

## OpEd - Universities Need to Reprogram

By Ronald Brownstein

Here 's a number that just doesn't compute. While the computer and communications industries say that thousands of high-skill, high-wage jobs go begging for a lack of qualified applicants, the number of students pursuing graduate engineering and science degrees at U.S. universities is declining.

The figure peaked in 1993 at 436,000; now there are about 30,000 fewer techies working for Advanced degrees. "Our education systems are not producing the right numbers of qualified workers," complained Intel Corp. Chairman Andy Grove at a Joint Economic Committee hearing earlier this month.

That shortage is at the root of the perennial dispute — now flaring again — over whether to let the technology industry import more highly skilled immigrants from abroad. Over the opposition of organized labor, Congress is now considering legislation that would allow into the country 200,000 of those high-skilled foreign workers annually — up from 115,000 now. That may be necessary as a short-term safety valve, but almost everyone on all sides of the debate agrees that the only sustainable response is to produce more U.S. workers capable of filling the new jobs.

Adding to the paradox is that many of those receiving the most advanced scientific training at U.S. schools — those pursuing Ph.D.s — are having trouble finding work at all. One study recently

found that the percentage of science and engineering Ph.D.'s who do not hold a 'full-time position in their field skyrocketed from about 1 in 10 in 1973 to about four times that by the mid-1990s.

"There is something really bizarrely wrong with our system when math and physics Ph.D.s are talking about a Ph.D. glut and there's a shortage of high tech employees," says economist Paul M. Romer.

Romer has a good idea what the problem is: A university establishment that is failing to respond to the job market in two distinct respects. First, by failing to attract enough students into advanced science programs and, second, by steering to many of those who do enter the programs onto tracks that prepare them only to teach at universities already glutted with aspiring professors.

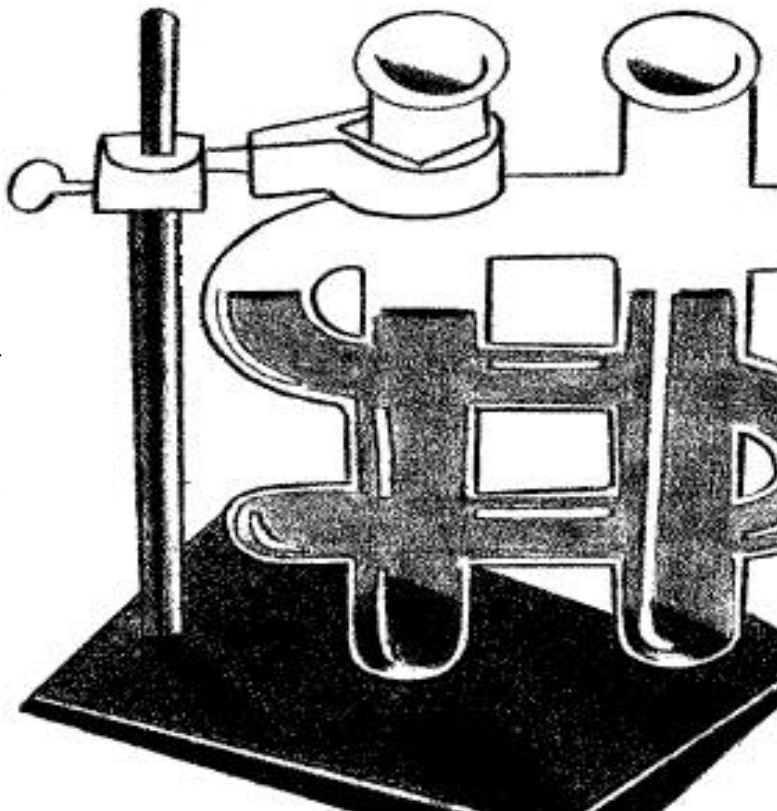
Romer's vantage point may be unique. For one thing, he's a professor at the Stanford University

Graduate School of Business. For another, he's an eclectic thinker with close ties to the techies. The son of former Democratic National Committee Chairman Roy Romer — the newly named superintendent of schools in Los Angeles — the younger Romer doesn't fit easily in party lines. He's working with the Clinton Justice Department on its effort to break up Microsoft, but he also holds a position at the conservative Hoover Institution at Stanford. The consistent theme in his work has been the importance of encouraging innovation, the economy's new lifeblood.

Hence his support for splitting Microsoft, which could make it easier for competitors to introduce new ideas into the software industry. And hence his support for a fundamental shift in the way the federal government tries to promote scientific progress.

As Romer argues in a new paper, Washington now focuses mostly on increasing the demand

for scientific research through programs that subsidize research and development both at universities and private companies. These efforts in many instances have produced undeniable benefits. But they tend to funnel money into already established areas of inquiry, and also to create a university culture where graduate science programs are dominated by the research needs of the star professors who attract the grants, not the employment demands of the



market. One result is that an increasing number of scientific graduate students pay for their education as research assistants — a track that points them toward a university life in research themselves.

Romer's alternative: Focus more on the supply side. Without abandoning its demand-side subsidies, he says, Washington should balance its efforts by prompting more young people to pursue scientific degrees. His proposal is twofold — give universities \$10,000-per-head bonuses for increasing the number of undergraduates who receive science and engineering degrees, then provide three-year fellowships worth \$20,000 annually to about 17,000 students a year who pursue graduate degrees in those fields.

That program would cost about \$2 billion a year. And, although Romer didn't propose this himself, it could be partially funded by significantly raising the fee the high-tech companies pay to import skilled workers from abroad.

What's intriguing about Romer's idea is how it attempts to use market forces to both change the academic culture and spread the benefits of the training. His reasonable theory is that science students — especially if freed from the research-assistant track with generous fellowships — will increasingly demand graduate programs that prepare them for jobs that the tech industries are actually trying to fill; universities, in turn, will compete for the buying power the new fellowships generate by creating the programs to train them.

Likewise, Romer argues, this approach would recognize the difficulty of government identifying specific areas of research to subsidize; better, he says, to create highly trained workers who may make breakthroughs no one can anticipate today. "It's very hard to predict what people will go out and do," he says. "But if you train a lot of very bright people in these areas, good things will come of it."

The most obvious parallel to this

effort is the GI Bill that helped send millions of returning veterans to college after World War II. But Romer thinks a more precise analogy may be the congressional vote during the Civil War to create the land grant colleges. These "agricultural and mechanical" colleges, still in operation today, aimed to produce not professors but the skilled, practical workers that a growing nation needed.

No one knew exactly how those seeds would grow, but they flourished as America built a national consumer market and industrialized over the next half-century. This moment of prosperity offers an equal opportunity to invest talented young people with the practical skills that could fuel decades of growth. "What we are talking about here," Romer says, "are things that could make a difference in how the economy looks in 2050."

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