# Case Study: Georgia Tech Reaches Out to 2040
## Planning from the Future Backwards and AI Guide GT's Journey

***Summary of the Case Study: Georgia Tech Reaches Out to 2040.*** Georgia Tech is an excellent example of an institution whose leadership aspires to profoundly understand the future and craft strong future vision to shape its strategies. It also aspires to exercise leadership in the evolution of global higher education in the 21st Century.

This case study describes the vision, processes, practices, and participants that Tech mobilized to convene a highly participatory futuring experience. The result was a Future Vision out to 2040 which drove Five Key Institutional Initiatives and an institutional commitment to establish a profoundly innovative culture, both grassroots and enterprise-wide, to support the achievement of those initiatives. This case demonstrates the power of the concept of planning from the future backward in practice.

This case also demonstrates Georgia Tech's leadership in a regional NSF-funded network focusing on AI/ML practices to transform online learning

**Why Read This?** One of the best examples of planning from the future backward, providing insightful foresight to 2040. An excellent process, using many external and internal stakeholders to define an ambitious global strategy. Also provides insight on the burgeoning, transformative importance of AI in the changing Knowledge, Work, and Learning Ecosystem.

# *The Case Study*
## *(References in Chapter V)*

## Background: Georgia Tech – a Global Research University

Georgia Institute of Technology is a public research university located in Midtown Atlanta. It is part of the University System of Georgia and has satellite campuses in Savannah, Georgia; Metz, France; Athlone, Ireland; Shenzhen, China; and Singapore. Tech is a research, development and commercialization powerhouse performing over $824 million in funded research annually and contributing significantly to the economic development of the Greater Atlanta Metropolitan Area and the South.
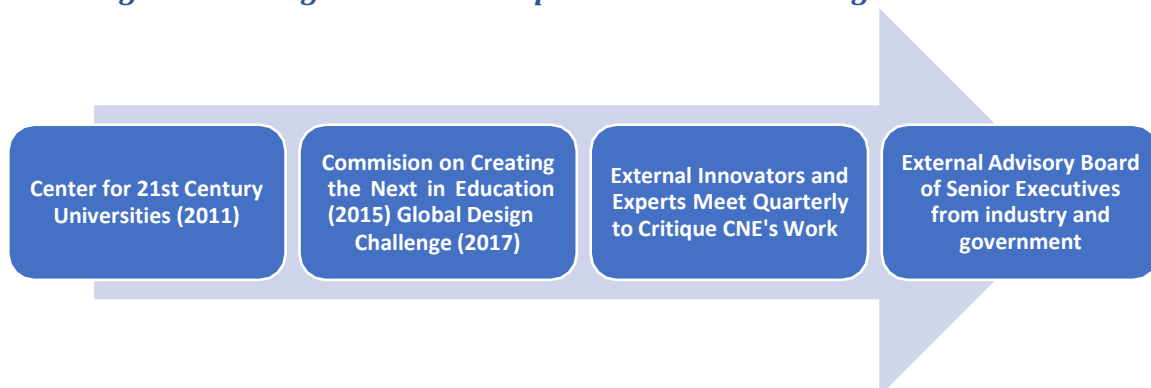
### *A Widely, Highly Regarded Innovator*

Georgia Tech was recently ranked as one of the top five innovative universities by Forbes magazine (2020). For some time, Georgia Tech has expressed its strategic intent to be the iconic technological university of the 21st century. Tech is the home of the **Center for 21st Century Universities (C21U),** which was established in 2012 https://c21u.gatech.edu/ as Tech's living laboratory for fundamental change in education. C21U functions as a research arm of the Office of the Provost. C21U and its researchers have collaborated to produce many influential publications, including:

- *Revolution in Higher Education: How a Small Band of Innovators Will Make*

- *College Accessible and Affordable* (DeMillo, 2015)

- "*The Future(s) of Public Higher Education,*"
  *http://c21u.gatech.edu/news/613149* and other ongoing work in many areas.

Georgia Tech's accomplishments relevant to this case are highlighted summarized in Figure 1.

### *Figure 1 – Georgia Tech's Accomplishments Contributing to This Case*



Center for 21st Century Universities (2011)

Commision on Creating the Next in Education (2015) Global Design Challenge (2017)

External Innovators and Experts Meet Quarterly to Critique CNE's Work

External Advisory Board of Senior Executives from industry and government

## How Georgia Tech Developed and Communicated its Future Vision.

In 2015, Georgia Tech's Provost Raphael Bras established the ***Commission on Creating the Next in Education (CNE)***, which was charged with reimagining the technological research university for the year 2040. CNE engaged a wide range of experts and stakeholders in a highly participatory experience that spanned several years. Fifty faculty, students, and staff members participated in the process, which included frequent Commission meetings, six formal convenings of the entire membership, informal weekly lunches, meetings of *ad hoc* subgroups, and many workshops, round tables, seminars, and colloquia. Distinguished speakers, sponsored by the Commission, gave public, campus-wide lectures.

### Global Design Challenge

In collaboration with the design firm IDEO and the U.S. Department of Education, the Commission sponsored a global design challenge to solicit ideas about the future of universities. A related outreach initiative—#GT2040—was launched in spring 2017 to solicit ideas from the Georgia Tech community about the future of higher education, some of the results of which are reflected in this video.
https://www.youtube.com/watch?time_continue=4&v=rkh8FoJbJYI

### Outreach to Other Experts and Stakeholders

In addition to core Commission membership, a larger group of educational innovators followed the work of the Commission and met quarterly to review the Commission's work and provide feedback. Several student initiatives were launched in parallel to the Commission. An external advisory board of senior executives from industry and government helped guide the Commission's work.

### Transparency and Accountability

Transparency was an important factor, so in addition to public venues for soliciting ideas, there were many briefings to committees, faculty, leadership teams, advisory groups, and student organizations. A complete list of Commission members and activities appears on pages 64-66 of the Commission's report.
https://provost.gatech.edu/sites/default/files/documents/deliberate_innovation_lifetime_education.pdf

### Core Principles and Reports on the Future

The deliberations of the Commission were shaped by three principles: accessibility, affordability, and excellence. The CNE created reports on four key factors influencing

the future of the enterprise: 1) Demographics, 2) Pedagogy, 3) Learner Needs, and 4) Socioeconomic Forces.

## Displaying Characteristics of the Engaged, Innovative Learning Enterprise

These reports establish Georgia Tech's strategic intent to transform to engage with learners throughout their lives and create a deliberately innovative culture, from grassroots to enterprise-level innovation. They also require a redefinition of its fundamental approach to educational engagement:

- eliminate artificial barriers between K-12 and college,

- invent flexible pathways and credentials that emphasize continual learning,

- reinvent the physical university for a worldwide population of learners, and

- invent new advising and coaching networks that serve the lifetime needs of Georgia Tech learners.

Figure 2 on the following page (Key elements of Georgia Tech's Approach to Transformation) summarizes the recommendations made in the final report in three focus areas:

- Five Insights from Georgia Tech 2040,

- The Five Strategic Initiatives which Georgia Tech will Pursue Out to 2040, and

- Creating a Purposefully Innovative Culture.

Both the process and the outcomes from the Georgia Tech experience reflect with the principles recommended in this book are described in Figure 3 "Summary of the Georgia Tech Case Study" at the endof the case.

## *Figure 2 - Key Elements of the Georgia Tech Approach to Transformation*

| Georgia Tech Vision 2040 | To Achieve Vision, Georgia Tech is Pursuing Five Initiatives | Create an Innovative Culture to Support Initiative Achievement |
|---|---|---|
| **Prepare for New Kinds of Learners** | **Initiative #1: Whole-Person Education.** Applies to both undergraduate and graduate students. | **Merge Grassroots and Enterprise Innovation.** Nurture both kinds on innovation. |
| **Create New Ways to Acquire Knowledge** | **Initiative #2: New Products/Services**. Flexible learning experiences and continuous learning opportunities. | **Elevate Innovation Practices to the Enterprise Level.** Actively scale-up successful innovations to enterprise level. |
| **Establish Lifelong Ties with Alumni** | **Initiative #3: Advising for a New Era.** Robust learner data backbone & AI assistants to integrate prescriptive, intrusive, developmental advising. | **Enhance the Innovation Ecosystem.** Fuse the values and mindsets of the research and education communities. |
| **Address Knowledg e Churn** | **Initiative #4: Artificial Intelligence & Personalization.** Multifunctional, virtual tutoring based on AI. | **Bridge Organizational Silos.** Eliminate fragmentation, cut across silos. |
| **Provide a Lifetime Educational Platform** | **Initiative #5: A Distributed, Worldwide Presence.** Establish physical and virtual presences, globally. | **Motivate Individuals to Innovate**. Create pervasive innovation. |

## Artificial Intelligence: A Long-Term Expeditionary Strategy

For several decades, the Georgia Institute of Technology has been on an ongoing expedition to advance artificial intelligence through interdisciplinary research and education designed to produce leading-edge technologies. Over the next five years, Georgia Tech will continue this expedition to make even greater investments in AI that will include the hiring of 100 additional researchers in the field, further solidifying its standing as a leader in the teaching and discovery of machine learning.

In July 2021, Georgia Tech received two National Science Foundation (NSF) Artificial Intelligence Research Institutes awards, totaling $40 million. A third award for $20 million was granted to the Georgia Research Alliance (GRA), with Georgia Tech serving as the leading academic partner for the grant. (Visit GRA.org for more information.)

The three newly established Institutes will address home care for aging adults; optimization of energy, logistics, and supply chains; and the widening gap in job opportunities and changing needs in workforce development.

These institutes are part of major National Science Foundation initiative on artificial intelligence.  In all, 18 institutes have been established across the US over the last two years.



### *The NSF AI Institutes at Georgia Tech*

NSF AI Institute for Collaborative Assistance and Responsive Interaction for Networked Groups (AI-CARING) will seek to create a vibrant discipline focused on personalized, collaborative AI systems that improve the quality of care for the aging. The systems will learn individual models of human behavior and how they change over time and use that knowledge to better collaborate and communicate in caregiving environments. The AI systems will help the growing population of older adults remain independent, improve their quality of life, and increase the effectiveness of care coordination across the care network.

The AI-CARING Institute builds on Tech's existing strengths in AI and in technology for aging. It will create not only novel solutions, but a new generation of researchers focused on the

interaction between AI and technology for aging. The aim of the Institute is to build cutting-edge technologies that improve the lives of everyone.

NSF AI Institute for Advances in Optimization (AI4Opt) will revolutionize decision-making on a large scale – fusing AI and mathematical optimization into intelligent systems that will achieve breakthroughs that neither field can achieve independently. Additionally, it will create pathways from high school to undergraduate and graduate education and workforce development training for AI in engineering that will empower a generation of underrepresented students and teachers to join the AI revolution. Housed in the H. Milton Stewart School of Industrial and Systems Engineering at Georgia Tech, AI4Opt will tackle use cases in energy, resilience and sustainability, supply chains, and circuit design and control.

With its focus on AI and optimization, AI4Opt will create new pathways for the development of novel tools that allow better engineering applications to benefit society. This will enable engineers to build higher quality materials, more efficient renewable resources, new computing systems, and more, while reinforcing the field as a career path for diverse students. The new institute complements the College's strategy fpr the integration of AI in engineering disciplines.

NSF AI Institute for Adult Learning and Online Education (ALOE) will lead the country and the world in the development of novel AI theories and techniques for enhancing the quality of adult online education, making this mode of learning comparable to that of in-person education in STEM disciplines. Together with partners in the Georgia technical college system and educational technology sector, ALOE will advance online learning using virtual assistants to make education more available, affordable, achievable, and ultimately more equitable. This Institute is led by the Georgia Research Alliance, with support from Georgia Tech and the University System of Georgia (USG).

Online education for adults is critical to the development of tomorrow's workforce. Serious questions remain about the quality of online learning and how best to teach adults online. Artificial intelligence provides a powerful tool for dramatically improving the accessibility and effectiveness of online learning and adult education.

***The Future of AI at Georgia Tech***

Georgia Tech is poised to strategically reimagine the future of AI and significantly advance its utilization in important application areas. Currently, 66% of Georgia Tech undergraduate computer science students have an academic concentration in Intelligence, focusing on the top-to-bottom computational models of intelligence. Its College of Computing recently launched a Ph.D. program in machine learning that pulls faculty from all colleges across the Institute, and many new courses are being developed that teach AI as a tool for science and engineering.

Georgia Tech is exploring the potential creation of a school or college of AI within the next five years, further building on its expansive AI and machine learning footprint. The NSF AI Institute awards will enable all AI-related academic programs to scale and further differentiate Georgia Tech as a leader in AI education.

Additionally, the awards will expand and complement ongoing AI research efforts at the Georgia Tech Research Institute (GTRI). In the last fiscal year, GTRI received millions of dollars in research awards from the Department of Defense and other sponsors for AI-affiliated research, and currently, many GTRI researchers are focused on AI-affiliated projects. (GTRI is one of the nation's leading institutes of applied research for national security.)

Georgia Tech has for decades now been pursuing new AI technologies, and now leads the way in AI that is responsive to the needs of the humans who use it. Tech has also worked hard to expand access to AI, especially for underrepresented groups. These Institutes will build on that history, expanding both its ability to create new technologies and to train the next generation of innovators.

## *Figure 3 - Summary of Georgia Tech Case Study*

| *Key Factors* | *Actions Taken* |
|---|---|
| ***Sense of Urgency*** | The Provost convened the Commission on ***Creating the Next in Education*** with sense of the urgency for radical change and a commitment to embed CNE's findings in the ongoing strategic initiatives of GT. |
| ***Foresight and Vision*** | GT's process for reaching out to the 2040 vision horizon and then "Planning from the Future Backwards" sets a standard for excellence, ambition and inclusiveness, and leverages GT's abiding values and distinctive attributes. |
| ***Guiding Coalition*** | The CNE incorporated Guiding Coalition principles in its diverse membership and wide engagement, development of talent and commitment, and continuing as a vibrant program office after its initial report. |
| ***Strategies and Action Plans*** | GT's five strategic initiatives are flexible and expeditionary: 1) whole-person education, 2) new products and services providing flexible, continuing learning experiences, 3) advising for a new era, 4) artificial intelligence and personalization, and 5) a distributed global presence, physically and virtually. They are the essence of expeditionary pursuit of "radical incrementalism." |
| ***Quick Wins, Continuing Wins*** | These five initiatives were built on existing areas of strength that could be used to achieve quick wins and serve as basis for continuing success through adaptation. |
| ***Action Roadmap: Leading and Navigating Change*** | The final report of the CNE produced an action roadmap for leading and navigating GT's progress toward transformative and regenerative change and for orchestrating the expeditionary strategic initiatives, building organizational capacity, and achieving the cultural change necessary for transformation and regeneration. |
| ***Organizational Capacity to be Built*** | The final report identified many of the organizational capacities that needed to be developed along the pathway: 1) leadership; 2) people, perspectives, and skills, 3) technology infrastructure, data, analytics; 4) policies, processes, and practices; and 5) culture and behaviors. |
| ***4 R's of Transformation – Realign, Redesign, Redefine, Reengineer*** | Realign – all programs, services, experiences to 2040's world of work/learning/being<br>Redesign – all curricula, open up the curriculum and portfolio of experiences<br>Redefine – roles, responsibilities, talents, and expectations of learners, staff, faculty<br>Reengineer – all processes and practices using embedded AI and other tools |
| ***Culture Change*** | Five specific cultural changes were specified to be pursued continuously: 1) merge grassroots and enterprise innovation; 2) actively scale up successful innovations to the enterprise level, 3) enhance the innovation ecosystem, 4) bridge organizational silos; and 5) motivate individuals to innovate. |
| ***Learning from Georgia Tech*** | This is a master class in foresight and storytelling. And it happened before the wake-up call provided by COVID. Few institutions have the leadership, competence, foresight, and resources to stage a Leading and Navigating Change exercise to rival GT's, or to follow through on initiatives at this scale. But most institutional leaders can use the readily available materials from GT to learn what the future may hold and the sorts of reimagined solutions and experiences that will be available from the best. |