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## Why not engineering

The question of why more kids don't choose engineering as a career, and why people abandon technical career paths, often centers on employment instability in scientific fields and better pay elsewhere. It is sometimes easier to understand such pressures by examining specific examples rather than dealing with abstract notions. With that in mind, consider Emanuel Derman, whose Ph.D. is in theoretical physics.

In the 1970s, he had trouble finding a permanent job in his field. He eventually went into applied science at the old Bell Labs. As the environment there for scientists began to change in the 1980s, he changed fields and went to work at Goldman Sachs, an investment-banking firm. At Goldman he became one of the first to do what eventually came to be called financial engineering, modeling ever-more complex financial instruments dreamed up by Wall Street.

Now Derman teaches financial engineering at Columbia University in a one-year Master's program filled with bright, math and science-oriented kids who might otherwise be matriculating in traditional engineering disciplines. "Most of the people in the Columbia program have engineering undergraduate degrees," says Derman.

The attraction of a financial-engineering degree? The pay, for one thing. "I'd guess our students start at \$90,000 to \$100,000 coming out of school, plus a bonus. Of course, that starts to change dramatically depending on how close you are to the business side of things," says Derman. For comparison, Georgia Tech, one of the nation's top schools in conventional engineering fields, says its recent graduates with B.S.s in engineering received a median salary of \$60,000; for those with M.S. degrees, the median is \$69,000.

Surprisingly, many financial-engineering students at Columbia are foreign. "A lot of them come from Asia, India, and France. Perhaps 20% of them are from the U.S.," says Derman. The reason for the low percentage of Americans, he thinks, is that, "Americans seem to want MBAs and prefer to be managers." He also says a high ratio of foreign students is not unusual for finance programs. "I think all the finance schools in America run on foreigners. It is a way for not-very-articulate people to make money and use their skills in a technical field," he says.

One other attraction is that financial engineering no longer requires a Ph.D.-level education. "When I got into the field, it was indeed mostly for people with Ph.D.s because you couldn't get off-the-shelf stuff to do the job. There was a lot of research and basic model building," says Derman.

But financial engineering isn't a good bet for technical types considering a career change. "It is much harder now to get hired if you don't have a financial-modeling background," says Derman. "There are degrees available in financial engineering, financial mathematics, and quantitative finance, so the hurdles are much higher. It is not impossible to find a job without them, but, by and large, people expect you to know something when you walk in."

You might wonder whether the financial meltdown two years ago gave budding financial engineers second thoughts about the ethics of their field. Not really, Derman says. "The models that quantitative types came up with were used to justify what people wanted to do, not to tell them what they should do."

— Leland Teschler, Editor



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