



"All the people who put the reports together have one or another of their personal needs fulfilled ... but it doesn't help the nation." - Vivek Wadhwa

## Feeling the Elephant

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A persistent anomaly, the mythology of science tells us, makes scientists curious and, on occasion, leads them to major discoveries. But one conspicuous anomaly has inspired notably little curiosity from the scientific community: the striking discrepancy between the glutted market for early-career scientists and the numerous prestigious reports calling for training and importing ever more scientists to head off a looming shortage. Numerous labor-market experts have found no such shortage, but the highly publicized perception of a dearth, often linked to inadequate K-12 education, persists.

"I've puzzled," says Michael Teitelbaum of the Alfred P. Sloan Foundation, author of numerous labor market studies, in an interview with *Science Careers*. A number of the shortage proponents "are people I know well and think very highly of." It's not "a point of view... put forward by hired guns...spouting whatever the client is telling them."

"I've been totally puzzled as well" by "all the misinformation out there," agrees former high-tech entrepreneur Vivek Wadhwa, now researching globalization at Duke and Harvard. His studies have revealed "myth after myth," he tells *Science Careers*. "Every data point I look at seems to be incorrect."

### Myth busters

Wadhwa found no general shortage, only "specific shortages in...specific areas of technology" such as the newly emerging field of biofuels, he says. Dozens of employers asked to compare American engineers to their much-vaunted colleagues from India and China agreed that "in education, training, quality of work, you name it, in every which way, Americans are better." Even the best schools in those countries "don't hold a candle to our best schools," he continues. Newly hired American university graduates "become productive within 30 days or so. If you hire a graduate of an Indian university, it takes between 3 and 6 months for them to become productive." The image of shortage arises from "emotion versus fact" and "misinformation that feeds on itself," Wadhwa says.

It's the old story of "the elephant, with the blind people feeling different parts," Teitelbaum says. The "energetic re-assertions of the Conventional Portrait of 'shortages,' shortfalls, failures of K-12 science and math teaching" are "expressions of interests by interest groups and their lobbyists," he testified at a [November Congressional hearing](#). Interest groups include employers seeking "an ample pool of qualified hires, without need to raise wages and benefits;...some universities and university associations [needing] graduate student enrollment and postdocs to conduct funded lab research;...some funding agencies [seeking] increased funding; [and]...some immigration lawyers and their associations [wanting]...high-volume visas, with legal fees paid by employers."

Another possible contributor to these widespread misperceptions: a failure to distinguish between the general situation and specific, narrow, local needs. A "perverse funding structure for graduate education" that supports students and postdocs on research grants, Teitelbaum testified, encourages universities to recruit according to their amount of funding rather than the career opportunities awaiting students and

trainees after graduation. A faculty member may have "research funding [for] 15 graduate research assistants and 10 postdocs...but there aren't enough people applying to be graduate students and postdocs from the US. From your perspective, that could be deemed to be shortage. The demand is inside the institution,... not in the labor market.... You're not thinking about whether there's demand for people who have gotten Ph.D.s or done postdocs."

Some faculty members, Teitelbaum continues in the interview, confirm his analysis and say they are "very worried" about the situation. But they find it "very hard to say this in their departments or to their colleagues" he says, "because it's very threatening to the structure by which research is done," raising the central question of "Who's going to actually do the bench research?"

## IT troubles

A similar clash of perceptions has roiled the information technology (IT) industry for years. Central to the controversy, argues computer scientist Norman Matloff of the University of California-Davis in [an article](#) in the *University of Michigan Journal of Law Reform*, is the issue of temporary H-1B visas for technical workers. "In 1997 the IT industry began to heavily lobby Congress to increase the yearly cap on the H-1B category... to cope with a severe high-tech labor shortage," Matloff writes. Opponents "contended that the industry's claim of a desperate labor shortage was invalid and was devised to hide the industry's real goal -- to use the H-1B program as a source of cheap labor." Matloff's article quotes Peter Cappelli of the Wharton School: "Researchers uniformly believe that there isn't a shortage while [industry] representatives vociferously believe that there is."

"An employer may find that it cannot hire the workers it needs because it cannot afford to pay the new, higher wages that scarcity has produced," writes Cappelli. "From the perspective of an individual employer, this situation looks like a shortage.... From the perspective of the economist and perhaps even of the industry, there is no shortage, just higher wages."

But in a true labor shortage, Wadhwa notes, "salaries should start shooting through the roof." Technically trained young Americans have not seen such salary spurts and many seek careers in finance, law, and other non-technical areas. "Students are smart," Wadhwa notes. Were salaries to rise, they'd say "Hey, this pays more than JP Morgan does! Let's use our engineering for engineering rather than becoming investment bankers."

Another symptom of a true shortage: "Take people with lesser skills and train them up," Wadhwa wrote. But employers still expect to find new hires with "exactly the right skills ...Microsoft uses software to weed out resumes, they get so many of them....They want the exact skills that they need at the lowest possible price."

Indeed, some employers resist teaching Americans new skills, Matloff writes, because "then the newly-enfranchised programmer may demand a higher salary, threatening to leave for another employer....Thus the employers claim a 'shortage,' when in fact it is once again simply a matter of a shortage of cheap workers."

## The visa vice

The H-1B visa, according to Wadhwa and the Matloff article, admirably suits the needs of employers wishing to pay bottom dollar. Many foreigners "will work for any salary" for the chance to come to America, Wadhwa observes. Because the H-1B belongs to the employer rather than the worker and the wait for permanent residence now extends as long as 10 years, the visa effectively prevents workers from changing jobs and thus, Wadhwa says, from demanding higher pay. Citizens and green card holders "can shift jobs. If you don't pay the market value, they'll go and work for the next company."

Many interests separate grant-funded research universities from private high-tech companies, but one thing that binds them together is the H-1B, which is used to admit limited numbers of tech workers -- but unlimited numbers of postdocs. "Research university lobbyists... have told me that they have made a deal with the lobbyists for the companies that wanted increased numbers of the H-1B visas," Teitelbaum says. "The companies wanted the universities to support their lobbying position.... The university lobbyists said, 'We don't really benefit from the H-1B visas very much.... What do we get out of this?'"

The result? "A great, typical Washington compromise. If the universities would support the tripling of the quota... that the companies wanted," Teitelbaum says, "then the companies would support exempting the universities from the limit." The arrangement "costs people indirectly, but from the point of view of the universities and companies, it doesn't cost anything," he says.

So, is the shortage argument simply a cover for cheap labor, as some in the IT community believe? Tietelbaum doesn't think so. The reports claiming shortage are the work of "respected people who are stating a point of view that they believe," he says. "I don't think they're simply telling a falsehood in order to get cheaper workers." But senior figures such as university presidents are "not out recruiting students. They're hearing from their faculty who were not getting enough people applying to graduate school." Many scientists, he adds, "feel trapped in this situation they can't change."

Says Wadhwa, "Everyone gets a lot out of [the present situation]....All the people who put the reports together have one or another of their personal needs fulfilled ... but it doesn't help the nation." And it doesn't help early career scientists seeking employment in a glutted labor market.

This is the second article of a two-part series. Part 1, "[Rising Above 'The Gathering Storm'](#)", appeared on 14 December 2007.

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