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### CAREER DEVELOPMENT : ARTICLES

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#### Taken for Granted: By the Numbers

Beryl Lief Benderly  
United States  
4 July 2008

Heard the one about Izzie running into his old pal Moe? They schmooze a while, then Izzie complains, "Aren't you gonna ask me how's business?"

"So, how's business?" Moe obliges.

"Oy," moans Izzie, "don't ask."

The wisecrack may be prehistoric, but, according to a new report on the condition of early-career scientists, the attitude it reflects is up-to-date. The government agencies funding researchers, grad students, and postdocs have shown so little curiosity about the recipients of their dollars that they lack the basic facts needed to craft sound policies, found a committee chaired by Thomas Cech, president of the Howard Hughes Medical Institute (HHMI) in Chevy Chase, Maryland, and a leader of the scientific community who has focused for years on the situation of young scientists.

"Key questions cannot be answered because no agency has collected certain critical information, such as the size of the early-career pool." -- From the *ARISE* report

This dearth of reliable information turns what ought to be simple data points into points of bitter contention. With no agreed-upon body of statistics, industry representatives argue that technical talent is in short supply while labor economists insist that many fields are glutted, and the two sides support contradictory solutions.

#### CENTRAL TO SCIENCE

*ARISE: Advancing Research in Science and Engineering* (PDF), the Cech committee's newly released white paper, resembles other recent blue-ribbon studies of early-career scientists in both its progenitors' highly prestigious positions and its title's high cornball quotient. Published in June by the *American Academy of Arts and Sciences* in Cambridge, Massachusetts (not to be confused with the *National Academies* in Washington, D.C.), it emphasizes themes long favored by Cech, including the crucial importance to the progress of science of providing support both for young faculty at the start of their independent careers and for risky research with transformative potential. These themes figure prominently in the National Academies' 2005 *Bridges to Independence* report, which Cech also chaired, and the new \$300 million early

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[career grant program](#) that HHMI announced in March.

Sharply focused on these two issues, which it considers "central to the nation's research efforts that have not received sufficient attention," the report revisits landmarks familiar from earlier studies, such as the rising age of first-time grant winners and of grant winners generally and the sharp increase in soft-money faculty positions. Also as in previous reports, it devotes almost no attention to the great majority of young scientists who will never get the chance to compete for independent funding because they can't find faculty jobs.

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But, the committee argues, accurate information about young scientists is crucial to correcting the problems now bedeviling them. "Although NIH [the U.S. National Institutes of Health] and NSF [National Science Foundation] collect data on early-career investigators and other agencies recognize the need for such data, better demographic tracking is required," the report states. No federal funder, for example, follows the careers of individual scientists, despite funding thousands of grad students, postdocs, and investigators who receive initial competitive grants. The government therefore has no idea what becomes of the people whose education, training, and early independent research taxpayers bankroll--nor, therefore, how well its programs are functioning or how they could be improved.

Efforts are under way at NIH to use data derived from grant applications to understand patterns within the scientific workforce, [according to NIH Deputy Director Raynard Kington](#) (PDF). One issue under study, for example, is the differential success rates of grant applicants of various racial and ethnic groups. But, again, such efforts cover only the minority of scientists who land faculty posts.

"Key questions cannot be answered because no agency has collected certain critical information, such as the size of the early-career pool," the Cech report asserts. Not even the National Science Board's authoritative [Science and Engineering Indicators 2008](#), for example, can say the number of postdocs in the United States, only that there may--or may not--be as many 90,000. "How many doctoral researchers each year leave academic research, and how many remain?" the Cech report asks. "How many remain in academic research and go unfunded? Federal agencies record information only on researchers who apply for funding. Obviously, recipients of doctorates follow a diversity of career paths, including industrial and government positions, and so there is no expectation that most should stay in academic research. Yet without the data, agencies cannot analyze or understand how well they are supporting early-career researchers."

Funding agencies need to "track demographics on a government-wide basis," the report recommends. "The difficulties encountered by early-career researchers will be addressed effectively only if all agencies work in cooperation to gain a more complete understanding of their investigator populations by field and career path."

#### DIGGING INTO THE DATA

[A recent study](#) (PDF) by Norman Matloff of the University of California, Davis, demonstrates how drilling into government data can clarify the policy debate. "H-1Bs: Still Not the Best and the Brightest," published in May by the [Center for Immigration Studies](#), a nonpartisan Washington, D.C., think tank, analyzes information submitted by employers to the Department of Labor's Permanent Labor Certification Program (PERM) in support of H-1B applications.

Matloff wants to know whether the computer engineers entering the United States on the coveted temporary skilled-worker visa really rank, as industry representatives seeking to raise the visa limit claim, among "the world's best" information technology (IT) brains, whose presence is essential to America's ability to innovate in the future. Or, are they, as activists within the American IT community insist, merely run-of-the-mill cheap labor useful for lowering companies' costs?

Matloff bases his analysis on what he calls a "simple but powerful idea: If the foreign workers were indeed outstanding talents, they would be paid accordingly." Comparing the salaries paid to H-1B holders with the "prevailing wage" declared by the employers, Matloff produces a ratio he calls the Talent Measure. He then takes the mean of the wages actually paid by each company to its H-1B workers and finds numbers quite close to 1.0. "Most foreign tech workers, especially those from Asia," he therefore concludes, "are in fact only average talent."

He next asks whether the foreign workers are indeed essential to innovation. PERM defines four categories of job responsibility and creativity. Level I jobs involve entry-level work and Level II "moderately complex tasks that require limited judgment." "Clearly, neither ... is for innovators," Matloff writes. Level III requires more advanced skills, but only at Level IV do employees "plan and conduct work requiring judgment and independent evaluation," according to PERM. Seventy percent of hires are at Levels I or II and only 11% are at Level IV, "the level of real expertise whose description is associated with innovation," Matloff notes. At some of the major IT companies, Level IV workers account for only 2% or 3% of the H-1B hires. "There appears to be a striking disconnect between what [companies] say and do," he concludes.

Whether Matloff's central assumption, that pay in the IT industry closely reflects talent, stands up to empirical scrutiny is a matter for labor-market economists to investigate. It could be that outstanding graduates from low-wage countries will accept run-of-the-mill offers from companies here because any American salary looks like a fortune and any ticket to America seems an open sesame to riches. Or it could be that opportunities in those countries are growing quickly enough to persuade homegrown superstars to stay put unless they receive excellent pay to come here.

Either way, what Matloff has done is remove the question from the realm of patriotic fear mongering and public relations and put it where a major policy issue belongs: in the realm of objective research. For the most part, the current debate on science labor-force policy desperately lacks facts that can be studied and analyzed in place of the anecdotes that dot current discussions.

Certainly, counting and tracking scientists would be far easier tasks than recent federal projects such as mapping the human genome or landing a rover on Mars. It's long past time that government research agencies begin fulfilling the basic requirement of scientific discourse: getting the data.

Beryl Benderly writes from Washington, D.C.	Comments, suggestions? Please send your feedback <a href="#">to our editor</a> .
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