New Leaders for MIT and BU
Herald Fresh Era in Boston

A scientist and an engineer are charting new courses for their institutions, drawing on their insider status and progressive social views about modern universities

Boston—This city and environs are flush with 5000 life scientists, $1.5 billion in National Institutes of Health funding, and dozens of pharmaceutical giants and small biotechnology firms. At the core of what attracts the people, funding, and business to this region is its wealth of universities. Two former bench scientists are now at the helms of two of the largest and most prestigious schools, and they are revving up their universities’ research engines to break down the walls between biology and other disciplines. They also are quietly advocating a social agenda designed to make their campuses more hospitable to women scientists and engineers—and more competitive in netting the best brains in a tough market.

Both Susan Hockfield—a Yale neuroscientist who last December became president of the Massachusetts Institute of Technology—and former MIT engineer Robert Brown, who last month crossed the Charles River to take the reins at Boston University (BU)—are technically savvy academic insiders with reputations for collegiality. Their backgrounds and personal styles stand in sharp contrast to those of Brown’s predecessor John Silber and the current president of the academic colossus down the road, Harvard’s Lawrence Summers. Both Silber and Summers are social scientists notorious for their bluntness, political connections, and autocratic styles.

As they settle into their jobs, both new presidents face formidable challenges. Brown’s task is to restore BU’s battered reputation, build its small endowment, and vault it into the top tier of U.S. research universities. Hockfield’s assignment is just as tough: Keep MIT in that top rank amid stiff competition for the best brains and become a national spokesperson for the science and technology community. Science recently spoke with both novice presidents about what they hope to accomplish.

Susan Hockfield: Finding her voice

Hockfield scored two firsts in succeeding Charles Vest, a mechanical engineer whose 14-year tenure featured a seat on the President’s Council of Advisors on Science and Technology (PCAST) along with a host of other national organizations. She is the first woman and the first biologist to run MIT, a momentous change at an institution long dominated by male engineers.

Her appointment reflects MIT’s deliberate effort to retool itself in two key areas: equal opportunity and biological research. An internal report released in 1999 found that women at MIT—even senior professors—faced career impediments. MIT responded quickly, bringing more women into senior administrative positions, providing better daycare and more flexible family options, and closely monitoring faculty appointments. At the same time, MIT moved to integrate some of its fiercely independent fiefdoms to take advantage of the biological revolution. This fall, a new building housing cross-disciplinary neuroscience studies will open its doors, and a new computational and systems biology initiative now pulls together some 80 biologists, computer scientists, and engineers from 10 separate academic units.

Although Hockfield is helping MIT move in new directions, she says she has had little direct experience either with professional discrimination or interdisciplinary work. She spent 20 years at Yale studying brain development in mammals, in particular deadly brain tumors called gliomas. Previously, she had worked under James Watson at Cold Spring Harbor Laboratory in New York.

Given MIT’s reputation as an engineering center, Hockfield acknowledges that the appointment of a life scientist as president raised eyebrows. But she sees it as an example of MIT’s eagerness to adapt to the rapidly changing research environment. Beginning in the 1930s, she notes, the institute chief brought in top-ranked physicists despite skepticism from engineers. That influx “provided an understanding of the nuts and bolts of the physical universe,” she says, making the institution “a vehicle for better engineering.” The blossoming of engineering science in the 1950s revolutionized the field. A half-century later, she says, molecular genetics is providing a “similar convergence of life sciences with engineering.”

Discrimination is not part of her professional experience, says 54-year-old Hockfield, although she has been subject to “the subtle or not-so-subtle slights that women suffer.” Still, she’s not afraid to speak out on the subject. In February, she co-authored an editorial in The Boston Globe that roundly criticized Summers’s widely-publicized remarks that genetic differences might explain why men outrank women in science (Science, 28 January, p. 492). “The question we must ask as a society is not ‘Can women excel in math, science, and engineering?’” Marie Curie exploded that myth a century ago.

MIT

Close watch. MIT’s Susan Hockfield (above) hopes the life sciences will inform other disciplines, including computer science, housed in this new Frank Gehry–designed building (right).
Robert Brown: Aiming for the top

When Bob Brown looks out the wall of glass behind his desk, his view of the spires, domes, and high rises of Harvard and MIT across the Charles River remind him what he faces in putting BU on the list of major research universities. The institution he now leads has spent the past 3 years lurching from crisis to controversy. “BU is a very fine university that just tends to get itself into the paper,” he says diplomatically. It is, he insists, “much better than its public image.”

During his 30 years as BU’s president ending in 2002, Silber turned a lackluster commuter school into the country’s fourth-largest private university. His extensive political connections helped attract the resources needed to build national reputations in high-energy physics, photonics, and medicine. But Silber also frequently angered faculty members by his involvement in what was taught in the classroom and by his public comments against feminists and homosexuals. He also faced criticism for leaving the school with a modest endowment of $620 million in 2003, 73rd in the nation. MIT, by contrast, had a $5.1 billion endowment, and Harvard’s $25.9 billion rules the academic roost.

Silber’s departure was as controversial as his tenure. He stepped aside to become chancellor in 1996, only to resume the presidency when his handpicked successor abruptly resigned in 2002. A long search for a successor produced former NASA chief Daniel Goldin, who immediately began discussing plans for radical changes in senior management. Alarmed trustees rescinded their offer 1 day before Goldin was to start work, paying him a $1.8 million settlement. Alluding to the recent difficult years, Brown says, “My sense is that many people believe we lost track of the university’s principles.” “A lot of faculty have put their head down, done great research and teaching, but are very quiet about where they work.”

Although Brown praises Silber for many accomplishments, he says he hopes to graft what he learned at MIT onto his new institution. At MIT, he says, “there was a feeling that being critical was not being disloyal.” He also intends to make his administration more transparent. “I am more open about data, about processes, trying to get people around the table to talk and work together to create a consensus,” he says. “But I’m not looking for a vote to drive the university forward, because that won’t lead to a great university either.”

One immediate test of leadership will be the construction of an advanced laboratory to study dangerous biological agents in the heart of the university’s medical center in the middle of the city. Although BU sees the planned facility as key to expanding its research portfolio, community activists fear it might release toxins or draw a terrorist attack. Brown insists that BU is doing “a superb job of being responsive to concerns” and disputes any damage to its reputation as a new institution. At MIT, he says, “there was no disloyal.” He also intends to make his administration more open about data, about processes, trying to get people around the table to talk and work together to create a consensus, he says. “But I’m not looking for a vote to drive the university forward, because that won’t lead to a great university either.”

Published by AAAS

www.sciencemag.org  SCIENCE  VOL 310  14 OCTOBER 2005
**Science Focus**

Given BU’s myriad difficulties, Brown’s decision to take the job stunned many faculty members. “Why would he choose to come here?” asked one incredulously. “He’s really good!” University sources say he was gunning for the top MIT job after Vest’s departure last year, rejecting overtures from the University of California, Berkeley, and Rice University in Houston, Texas. Brown declines comment.

The 53-year-old Brown arrived at MIT as a chemistry professor in 1979, and by 1998 he had become provost. While Vest met with policymakers in Washington, D.C., and wooed donors around the world, Brown stayed in Cambridge and quietly revolutionized the 140-year-old school. As engineering dean, he cannily asserted control over empty faculty slots. “If that hadn’t happened, there would not be a biological engineering division today,” he says. That control, Brown adds, allowed MIT to reshape itself to address the increasingly interdisciplinary nature of biology, engineering, and the physical sciences.

It’s an area in which Brown expects BU can shine, too. “When you have the top five departments in the world, the tendency to want to interact outside that department is less. BU hasn’t had the luxury of those very, very strong departments, so you see an enormous amount of interaction between faculty. The best example is the new engineering and life sciences building, which is not owned by a department. The floors are laid out in terms of research areas. At one of these great top-tier universities, [such synergy] would be very difficult.”

At MIT, Brown also oversaw construction of a flashy computer science and artificial intelligence center designed by Frank Gehry, and he brokered a difficult and time-consuming deal with Harvard to create the Broad Institute to combine genomics with medical research. He’s also been a leading advocate for revamping the way women scientists are treated in academia.

Does BU have a similar problem? “I have no data, but it is definitely on the radar screen,” he says. Brown is organizing a group that would do for BU what the 1999 report did for MIT. “There are some [issues] that are easy, such as daycare,” he says, but to standardize hiring procedures across units is more difficult. He says he soon will set up a committee charged by the president and provost to gather data and propose changes.

In the meantime, Brown must compete with other Boston-area universities and industry for top science and engineering faculty. He knows that, without a huge endowment, he’s starting at a disadvantage. “I can’t see how you easily ever make it up. You are going to need to build a philanthropic tradition that has not been in this institution.” He also knows that those domes and spires across the river can’t be ignored. “Will Harvard always cast a shadow?” he asks. “Yes.”

—ANDREW LAWLER

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**Science Education**

**New Curricula Aim to Make High School Labs Less Boring**

A cadre of education researchers is remaking science labs to give students a taste of the real thing.

This year, Barrington Ross made cell division a life-or-death matter for his seventh-grade class at Shepherd Middle School in Durham, North Carolina. Instead of peering into a microscope or acting out the process, the students worked through a series of computer simulations to select which of three plant extracts is most likely to be active against the unchecked proliferation of cells that is the hallmark of cancer. Then they defended their choice in an online debate. “Having an authentic problem to work on made them think and feel like real scientists,” says Ross, noting that some students added personal dimensions to the exercise by talking about family members suffering from cancer.

Ross doesn’t expect all his students to become scientists. But he does want them to understand the scientific method—and what it’s like to develop and test a hypothesis. Those goals are rarely achieved in secondary school science labs, says a new report by the National Academies. The study, requested by the National Science Foundation, found that most labs focus on mechanical procedures such as slide preparation and pH measurement instead of scientific principles. “For many students,” says Vincent Lunetta, an education researcher at Pennsylvania State University, University Park, “lab work is manipulating equipment, not ideas.”

A growing number of education researchers are trying to change that pattern. Some of the new materials take students beyond the traditional tasks of observation and data collection into the realms of theory-building and scientific reasoning. “The goal is to put students through a process that mirrors what scientists do,” says Marcia Linn, an education professor at the University of California (UC), Berkeley.

Embrace the unknown

The academy is not the first to conclude that most science labs are dull, dry affairs in which students are told ahead of time what they will learn. Many teachers aren’t sufficiently trained to conduct open-ended, inquiry-based labs, for one, and few have the time and resources needed to go beyond the cookbook approach. There’s also little incentive for schools to transform labs when state assessment tests—the real drivers of curriculum change—emphasize factual knowledge rather than scientific reasoning. “Following instructions out of a textbook is much easier” for teachers, says Joseph Krajcik, a professor of science education at the University of Michigan, Ann Arbor.

The new wave of education materials is meant to be more appealing to students without being more difficult...