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U.S. pushes for more scientists, but the jobs aren't there

By Brian Vastag, Published: July 7

Michelle Amaral wanted to be a brain scientist to help cure diseases. She planned a traditional academic science career: PhD, university professorship and, eventually, her own lab.

But three years after earning a doctorate in neuroscience, she gave up trying to find a permanent job in her field.

Dropping her dream, she took an administrative position at her university, experiencing firsthand an economic reality that, at first look, is counterintuitive: There are too many laboratory scientists for too few jobs.

That reality runs counter to messages sent by President Obama and the National Science Foundation and other influential groups, who in recent years have called for U.S. universities to churn out more scientists.

Obama has made science education a priority, launching a White House science fair to get young people interested in the field.

But it's questionable whether those youths will be able to find work when they get a PhD. Although jobs in some high-tech areas, especially computer and petroleum engineering, seem to be booming, the market is much tighter for lab-bound scientists — those seeking new discoveries in biology, chemistry and medicine.

"There have been many predictions of [science] labor shortages and . . . robust job growth," said Jim Austin, editor of the online magazine ScienceCareers. "And yet, it seems awfully hard for people to find a job. Anyone who goes into science expecting employers to clamor for their services will be deeply disappointed."

One big driver of that trend: Traditional academic jobs are scarcer than ever. Once a primary career path, only 14 percent of those with a PhD in biology and the life sciences

now land a coveted academic position within five years, according to a 2009 NSF survey. That figure has been steadily declining since the 1970s, said Paula Stephan, an economist at Georgia State University who studies the scientific workforce. The reason: The supply of scientists has grown far faster than the number of academic positions.

Research jobs slashed

The pharmaceutical industry once was a haven for biologists and chemists who did not go into academia. Well-paying, stable research jobs were plentiful in the Northeast, the San Francisco Bay area and other hubs. But a decade of slash-and-burn mergers; stagnating profit; exporting of jobs to India, China and Europe; and declining investment in research and development have dramatically shrunk the U.S. drug industry, with research positions taking heavy hits.

Since 2000, U.S. drug firms have slashed 300,000 jobs, according to an analysis by consulting firm Challenger, Gray & Christmas. In the latest closure, Roche last month announced it is shuttering its storied Nutley, N.J., campus — where Valium was invented — and shedding another 1,000 research jobs.

"It's been a bloodbath, it's been awful," said Kim Haas, who spent 20 years designing pharmaceuticals for drug giants Wyeth and Sanofi-Aventis and is in her early 50s. Haas lost her six-figure job at Sanofi-Aventis in New Jersey last year. She now works one or two days a week on contract at a Philadelphia university. She dips into savings to make ends meet.

"Scads and scads and scads of people" have been cut, Haas said. "Very good chemists with PhDs from Stanford can't find jobs."

Largely because of drug industry cuts, the unemployment rate among chemists now stands at its highest mark in 40 years, at 4.6 percent, according to the American Chemical Society, which has 164,000 members. For young chemists, the picture is much worse. Just 38 percent of new PhD chemists were employed in 2011, according to a recent ACS survey.

Although the overall unemployment rate of chemists and other scientists is much lower than the national average, those figures mask an open secret: Many scientists work outside their chosen field.

"They'll be employed in something," said Michael S. Teitelbaum, a senior adviser to the Alfred P. Sloan Foundation who studies the scientific workforce. "But they go and do other things because they can't find the position they spent their 20s preparing for."

Until recently, PhD organic chemist Mark Darey fit that description. In 2009, he was laid off from Albany Molecular Research, a contractor for pharmaceutical companies, after 20 years in the business. As he applied for 400 chemistry jobs, he worked as a low-wage

office temp — and so was not included in the unemployment figures.

"It was quite scary," said Darey, who this year finally landed another chemist position, at DuPont in Belle, W.Va. "I was watching my bank balance dwindle away, wondering when I'd have to sell the house."

Two groups seem to be doing better than other scientists: physicists and physicians. The unemployment rate among those two groups hovers around 1 to 2 percent, according to surveys from NSF and other groups. Physicists end up working in many technical fields — and some go to Wall Street — while the demand for doctors continues to climb as the U.S. population grows and ages.

But for the much larger pool of biologists and chemists, "It's a particularly difficult time right now," Stephan said.

One reason: A glut of new biomedical scientists that entered the field when the economy was healthier. From 1998 to 2003, the budget of the National Institutes of Health doubled to $30 billion per year. That boost — much of which flows to universities — drew in new, young scientists. The number of new PhDs in the medical and life sciences boomed, nearly doubling from 2003 to 2007, according to the NSF.

But that boom is about to go bust, because an equal number of permanent jobs failed to follow. One big factor: Since 2004, federal research spending across all agencies has stagnated relative to inflation, according to an analysis by the American Association for the Advancement of Science.

Although the injection of $10 billion in federal stimulus funds to the NIH from the American Recovery and Reinvestment Act of 2009 "created or retained" 50,000 science jobs, according to the NIH, that money is running dry, putting those positions at risk.

The lack of permanent jobs leaves many PhD scientists doing routine laboratory work in low-wage positions known as "post-docs," or postdoctoral fellowships. Post-docs used to last a year or two, but now it's not unusual to find scientists toiling away for six, seven, even 10 years.

Until recently, Amaral, the neuroscientist, was one of perhaps 100,000 scientists — the figures are fuzzy — in the United States working as a post-doc. After earning her expensive doctorate in neuroscience over seven years, which she financed by working and drawing down her savings, Amaral spent a year counting blips on a computer screen for another scientist.

"I couldn't answer the question of how this was any different from undergraduate work," said Amaral, 39.

Salaries for university post-doc jobs start at about $39,000, according to the National

Postdoctoral Association. They require a science PhD — which can leave the recipient buried in debt. Benefits are usually minimal and, until a decade ago, even health insurance was rare.

Stephan, the Georgia State economist, calls the post-doc system a "pyramid scheme" that enriches — in prestige, scientific publications and federal grant dollars — a few senior scientists at the expense of a large pool of young, cheap ones.

Disillusioned

"I don't think anybody minds sucking it up for a year or two, seeing it as an apprenticeship," said Zoe Fonseca-Kelly, a PhD geneticist who spent seven years as a post-doc at three universities. "What's very frustrating is that it's turned into a five-year process. People get very disillusioned with it."

Fonseca-Kelly got fed up with it, too. She left the lab for an administrative job at Harvard Medical School.

The post-doc system is "dysfunctional and not sustainable in the long term," Princeton University President Shirley Tilghman told top brass at NIH in June. Tilghman heads an NIH-appointed panel that is wrestling with overhauling how that agency trains new scientists. A new report from her group calls for better pay and more benefits for post-docs and major changes in how NIH funds young scientists.

Like many scientists, Amaral grew disillusioned with the system that left her with an expensive degree but few job options. She left her lab in December after federal funding for her post-doc position ran out. She now works as an administrator at the University of Alabama-Birmingham and is in a "holding pattern," unsure whether — or how — to advance a science career she spent more than a decade working toward.

"I've listened to this stuff on the news about how we need more scientists and engineers," she said. "I'm thinking, 'What are you talking about?' We're here. We need something to do besides manual labor for another academic person."

Haas, the former drug company chemist, has even harsher words. She plans to "get out of Jersey and get out of science" when her daughter graduates from high school in two years. "She's very good at everything, very smart," Haas said of her daughter. "She loves chemistry, loves math. I tell her, 'Don't go into science.' I've made that very clear to her."