

Recruiting the Best and Brightest

Lucent Technologies' Bell Laboratories, IBM's T. J. Watson Research Center, and Microsoft Research (MSR) rank high on any list of premier research organizations. Together, these three institutions have supplied the building blocks for much of mod-

ern technology, a record that few institutions—academic, governmental, or industrial—can rival. What is less recognized is their ability to recruit the best and brightest research-minded Ph.D. graduates and post-doctoral students, a talent that has aided greatly in building and maintaining their reputations as among the *crème de la crème* of U.S. research institutions.

IBM Corp. has a \$6 billion yearly R&D budget and eight research laboratories, including one in Beijing, China. The T. J. Watson Research Center, opened in 1945, consists of two campuses, located in Yorktown Heights and Hawthorne, New York, with 1,400 employees. IBM's research history is replete with breakthroughs, including the first large-scale computer, Fortran, dynamic random access memory (DRAM), the scanning tunneling microscope, and high-temperature superconductivity.

Bell Labs was founded by AT&T in 1925. Now, as part of Lucent Technologies, it has more than 30,000 employees in 25 countries and an annual R&D budget of about \$4 billion. It is best known in physics circles for its physical science research division (Murray Hill, NJ), which has 600 employees, 70% of whom hold Ph.D.'s. Few institutions have paralleled Bell Labs' track record in groundbreaking research. Since it opened, its scientists have earned more than 30,000 patents and received six Nobel prizes, nine National Medals of Science, and five National Medals of Technology. The Nobel prizes were awarded for the discovery of the transistor, cosmic

background radiation, atom trapping with lasers, the fractional quantum Hall effect, and other breakthroughs. MSR (Redmond, WA) employs more than 500 scientists and engineers, two-thirds of whom have Ph.D.'s. It also has

out if they have a lot of other interests and are flexible and broad-minded."

A diverse career path is also a hallmark at IBM Watson. "Our research environment is a multidisciplinary one," says Tom Theis, director of physical sciences at IBM Watson.



Researchers at Bell Laboratories recently invented an optical fiber that converts a single color of light into all the colors of the rainbow. Potential applications include optical displays and data storage.

laboratories in San Francisco; Cambridge, England; and Beijing. MSR was founded in 1991 and does basic and applied research in computer science and mathematics. MSR scientists include winners of the most prestigious awards in computer science and mathematics, such as the Turing Award, the Fields Medal, and the Wolf Prize.

To keep their technological edge, these laboratories must continue to recruit top young scientists with the potential to revolutionize their fields of endeavor. What do they look for in a potential employee? Do their standards change over time? And what can they offer fledgling scientists to entice them to join their research staffs rather than seek a career in academia or federal laboratories?

According to Bell Labs' Don Murphy, chair of the physical sciences recruiting advisory committee, a stimulating atmosphere and the chance to work with extremely smart people are key drawing cards. "Bell Labs is a dynamic place where research ranges from purely fundamental to technologically focused," says Murphy. "Our emphasis is on communications technology, which is probably the most rapid-paced field there is. Anything related to wireless or optical is extremely hot. Although candidates are initially attracted to Bell Labs because of our scientific reputation, they soon find out about the technologies needed for the future, and often end up making contributions in quite different areas from where they started. In the interview process, therefore, we try to find

"I tell potential candidates that they may be changing the focus of their work and their collaborators every few years. We look for people who are curious in that way, who want to make contributions in various fields." Theis looks at a candidate's research abilities, depth in his or her field, and breadth of interests. "There are those who are incredibly deep in their own field but who have no interest in other areas, and this is a big turn-off to us," he remarks.

In addition, Theis and other IBM recruiters must keep corporate goals in mind. "We look for people in fields we feel are strategic to IBM's future. IBM wants to be the information technology company, so we won't hire people to do particle physics. However, we will hire people to do long-term basic research at the foundations of information technology, such as in quantum information science."

Physicist Dan Ling is vice president of MSR. He joined the organization in 1992, after several years as a successful senior manager at IBM Watson, where he co-invented the video DRAM. He describes the MSR environment as "in the same mold as IBM Watson or Bell Labs." Like them, "we focus on long-term fundamental research and give our people the freedom to be creative and follow their interests. We also encourage them all to be familiar with Microsoft's product line and strategic direction, so that they can orient their career goals accordingly."

When recruiting on campuses, Ling generally looks for the same things he did when

at IBM—“very bright students with good track records of research and publications. I also look for students who seem very enthusiastic at the prospect of seeing their work actually used and having an impact, as it’s important that our work affect Microsoft’s products.”

Looking for potential employees with a broad set of interests is something all three recruiters share. Says Ling, “I advise students to avoid overspecializing. Technology changes very quickly, and one has to be very nimble to be able to respond to the changes and the environment they create. Overspecializing won’t give you the flexibility to do this.”

Bell Lab’s Murphy says that despite working in a for-profit organization, he wouldn’t necessarily favor a candidate who had taken a business or economics course over one who hadn’t. “Certainly, an interest in business is valuable; however, it wouldn’t sway me. We try to probe the depth of their interests and find that today, a combination of technical excellence and entrepreneurship is a plus. We like to see signs of creativity and innovation coupled with a good, solid background.”

The three institutions mostly hire graduating Ph.D. students for both postdoctoral and permanent positions, and some post-docs. At MSR, Ling reports, they hire 30 to 40 students a year, mostly Ph.D. computer scientists and some mathematicians and physicists. “We also hire a few bachelor’s and master’s graduates, particularly for areas where we need to develop a particular system and have it up and running in a short time.”

This says that there have been changes in the student population recruited by IBM Watson over the years. “We used to hire mostly physicists, whereas now, it’s more of an even mix between physicists, chemists, materials scientists, and perhaps, in the near future, biochemists,” he adds. “In the late 1970s, most of our basic researchers wanted to publish their work in *Physical Review Letters*. Now, in addition to prominent physics journals, we publish more in *Science* and *Nature*, because they appeal to a much broader audience.” This sees a greater

emphasis on nanotechnology and materials research in the future, “given the capabilities for controlling the properties of materials on finer scales and multiple scales.”

Both Ling and Murphy say their recruiting criteria haven’t changed much over the past

20 years. “We’ve always looked for people at the leading edge of science and technology, who could carry out an innovative research program and still keep their eyes open for future opportunities, because at Bell Labs things constantly evolve,” Murphy says. 