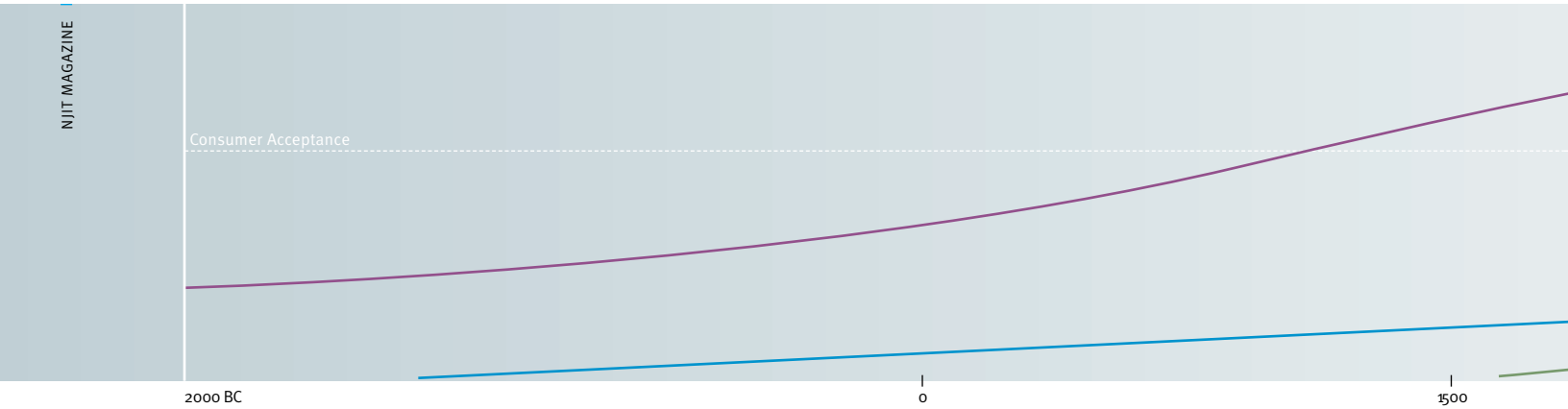

CATCHING THE FOURTH WAVE

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PHOTO: BILL WITTKOP

YOU MAY HAVE RIDDEN THEM YOURSELF — the swells that develop farther out than most others in the surf, the crests that give you a hot ride all the way in. We can also profit from knowing how to surf the successive waves of social history enumerated by Alvin Toffler in *The Third Wave*.

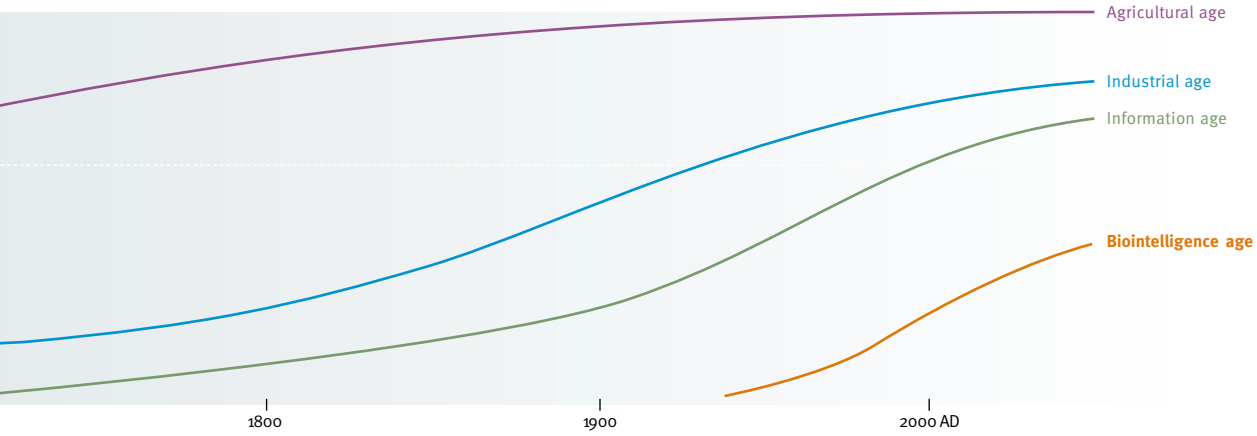
New Jersey, the Garden State, participated in the agricultural first wave from its inception. But New Jersey caught the second wave — the Industrial Revolution — somewhat later than other states. Under the guidance of people like Thomas Edison, though, New Jersey did ride the final crest of the second wave, which was extremely broad and deep.

The next wave was just as tall but much sharper. Led by AT&T, RCA and others, New Jersey caught the communication/information third wave as it formed and has ridden it well. NJIT played a major role in surfing that wave by training many engineers in relevant disciplines. But as recent experience at AT&T and Lucent shows, this wave may be approaching its crest.

Going beyond Toffler, the fourth wave — biological intelligence and medical technology — is on the horizon, as noted surgeon and researcher Richard Satava outlined in a 2002 conference presentation titled "The Biointelligence Age." If we continue to be good surfers, New Jersey and NJIT may be in the perfect position to catch this wave as it builds.

Forces now converging can thrust NJIT into a prominent position in the development of biomedical intelligence and technology, not only in the state but throughout our nation and the world. A crucial advantage is NJIT's location at the heart of the Northeast's "Interstate 95 corridor." This area has emerged as the health-care epicenter of the United States, a point emphasized by David Leonhardt in *The New York Times* on December 30, 2002. Stretching from Boston to Washington, D.C. (home of the National Institutes of Health), this corridor has the highest concentration of health-care jobs in the country. In fact, as Leonhardt wrote, the medical industry here has reached a critical mass that makes its regional importance likely to become even greater.

Another force converging on NJIT is the potential realignment of public higher education in New



Jersey and the proposal to integrate NJIT with neighboring University of Medicine and Dentistry of New Jersey. Closer ties will help unleash the power of collaboration between technology and biomedicine to a much greater extent than previously possible. Just as the building of teaching hospitals a century ago by large universities germinated the Northeast health-care corridor, the fusion of academic medicine in Newark with NJIT's technological prowess promises to give birth to a new biomedical powerhouse in the region.

Biomedical developments at NJIT will also benefit from New Jersey's focus as the center of the U.S. and international pharmaceutical industry. This concentration resulted from proximity to New York and Philadelphia, two cities which early on evolved substantial concentrations of teaching hospitals. The leadership of these cities in medical research continues today; respectively, they rank second and fourth nationally in terms of cities that receive the most research funds from the National Institutes of Health. As technology- and information-based aspects of biomedicine continue to evolve, proximity to these two metropolitan centers, as well as the development of a focus in Newark itself, will reinforce NJIT's growth in biomedicine.

The diverse biomedical research programs already begun at NJIT are likely to grow throughout the university. Certainly, the recent founding of the Department of Biomedical Engineering establishes a focal point within Newark College of Engineering. Other departments within NCE, such as electrical, mechanical and chemical engineering, have also begun to ride the fourth wave. Biomedical research programs are also growing outside of NCE — in physics, mathematics and computer science, for example.

Under the guidance of David Kristol and Stanley Reisman, biomedical engineering activities have been part of NJIT for almost 20 years. Under their inspiration, many NJIT alumni have earned master's degrees in the field. Bill Van Buskirk's arrival as provost led to the founding of the Department of Biomedical Engineering in 2001, which is what attracted me here from Johns Hopkins.

NJIT was fortunate in attracting four other outstanding investigators to form the core of the new BME department. Richard Foulds brought with him years of innovation as a leader in rehabilitation engineering. Michael Jaffe, widely known for his biopolymers work, is one of only 30 Fellows of the Polymer Society. Richard Greene, formerly director of research for the Veterans Administration, is jointly leading an effort in vision engineering with Gordon Thomas, acting chair of the physics department. Michael Lacker brought his expertise in mathematical modeling of physiologic systems when he switched his appointment from math to biomedical engineering. That Greene and Lacker hold M.D. degrees in addition to their Ph.D.'s illustrates that biomedical engineering is also an appropriate major for premedical education.

Also promising for NJIT are the two youngest members of the BME department: Tara Alvarez and Treena Arinzeh, who are assistant professors. Alvarez's background is in biological control systems and instrumentation, which she has applied to research into eye movement. Arinzeh brings considerable experience with biomaterials and their interaction with cells, in particular mesenchymal stem cells.

Led by faculty members such as these, NJIT is well positioned to catch the biomedical fourth wave. It should be an exciting ride. ■