doesn't vary much by sector," Hancock says. "Even if it's not what they expected, the outcomes are OK."

Hancock's analysis revealed some disparities in salaries. Those reported for graduates in academia (a yearly median of £37,000, or US\$51,000) were higher than those in industry (£36,000 for men; £34,000 for women).

Women in the biological sciences reported earning a median of £35,000 per year compared with £36,000 for men. The gender gap was slightly larger in the physical sciences and engineering, where women reported a median salary of £34,000 and men £36,000. The biggest gap was in the biomedical sciences, where women reported an annual salary of £36,000, whereas men earned £45,000. "There are persistent and stubborn gender differences," Hancock says, but she adds that the data offer no clues about the root cause of the pay disparities.

Metcalfe says that the data do not make it clear whether UK female scientists are getting short-changed. She notes that the survey used salary ranges, not exact salaries, and that the relatively small number of people surveyed in the biomedical sciences — fewer than 600 — makes the figures sensitive to outliers.

In Canada, the 10,000 PhDs Project at the University of Toronto (UT) (see [go.nature.com/2ccdzyj](http://go.nature.com/2ccdzyj)), led by biochemist Reinhart Reithmeier, also found encouraging results. The project tracked outcomes for all PhD holders who received a doctoral degree from UT between 2000 and 2015. Through online searches, project researchers verified job titles for 9,583 PhD holders, or 88% of all graduates. The study has no data for the remaining 12%, but Reithmeier notes that in the 2016 census, the unemployment rate for all PhD graduates in Canada was 5.1%.

Science doctoral degrees led to a wide array of positions in Canada. About 23% of respondents have tenure or tenure-track positions, and

just over half work in any type of academic position, including as administrators. Nearly 30% are in industry, and others work for the federal or provincial governments, charities or entrepreneurial businesses.

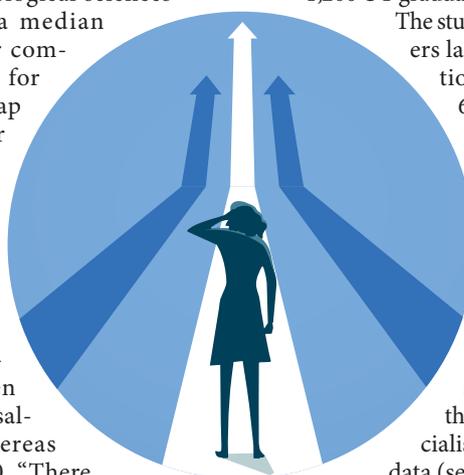
The unusually large percentage of graduates in academia might be a local phenomenon, says Joshua Barker, dean of UT's School of Graduate Studies. "We know that a lot of our graduates like to stay in the region," he says. The report found that the city's two largest universities — UT and York University — employed nearly 1,200 UT graduates between them.

The study shows that PhD holders landed a variety of positions in industry. Nearly 60% of life-sciences graduates now working in the private sector ended up in biotechnology or pharmaceutical jobs. But 13% of all physical-sciences PhDs in the private sector work in banking, finance or investments — sectors that increasingly need specialists who can manage big data (see *Nature* 548, 613–614; 2017). "These niches probably didn't exist 15 years ago," says Reithmeier.

The UT findings were largely consistent with a survey from the University of British Columbia in Vancouver done in 2016, which tracked graduates who had earned PhDs from 2005 to 2013 (see [go.nature.com/2tdcgh9](http://go.nature.com/2tdcgh9)). Just over half of those graduates had positions in academia; of those, nearly 15% had postdoctoral fellowships. More than 91% of survey respondents said that they felt as if they were on the right career path, but some reported that they felt overqualified, unable to find work that was relevant to their doctoral degree. "I don't want to ignore those who are struggling and unhappy," says Susan Porter, the university's dean and vice-provost of graduate and postdoctoral studies. "Some feel that they were fed a line."

The main takeaway, Metcalfe says, is that PhD recipients should feel confident in their career potential, especially if they are willing to look beyond universities. "All of our language in academia encourages researchers to be academics," she says. "The challenge is getting over this psychological barrier to help researchers look more widely in terms of employment. There are some great jobs out there." ■

ILLUSTRATION ADAPTED FROM GETTY



**CORRECTION**

The Careers news story 'PhD career paths hold promise' (*Nature* **555**, 277; 2018) gave the wrong year for the start of the PhDs Project. It started in 2000, not 2002.