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## **The New Hot Job: Nuclear Engineering**

### **After decades of declining interest in the field, universities are scrambling to keep up with the newfound demand**

By *Alison Go*

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"Nuclear Help Desperately Wanted" could be the sign in front of dozens of engineering colleges across the country. With worldwide interest in nuclear energy and technology skyrocketing, engineers with a nuclear background are feeling very popular these days. It's welcome news for a field that has been long stifled by negative public opinion. The challenge the discipline faces is how to meet this new demand after years of shrinking interest.



(Jim Lo Scalzo for USN&WR)

Due in part to the accident at Three Mile Island in Pennsylvania and the disaster at Chernobyl in Ukraine, the nuclear energy sector has been in decline for 30 years. Enrollment at undergraduate and graduate programs has dwindled, and some nuclear engineering programs have merged with other disciplines or shut down altogether. The ones that did survive shifted their focus to more lucrative fields within nuclear research, such as radiation detection or medical physics. According to the American Nuclear Society, 65 nuclear engineering programs existed in the country in 1980; now there is less than half that.

But in recent months, nuclear has re-emerged as a much ballyhooed energy source, and the entire community is scrambling to stave off what could be a massive shortage of qualified workers if the demand for nuclear power does take off. With an aging workforce, including many workers who are near retirement, the ANS estimates that 700 nuclear engineers need to graduate per year to support the potential demand. The organization currently expects only 249 new engineers to be available each year.

Students appear to be eager to fill the gap. Even without recruiting, some university departments are seeing as much growth as they can handle: There are more than three times as many nuclear engineering students now as there were just five years ago. "Today's students don't have the same fear of nuclear power that their parents did," says Mark Pierson, a professor at Virginia Tech.

Not only are the existing programs growing near capacity, but departments that shuttered

years ago are finding new life. Virginia Tech, which closed its nuclear engineering program in the early 1980s, launched a nuclear graduate certification program, headed by Pierson, last fall. New Mexico State University, the University of Virginia, and the Colorado School of Mines have made similar moves.

The Virginia Tech program owes much of its success to large energy companies that have pushed the school to offer certain courses. Companies such as Paris-based Areva NP and Virginia-based Babcock & Wilcox supply the graduate-level classrooms with about two thirds of the program's students. Exelon, the top nuclear power plant operator in the country, has given several Midwest universities, technical schools, and community colleges more than a half a million dollars for scholarships and recruitment. These companies are not just looking for nuclear engineers: They're also anticipating shortages of skilled tradesmen and mechanical, electrical, chemical, and civil engineers with the know-how to run and build nuclear facilities. Such experts actually make up the vast majority of the energy workforce.

For the most part, the nuclear community is happy with the outpouring of interest, but it also worries about shortages in lab space, resources, and competent junior faculty. The hiring problem is especially pronounced for less-established schools. The competition to recruit faculty has been called fierce, with salaries on the rise and faculty being raided by competing universities.

The shrinking nuclear market in decades past also decreased the number of research and test reactors run by universities. There are only 24 of these reactors online today, less than half the number in the 1980s, according to the Nuclear Regulatory Commission. Some were decommissioned because post-Sept. 11 security measures were too costly. Other schools just could not justify an expensive reactor after student enrollment declined. No one expects new research reactors to be built, but academics and industry folk alike worry that the lack of research reactors could mean that fewer of the new nuclear engineers and operators will have real-life reactor experience. "If you're studying science and engineering, it's nice to be able to study the theory, then walk into a lab and do the work," says Audeen Fentiman, an associate dean at Purdue's nuclear engineering department. "A reactor allows a student to do that."

Perhaps more than any other engineering discipline, nuclear is at the mercy of public opinion, and politics often plays a role in its development, or lack thereof. For example, in his first State of the Union address, Bill Clinton announced that nuclear power research was "no longer needed" and that its federal funding would be all but eliminated. "It just wasn't politically astute to be touting nuclear energy in 1993," said John Gutteridge, who is the manager of the education program at the Nuclear Regulatory Commission. By 1998, the Office of Nuclear Energy within the Department of Energy had no funding for research activities at all.

How quickly public opinion can change. In the presidential campaign, presumptive Republican nominee John McCain has said he wants to build 45 new nuclear power plants by 2030. (Democratic candidate Barack Obama has not announced a nuclear strategy.)

The increased political interest hasn't quite translated into big bucks, though. Since the '90s, Congress has shown a decent amount of support for nuclear programs at universities; in one year, it appropriated \$27 million for departments to build infrastructure and hire junior faculty. But that money has controversially been moved from one agency to another, in part because of conflict with the administration's antiproliferation goals and in part because the powers that be just can't decide what they want to do.

Stable federal support for nuclear is crucial for its development, and the nuclear community has been working to address the concerns of its most ardent detractors. Key issues are waste disposal, security, and the potential for accidents.

Even if the American nuclear renaissance isn't fully realized, universities have a role to play in the burgeoning global market for nuclear energy—a force even the U.S. political machine can't stop. The United States still has some of the best training in nuclear safety standards of any country in the world, and foreign students comprise almost 50 percent of the enrollment in some U.S. engineering departments. These international students are expected to return home with some of world's top training. As Bill Martin, the chair of University of Michigan's nuclear engineering department, says, "An accident anywhere means an accident everywhere." With or without clear political and public support, it's a scenario the entire community is working awfully hard to prevent.

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I have been telling my husband for over five years that his expertise as a nuclear power mechanic (with 40 years of experience) is being wasted as he will soon be retiring. All these pass few years should have been devoted to being an hands-on instructor for the company he works for. He would try to instruct as many young men/women as he could but that is differcult when you are needed to "get-the-job done.

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