The challenge and opportunity for the College of Sciences in the decade ahead is to capture the power of our community so that we can make fundamental discoveries, address humanity’s most pressing challenges in the 21st century, and develop global leaders in science and technology. To support our work, we are committed to workplace, education, and research excellence — and to a community marked by diversity, equity, and inclusion. We are inspired to realize the Georgia Tech motto of “Progress and Service.”
The main goals of our plan — excellence in the workplace, in education and training, and in our research endeavors — are designed to bring distinction to the College and to Georgia Tech. Cutting across all goals are three themes that will infuse our efforts in the decade ahead.

» Theme 1: Catalyze Discovery and Solutions

We plan to push the frontier of fundamental knowledge in science and mathematics, to advance solution-based science, and to support the arc that connects these avenues of discovery. While continuing to catalyze fundamental science across the College, we will amplify our impact by focusing more intently on convergent science that seeks to improve the health of the planet and people in the state of Georgia, across our nation, and our world. Furthermore, we will imbue our learning environment for undergraduate and graduate students with a culture that emphasizes and values discovery, solutions, and their connection.

» Theme 2: Amplify Impact

We aim to amplify our research impact by supporting and rewarding efforts to lead team science and entrepreneurship — and by developing faculty as scientific leaders at Georgia Tech and beyond. We plan to increase the representation of the College’s majors to 20% of the Georgia Tech undergraduate population, thereby establishing a critical mass and raising the internal and external impact of science and mathematics at Georgia Tech. We aim to develop and model a successful workplace with policies, procedures, and practices that can be shared across the Institute. Finally, we plan to amplify our impact through strategic philanthropic and communication efforts.

» Theme 3: Build Communities of Excellence

To build the community that can most effectively advance the vision and mission of the College, it is imperative that we create an inclusive and equitable environment for all students, staff, and faculty members and that we recruit, welcome, and retain a diverse population for all sectors of our community. Community is built not simply from a collection of individuals, but rather from the relationships they forge. To that end, we will work to create a community infused with excellence, respect, professionalism, and trust — where all members have opportunities for professional development and support.
In November 2019, College of Sciences Dean and Betsy Middleton and John Clark Sutherland Chair Susan Lozier established a Strategic Planning Committee and charged the members with the development of the College of Sciences Strategic Plan for 2021-2030. The Committee was comprised of academic faculty from all six schools in the College.

**BACKGROUND**

Graduate research assistant Kelly Michie inspects a dish with a bacteria culture. Through a large-scale study of microbial interactions, Michie and fellow researchers in Marvin Whiteley’s lab found that common mouth bacteria responsible for acute periodontitis fares better when paired with bacteria and other microbes that live outside the mouth.

- Shana Kerr, Senior Academic Professional, School of Biological Sciences
- Julia Kubanek, Associate Dean in the College (ex-officio)
- Scott Moffat, Associate Professor, School of Psychology
- Nga Lee Ng, Associate Professor, School of Earth and Atmospheric Sciences and School of Chemical & Biomolecular Engineering
- Carlos Silva, Professor, School of Chemistry & Biochemistry and School of Physics
- Simon Sponberg, Associate Professor, School of Physics and School of Biological Sciences
- Marvin Whiteley, Professor, School of Biological Sciences (Committee chair)
- Ed Greco, Senior Academic Professional, School of Physics
- Sung Ha Kang, Professor, School of Mathematics
Dean Lozier’s charge to the Committee was to gather broad community input for a strategic plan that:

- Outlines the mission and vision of the College for the next decade.
- Provides immediate and long-term actionable goals focused on excellence in education, research, faculty and staff development, outreach, communication, and service.
- Establishes an implementation plan with specific metrics of success.
- Is inclusive of all individuals associated with the College.

**Guiding Principles**

At the start of the Committee’s work, the members decided that in the conduct of their work they would envision the future of the College through its members and constituents. Furthermore, cognizant of our responsibilities to the state and people of Georgia, the members’ work was motivated by a desire to:

- Develop global leaders through a transformative, accessible, and affordable educational and research experience.
- Leverage the world class technological resources at Georgia Tech to respond to the educational and research challenges of the 21st century.
- Position the College to solve relevant societal problems in research and education that improve the quality of life throughout the world.
- Communicate the societal benefits of science, mathematics, and technology to the public.

Finally, the Committee identified the following key core values for the work of the College in the decade ahead: accountability, collaboration, cooperation, discovery, diversity, excellence, innovation, integrity, respect, service, and solutions. These values are expressed in the goals and strategies contained in the following pages, along with our corresponding Strategic Implementation Plan.

**Strategic Planning Process**

In the scope of their work, the Committee gathered data from across the College. These data included information about the schools and College from the Dean’s Office and websites, current and previous strategic plans from the College’s six schools, the 2020 Georgia Tech Strategic Plan draft, and strategic plans from peer institutions. Additionally, the Committee held town halls centered around a “SWOT” (Strengths, Weaknesses, Opportunities, and Threats) framework. Five town halls were held, one each for undergraduate students, graduate students, staff, postdoctoral/research scientists, and faculty. The SWOT analysis was also available online for the entire College of Sciences community. Finally, the Committee had conversations about the future of the College with internal governance groups, along with Research Institute leadership and members.
At its heart, this plan is about people. Because our core strengths are students, faculty, staff, and alumni, an elevation and expansion of our work will only result from adequate support and recognition of the people in the College of Sciences. Thus, our challenge and opportunity for the decade ahead is to capture the power of our community so that we can make fundamental scientific discoveries, address humanity’s most pressing challenges in the 21st century, and produce leaders invested in this shared work.

OUR VISION

We envision the College of Sciences at Georgia Tech as a diverse community dedicated to excellence in education and research — and to the intellectual and economic development of Atlanta, the state of Georgia, and the world. College community members are leaders in advancing scientific discovery and solutions, educating future generations, and using science and mathematics to make our communities and world a better place. Everyone associated with the College has a sense of belonging and community — as well as individual and collective purpose.

David Collard, College of Sciences senior associate dean and School of Chemistry and Biochemistry professor (left), with research scientist and OXIDE program manager Shannon Watt.
To achieve our vision, we will develop global leaders in science, technology, and education; inspire them to answer the world’s most pressing questions; and translate that knowledge to foster a healthy people and planet. To support this work, we are committed to workplace, education, and research excellence and to a community marked by diversity, equity, and inclusion. We are inspired to realize the Georgia Tech motto of "Progress and Service."

Our Goals

Our goals in the decade ahead are centered on the core aspects of our work — namely education, training, and research. Thus, the main goals articulated in this plan focus on 

- **excellence in the workplace**, in education and training, and in our research endeavors. We are keenly aware that our work in these areas is possible only if we have a workplace where students, staff, and faculty can productively contribute to our mission.

To achieve success in each of these endeavors such that we bring distinction to the College and to Georgia Tech, we plan to focus more intently on discovery and solutions in our work — and the connections between them — to amplify our work and strengthen our communities.

As such, three themes — 

- **catalyze discovery**, 
- **amplify impact**, and 
- **build communities of excellence** — cut across each of our three goals. These themes are further expressed in the executive summary of this plan, with the following strategies assigned to meet each goal.

In collaboration with units across the Institute, we will additionally work to achieve 

- **several partnership goals** which are outlined at the end of this plan, following our primary three goals.

---

**Goal 1: Workplace Excellence**

- Foster a Greater Sense of Community Within the College
- Support Staff Through Salary Equity, Career Development, and Training
- Enhance Faculty Diversity, Mentorship, and Support

**Goal 2: Education and Training Excellence**

- Provide Access to Rigorous and Innovative Academic Programs
- Promote the Interface Between the Research and Educational Missions
- Equip Students to Embark on Productive and Satisfying Careers, and to Innovate in the Service of Society

**Goal 3: Research Excellence**

- Foster Interdisciplinary Research Synergies with Targeted Hiring and Enhancements to the Research Environment
- Support Faculty-led Research and the Career Development of Researchers
- Develop Scientific Leaders at Georgia Tech and Beyond

---

Matt Baker, College of Sciences associate dean for Faculty Development and School of Mathematics professor (left), performs a magic trick at a community outreach event hosted by the College to share and celebrate the International Year of the Periodic Table.
GOAL 1: WORKPLACE EXCELLENCE

The collective efforts of students, staff, faculty, and alumni are needed to fulfill the College’s research, educational and outreach missions and to meet the goals outlined in this plan. As such, it is imperative that we foster a workplace environment marked by a community ethos. Moving ahead we plan to build on the support provided to faculty and students in our community, and focus more intently on the support we provide staff throughout the College and connections we make with alumni. Finally, understanding the importance of inclusive excellence, we will redouble our efforts to build and support a diverse community. Our strategies to create excellence in the workplace are:

Foster a Greater Sense of Community Within the College

We have a shared responsibility to make the College a nurturing and inclusive community that not only supports and develops our current members, but attracts future talent by virtue of its strength, positivity, and diversity. To do this, we must foster enhanced communication, encourage open and honest sharing of ideas, focus on team building, and keep considerations of diversity, equity, and inclusion at the forefront of our minds throughout these processes. Specific tasks in this strategy include:

- Establish student, staff, research faculty, and academic faculty advisory councils that are representative of all schools and units within the College. These councils will make recommendations to the schools and the College about governance, policies, and practices; and will provide feedback to the deans, directors, and chairs on planned programs and policies.
- Continue to strengthen communication and partnership with the College of Sciences Advisory Board, and examine means by which the Board can aid the goals articulated in this plan.
- Hold recurring all-school and all-College meetings of staff, faculty, and students to share information, solicit feedback, and increase participation by all community members. Maintain regular town hall meetings for staff and faculty to meet with the Dean each month, develop a corresponding annual online workplace engagement survey, and establish periodic town halls for alumni.
- Respond to forthcoming recommendations of the College Task Force on Racial Equity initiated by Dean Lozier in summer 2020. Adopt shared responsibility for creating an equitable, inclusive, and diverse community.
- Maintain, expand, and develop school-specific activities focused on transparency, teamwork, well-being, and inclusivity among students, faculty, and staff. Develop welcome packages for graduate students, and further develop our College and school websites as resources of information and news.
Support Staff Through Salary Equity, Career Development, and Training

Our College’s staff are the unheralded lifeblood of the College, supporting every aspect of our mission and enabling our students, faculty, and fellow staff to achieve maximal success in their educational, research, and service activities. However, our staff face numerous challenges, including limited professional development opportunities, spikes in workload due to substantial policy or procedural changes and/or unexpected departures and absences, and longstanding inequities in compensation and promotion. In order to combat these challenges, we will:

» Work toward salary equity, advocate for increased funding to achieve this goal, and be transparent about efforts to do so.
» Increase opportunities for staff professional development, including support of participation in relevant workshops and conferences.
» Provide flexible support to the schools and their faculty by establishing a cohort of cross-trained staff who can support each other across schools.

Enhance Faculty Diversity, Mentorship, and Support

A critical community need is the diversification of our faculty. Simply put, excellence in our teaching and research missions requires a diverse community of scholars and teachers. Faculty with diverse backgrounds and experiences enrich our community with their ideas and perspectives and serve as role models for our entire community. Another critical need is the support of all faculty. Across the board, tenured and tenure-track faculty are expected to publish, win competitive grants, run complex research labs, be excellent teachers, and achieve scientific success. Similarly, non-tenure-track academic faculty face a myriad of responsibilities in their service and teaching obligations, as do research faculty in the conduct and support of research. Frequently lacking, amidst this press of responsibilities, is the time for early- and mid-career faculty to explore new leadership roles and to participate in mentoring programs. In support of this strategy, we plan to:

» Invest in initiatives that focus on the successful recruitment and retention of underrepresented minority faculty across all schools.
» Establish a career mentoring program and a leadership skills development program for early- and mid-career faculty.
» Provide new professional development resources, opportunities, and funding for non-tenure-track academic and research faculty.
GOAL 2: EDUCATION AND TRAINING EXCELLENCE

The College will provide transformative educational experiences for students and trainees by fostering a creative, inclusive, and equitable learning environment. This learning environment will afford opportunities to engage in rigorous scholarship, a research culture that emphasizes discovery and dissemination, and attainment of skills relevant to future careers and life-long learning in a technology-focused economy. The College will nurture a community of engaged peers, role models, and mentors. Graduates will be well equipped to embark on rewarding and impactful career pathways that extend beyond their disciplinary training, and to innovate in the service of our society. Our strategies to create education and training excellence are:

» Provide Access to Rigorous and Innovative Academic Programs

The College of Sciences attracts highly motivated and talented students to its undergraduate and graduate programs. Our graduates go on to work in a broad array of careers in business, medicine, academia, and beyond. The College commits to a process of continuing improvement of its academic offerings, from curriculum design and instructional practices to student advising. This process will be informed through a rigorous ongoing assessment of its programs. In pursuit of this strategy, we will:

» Build on our effort to recruit and retain students into our current degree programs, revise policies and practices as needed, and seek additional investments to accelerate the recruitment and retention of students who have been historically underrepresented in STEM fields.

» Evaluate the merit and feasibility of new undergraduate and graduate programs.

» Emphasize both formative and summative evaluation of instructors to promote the use of evidence-based pedagogies.

» Coordinate and support systematic program-level assessment of instruction.

» Create separate College-wide undergraduate student and graduate student advisory councils to provide input to College leadership.

» Explore the design of core general education courses, best practices, and collaborative course design opportunities.

» Review student advising practices and share best practices.

» Promote the Interface Between the Research and Educational Missions

Georgia Tech’s world class research programs present exceptional opportunities to engage our students in modern hands-on learning experiences. Rather than viewing undergraduate research as a capstone experience that builds on a student’s preexisting knowledge — often requiring completion of specific, high-level, prerequisite courses — we see it as an integral part of a student’s training where they explore new concepts, master background material in an individualized ‘just-in-time’ manner, and develop insights in parallel with their coursework learning. Thus, we will:

» Work to involve more undergraduates in the Institute’s research endeavor earlier in their college experience — promoting this opportunity to all undergraduates and faculty, celebrating their shared accomplishments, and seeking resources to facilitate faculty participation.
Equip Students to Embark on Productive and Satisfying Careers, and to Innovate in the Service of Society

A program’s quality may be measured by its impact on students and the accomplishments of its alumni. Prospective students and their families are increasingly considering the return-on-investment of an institution and its majors and programs. Rather than leaving career planning to the latter stages of undergraduate study, we will encourage exploration and career-relevant skill development through curricular, co-curricular, and extra-curricular components. These will be developed and offered in conjunction with The Georgia Tech Career Center (formally known as the Center for Career Discovery and Development, or C2D2) and the Georgia Tech Alumni Association, as well as the College of Sciences Advisory Board. In pursuit of this strategy, we will:

» Engage the Georgia Tech Career Center, our alumni, and the College of Sciences Advisory Board to create resources that specifically address the career needs of undergraduates and graduate students.

» Develop a framework for career mentoring, entrepreneurship, internships, fellowship applications, and public engagement through curricular, co-curricular, and extra-curricular activities.

» Partner with the Georgia Tech Alumni Association to better coordinate, track, and maintain engagement with alumni.

The widely recognized quality of the College’s doctoral programs is a significant contributor to the Institute’s reputational standing. To further bolster the quality of the research output, and to broaden participation in research careers of individuals who are in groups that have historically been underrepresented in STEM fields, we will:

» Accelerate efforts to increase enrollment and retention of underrepresented minority students in our graduate programs across the College.

» Explore creation of College of Sciences graduate fellowships to recruit top doctoral candidates, with a particular emphasis on interdisciplinary fields.

Georgia Aquarium wanted to know which bacteria were removing nitrates from the water of Ocean Voyager, the largest indoor oceanic aquarium in the United States. Marine biochemists Andrew Burns and Zoe Pratte in Frank Stewart’s Marine Microbiology lab discovered very natural bacterial colonies at work. (Credit: Rob Felt)
With an emphasis on fundamental discoveries and interdisciplinary science, the College’s research portfolio has grown dramatically in the last decade. Moving forward, we will build on present strengths while emphasizing research along the arc from discovery to solutions. Specifically, we will:

- Advance the frontier of fundamental science and mathematics — and identify building blocks for future research.
- Foster cross-disciplinary directions that synergistically drive foundational discoveries and connect with societal impacts.
- Amplify global impact via institutional, national, and international partnerships.

In addition to our continued embrace of fundamental science, cross-cutting and convergent scientific directions will guide our investments. Specifically, we aim to elevate the following ongoing initiatives within the six schools of the College:

- **Quantum systems** — including quantum materials, quantum computing, and quantum information science
- **Neuroscience, physics of movement, and robotics**
- **Microbial dynamics and infection, evolution, astrobiology, and the origins of life**
- **Planetary sciences and astrophysics**
- **Data science** that harnesses **machine learning** and **artificial intelligence** to spur the **data revolution** in the sciences
- **Climate science, biodiversity, ecosystem resilience, and global change**

The success of our research endeavor hinges on supporting, retaining, and mentoring faculty, especially mid-career faculty whose research growth and productivity is particularly critical to Georgia Tech. Success also depends on the timely identification of research opportunities for which the College is poised to lead. Thus, we will encourage team science, multi-institution collaborative projects, and foundation- and industry-sponsored projects as mechanisms for faculty to diversify their research portfolio. We will support an expanding population of research-active students and trainees and immerse them in real-world collaborative research opportunities with entrepreneurial promise. Our strategies to cultivate research excellence are:
Support Faculty-led Research and the Career Development of Researchers

In the most recent decade, we have had exceptional success recruiting and developing the careers of assistant professors within the College. In the coming decade, we are called to more fully support the research of these faculty as they move into the tenured associate and full professor ranks by hosting their programs in research environments that reward and enhance creativity and collaborative science. Our research community also includes critical early career members such as graduate students and postdoctoral fellows, whose career development needs we must meet and foster — as well as research faculty building their long-term careers at Georgia Tech. To grow and support our research community, we envision the following tasks:

- Prioritize the creation of new faculty endowed chairs and professorships.
- Develop a plan to expand the effort for joint faculty hires — especially in high priority, cross-cutting areas of research.
- Create common spaces for faculty-trainee interaction through new and expanded interdisciplinary research neighborhoods.
- Enhance the faculty’s ability to rapidly respond to critical challenges that call for scientific expertise by establishing communication networks and seed funding.

Foster Interdisciplinary Research Synergies with Targeted Hiring and Enhancements to the Research Environment

We aim to enhance the College as a community of engaged, entrepreneurial experts leading new scientific discoveries — as well as local, national, and global initiatives that create a foundation for the scientific and technological solutions to address the most pressing problems of the 21st century. To catalyze discovery and amplify our impact, we need to welcome new faculty to Georgia Tech to both complement our existing expertise and to increase our diversity — and we must support these new faculty with research endowments and embed them within collaborative teams co-located in interdisciplinary research neighborhoods. Tasks associated with this strategy include:

- Prioritize the creation of new faculty endowed chairs and professorships.
- Develop a plan to expand the effort for joint faculty hires — especially in high priority, cross-cutting areas of research.
- Create common spaces for faculty-trainee interaction through new and expanded interdisciplinary research neighborhoods.
- Enhance the faculty’s ability to rapidly respond to critical challenges that call for scientific expertise by establishing communication networks and seed funding.

Develop Scientific Leaders at Georgia Tech and Beyond

Georgia Tech is internationally known as a successful incubator of interdisciplinary research, and the College is critical on the Institute’s arc from discovery to solutions that improve the human condition. To make the most of this collaborative environment, and to place science in the forefront of defining the research agenda at Georgia Tech, our faculty will need to access new research funding sources, form new teams, and promote our successes across campus and beyond Georgia Tech. In pursuit of this strategy, we will focus on the following tasks:

- Provide mechanisms to materially support the research efforts of mid-career faculty.
- Prioritize the establishment of endowed graduate fellowships, and work with other colleges to establish a prestigious postdoctoral scholar program.
- Identify and support career pathways for graduate students, postdoctoral scientists, and research scientists.
- Sponsor and promote College faculty for local, national, and international awards and recognition.
GOALS IN PARTNERSHIP WITH UNITS ACROSS THE INSTITUTE

In addition to the goals listed above, we will work with partners across Georgia Tech to:

- Promote the health and well-being of our students and employees, in collaboration with the Institute's new strategic goal, “Cultivate Well-Being.” Partners in our efforts will include the Georgia Tech Division of Student Life, Stamps Health Services, the Office of Human Resources, and the Center for Assessment, Referral, and Education (CARE).
- Better equip faculty, teaching assistants, and staff to productively respond to the issues that students face in meeting Georgia Tech's rigorous academic standards and in navigating the challenges of the college experience. We will work with the Georgia Tech Counseling Center to communicate best practices for these stakeholders.
- Ensure faculty and teaching assistants understand student accommodations and how to implement them to ensure student success. We will expand our partnership with the Georgia Tech Office of Disability Services to communicate best practices for faculty and teaching assistants.
- Advance the scientific discourse across campus related to the United Nations' Sustainable Development Goals (UN SDGs). We will stress reliance on scientific data and models in the development and implementation of campus-wide sustainability initiatives and programs.
- Ensure all College of Sciences staff members have access to and are apprised of guidelines and pathways for staff promotion.
- Assess feasibility and interest in establishing tenure-track faculty lines for discipline-based education research (DBER) across the Institute.
- Sustain and improve our outreach efforts with non-profits and community stakeholders in Atlanta and the state of Georgia to continuously increase science literacy and promote interest in science education.
LEARN HOW YOU CAN GET INVOLVED AT COS.GATECH.EDU

Cover image: Former postdoctoral fellow Betül Kaçar watching evolution in action, resurrecting a 500 million-year-old gene from bacteria and inserting it into modern-day E. coli.