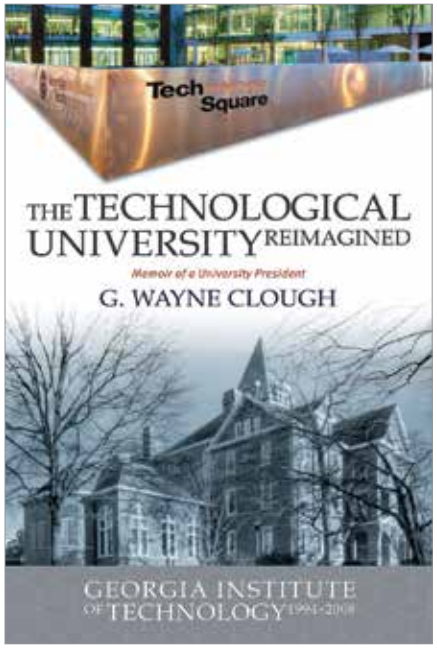
Reconceptualizing the Public Research University

WILLIAM DABARS



The Technological University Reimagined: Georgia Institute of Technology, 1994–2008
by G. Wayne Clough. Macon, GA: Mercer University Press, 2021, 246 pp.

Engineering education in the United States is "stuck in 1955," according to a recent assessment by Sheryl Sorby, Norman L. Fortenberry, and Gary Bertoline of the American Society for Engineering Education. But apart from issues unique to engineering—the widely cited chokehold of calculus on the curriculum, for example—what is amiss in the education of engineers in part reflects the present limitations of the American research university.

The shortcomings of contemporary research universities are well-known. The exclusion of countless academically qualified applicants from the nation's leading universities, for example, is a function of admissions protocols that reward privileged students. The prioritization of basic research over application and individual attainment over transdisciplinary and trans-sectoral collaboration diminishes the social impact of knowledge production. To remedy these and other outdated and exclusionary issues with engineering education, Sorby and her colleagues call for broad accessibility and making curricula relevant to personal as well as professional concerns. All of this, of course, could be said about most disciplinary and professional education offered by research universities.

But academic culture at all levels is notoriously averse to change, which often comes only incrementally and after all other options have been exhausted. For higher education to keep up with what sociologist Martin Trow called—a half century ago—"a society whose chief characteristic is rapid social and technological change" requires effective academic leadership as a critical counterweight in a system that is buffeted by external pressures and constrained by inherent design limitations. In *The Technological University Reimagined: Georgia Institute of Technology, 1994–2008*, G. Wayne Clough recounts in a compelling memoir his accomplishments as president of Georgia Tech, which steadied and turned around a lagging institution.

Transformative reconceptualizations of major research universities are few and far between. The turnarounds of the University of Southern California and New York University a few decades back are often cited as examples. More recently, my home institution of Arizona State University has executed a comprehensive reconceptualization, undertaken with the explicit intent of creating a new model for the research university. As described in a book I coauthored with ASU president Michael M. Crow, *The Fifth Wave: The*

Evolution of American Higher Education (Johns Hopkins University Press, 2020), ASU has increased accessibility to a broad demographic representative of the diversity of American society, enhanced academic performance and research output, and bolstered the societal impact of discovery and innovation.

In *The Technological University Reimagined,* Clough focuses on some of these same priorities. Although both universities ascended to the top tier of public research universities, the reconceptualizations of Georgia Tech and ASU are different in kind and scale. To consider only one difference, Georgia Tech's acceptance rate of 21% remains among the lowest in this category of institution, behind only the University of California, Los Angeles, and UC Berkeley. In contrast, the national average is 60% and ASU accepts *all* academically qualified Arizona students regardless of financial need. Consistent with Georgia Tech's status as a highly selective university, the average high school grade point average of degree-seeking, first-time, first-year Georgia Tech students in fall 2020 was 4.09, with a freshman retention rate of almost 97%.

During Clough's tenure at Georgia Tech, annual sponsored research expenditures more than doubled, up from $212 million in FY 1995 to $522 million in FY 2008. In FY 2019, Georgia Tech reported $960 million in research expenditures, ranking second only to the Massachusetts Institute of Technology among universities with no medical school. Confirming these accomplishments, Georgia Tech became a member institution of the prestigious Association of American Universities in 2010.

Clough painstakingly recounts his own education at and service to his alma mater. As a cooperative education student, Clough financed his bachelor's and master's degrees in civil engineering from Georgia Tech by working as a railroad surveyor. He completed his doctorate at the University of California, Berkeley, and subsequently served on the faculties at Duke, Stanford, and Virginia Tech, and as provost and vice president of academic affairs at the University of Washington.

Georgia Tech brought in Clough as president in 1994 to calm the waters after the disappointing performance of the preceding administration. He was the first alumnus of Georgia Tech to become president of the institution. Policy scholar Barry Bozeman, founder and former director of the School of Public Policy at Georgia Tech, attributes Clough's success in part to having been the "right person at the right time."

Shortly after his arrival, Clough found fifteen pages of handwritten notes from his predecessor that described some of the problems he would inherit. Among the challenges that greeted Clough was a claim that Georgia Tech owed the federal government $40 million for indirect costs and an agreement to help host the Summer Olympics in Atlanta in 1996. An administration colleague resolved the $40 million claim and as preparations for the Olympics unfolded, Georgia Tech addressed thorny issues such as what do with the functioning nuclear reactor on campus.

Clough envisioned a new strategic plan for the university that included tenets likely to be taken for granted by most major research universities. He shifted the school toward transdisciplinary collaboration across academia, business and industry, and government; accelerated the transfer of university-based research and development to the marketplace; and embraced the humanities and social sciences, including public policy. Georgia Tech moreover improved its research prowess by partnering with nearby private Emory University to pursue biomedical and nanotechnology initiatives. Indeed, Georgia Tech, Emory, and the University of Georgia could constitute a regional innovation cluster much like Silicon Valley, the Route 128 corridor in Boston, and the Research Triangle in North Carolina.

Georgia Tech received $1.5 billion in donations over the 14-year period of Clough's presidency, which financed the expansion of the physical facilities, funded research, enhanced graduation rates, and expanded the school's Promise Program, which assists students from lower income families. Service to the local community increased substantially when Georgia Tech borrowed $320 million to construct Technology Square, redeveloping a neighborhood in Atlanta into a corporate research center. Clough also increased the influence of Georgia Tech in the policy arena by serving on the National Science Board, chairing a 2004 report, *The Engineer of 2020: Visions of Engineering in the New Century*, which envisioned the discipline in an era of increasing technological complexity.

Among the attributes of the "multiversity" described in 1963 by then president of the University of California Clark Kerr were a "series of individual faculty entrepreneurs held together by a common grievance over parking." Apparently, little has changed. Clough recounts that when he took the helm the "asphalt surface parking lots that blanketed the campus" constituted the "prevailing landscape feature." Although administrators deemed convenient parking essential to faculty recruitment, he sought to reimagine the campus, guided by a new master plan commensurate to his ambitions for the university. Along with an intent to imbue the campus with a sense of place, he successfully navigated the intricacies of conception, financing, design, and construction.

As lessons from his leadership of Georgia Tech, Clough believes that spending time reimagining the purposes of organizations is time well-spent; lack of resources should not deter ambitious aspiration; calculated risk can be beneficial; seizing opportunities is essential; proper motivation should drive decisions;

not all decisions will work out or be effective; and that public universities must help the nation achieve its ideals. "It was a great honor for a boy born in rural South Georgia to have become the man who served as the first alumnus to be president of Georgia Tech," Clough concludes.

Clough's efforts to transform the university were by many accounts successful. "Since the 1990s, Georgia Tech advanced from a regional technical university to one of the nation's top engineering schools," writes historian Roger L. Geiger. According to Geiger and Creso Sá, writing shortly after Clough left Georgia Tech in 2008 to become secretary of the Smithsonian Institution, "Tying economic relevance to the aspiration to rise as a preeminent technological institution, Georgia Tech has markedly improved its research capabilities and academic reputation." As an account of academic leadership serving democratic ideals, the book serves both to inspire and guide those tasked with leading our nation's universities.

The "technological university" specified in the title of Clough's book is, of course, a member of a subset of the American research university that concentrates on the application of science and technology. For students fortunate enough to attend top-tier universities such as Georgia Tech, their technical education is necessarily part and parcel of a comprehensive liberal arts curriculum. As Michael Crow and I put it in *The Fifth Wave*, "Mere access to standardized forms of instruction decoupled from discovery and knowledge production will not deliver desired societal outcomes." And as we added elsewhere, "Nor is narrowly focused vocational or technical education sufficient to prepare graduates for the challenges and complexities of the decades ahead."

If technology is "any means to fulfill a human purpose," as economist W. Brian Arthur put it—whether "method or process or device: a particular speech recognition algorithm, or a filtration process in chemical engineering, or a diesel engine," then technology—and the organizations that advance innovation—must be conceived and executed in the public interest. This means, in part, that curricula must no longer sideline concerns with justice, equity, diversity, and inclusion, including the inclusion and empowerment of marginalized participants.

MIT computer scientist Danny Hillis observes that we may be "empowered by the tools of the Enlightenment" but in this postmodern era have entered the Age of Entanglement: "We can no longer see ourselves as separate from the natural world—or our technology—but as a part of them, integrated, codependent, and entangled." In the Age of Entanglement, he suggests, our inclination toward the analytical will have to be matched by synthetic approaches: "Instead of classifying organisms, we construct them. Instead of discovering new worlds, we create them."

Reconceptualizations such as those undertaken by Georgia Tech are essential to advance education, research, and public service at the scales needed to respond to the entangled opportunities and challenges facing society today. Optimal institutional design is integral to scholarly production, scientific discovery, technological innovation, and creative endeavor. The imperative to embrace complexity, uncertainty, adaptability, reflexivity, and resilience must be reengineered—or reimagined—into academic culture, especially at our research universities, and follows from the recognition that the outcomes of our endeavor must be aligned with societal goals.

William Dabars *is a research professor in the School for the Future of Innovation in Society, a Senior Global Futures Scholar in the Julie Ann Wrigley Global Futures Laboratory, and senior research fellow in the Office of the President, Arizona State University.*