Biologists lose out in post-PhD earnings analysis

Many doctoral recipients take well-paid industry jobs, study finds.

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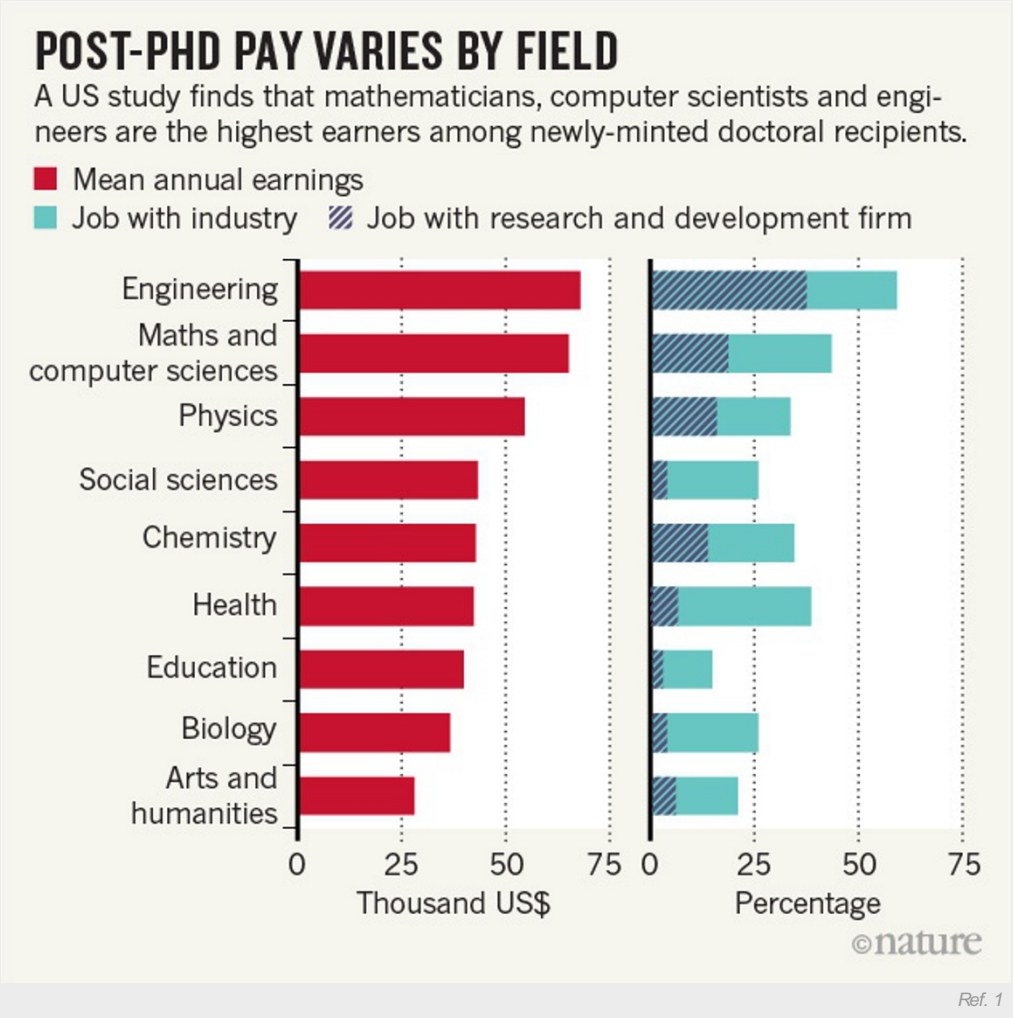
10 December 2015

A study tracing the economic prospects of more than 3,000 US PhD students suggests that around 40% take a job in industry within a year of graduating — where they earn more than their counterparts who stayed in academia.

But earnings depend heavily on the doctoral field, finds the analysis, published on 10 December in *Science*[1]. One year after graduating, doctorates in mathematics, computer sciences and engineering raked in the highest amounts — US$65,000 a year on average, with the 60% of engineers who took industry jobs earning around $80,000 a year. Those with biology PhDs earned the least, around $36,000 per year, perhaps because of the effect of many taking postdoctoral fellowships — only 26% of biology graduates went straight into industry jobs.



Comparing the earnings of newly-minted PhDs is not the primary aim of the study, led by economists Julia Lane at New York University and Bruce Weinberg of Ohio State University in Columbus. Instead, the analysis is part of a project to examine how funding for academic research translates into economic productivity for society — a subject for which comprehensive data have been difficult to obtain. The UMETRICS project, based at the University of Michigan in Ann Arbor, links anonymized census data on employment and income to student information from a consortium of universities in and around the Midwestern United States.

"That the report suggests that doctoral recipients work in establishments associated with high productivity illustrates how doctoral education probably contributes to economic growth and job creation," says Suzanne Ortega, president of the Council of Graduate Schools in Washington DC.

The team examined the prospects of PhD students who graduated between 2009 and 2011 from eight universities. They found that top employers in industry included electronics, engineering and pharmaceutical companies, and that industry graduates tended to end up at large firms, which paid a median salary of more than $90,000. Roughly 20% of researchers remained in the state in which they graduated; of those who went elsewhere, 19% moved to California — the state which accounts for more than a quarter of the nation's R&D expenditure.

How to build a better PhD

"People are going from these research experiences in graduate school into industry, to places where they're valuable, where their training is entering the economy," says Weinberg.

"None of the conclusions here are surprising, but they have such exhaustive data behind everything. I don't think anyone's done such a thorough analysis before," comments Patricia Labosky, a programme director for scientific training at the US National Institutes of Health in Bethesda, Maryland, who was not involved in the study.

Life outside the lab: The ones who got away

Lane cautions that their results are meant to be descriptive and do not establish whether there is a causal link between more research funding and economic productivity. The data also cannot account for graduates who leave the United States. But the question of causality could be addressed in the future, she says, by analysing natural 'experiments' that can occur when a university receives an unexpected bolus of research funding. Tracing the effects of gender and the movement of people between disciplines is also of interest.

The UMETRICS project, which is funded by a mixture of philanthropic foundations, government agencies and the participating universities, will release its data for others to examine — under strict confidentiality protections — in December 2016. The project is working towards including more institutions across the United States; at the same time, Lane has begun collecting data on research training and career outcomes at the University of Strasbourg in France, and several research institutions in Spain. "As this goes out and expands, you can imagine cutting the data across many, many dimensions over time. This is just the first step," she says.

Make the most of PhDs

Nature | doi:10.1038/nature.2015.19009

References

1. Zolas, N. *et al*. *Science* **350**, 1367–1371 (2015).