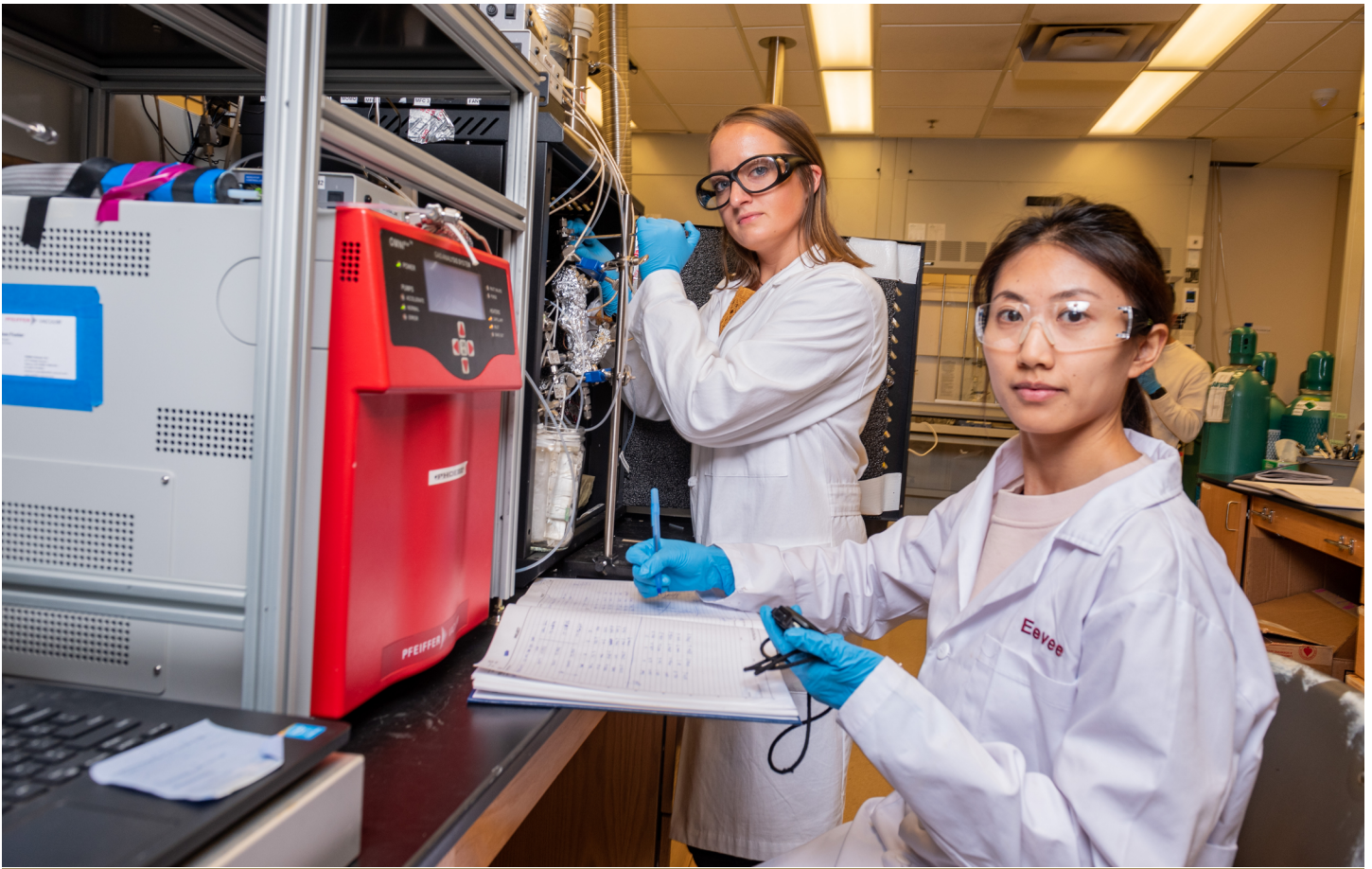
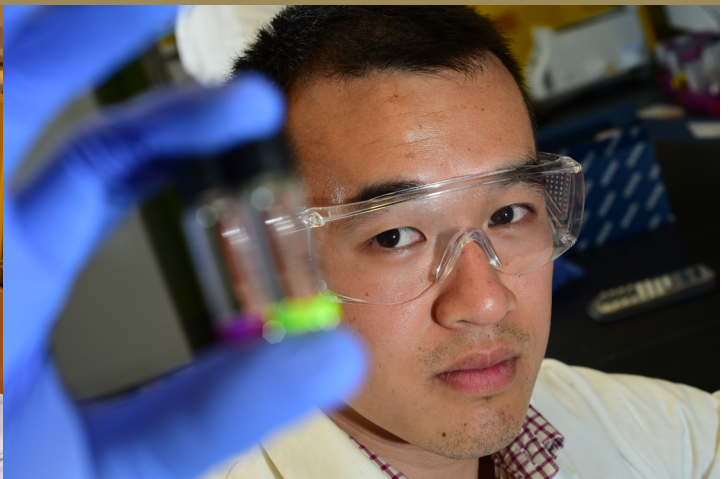




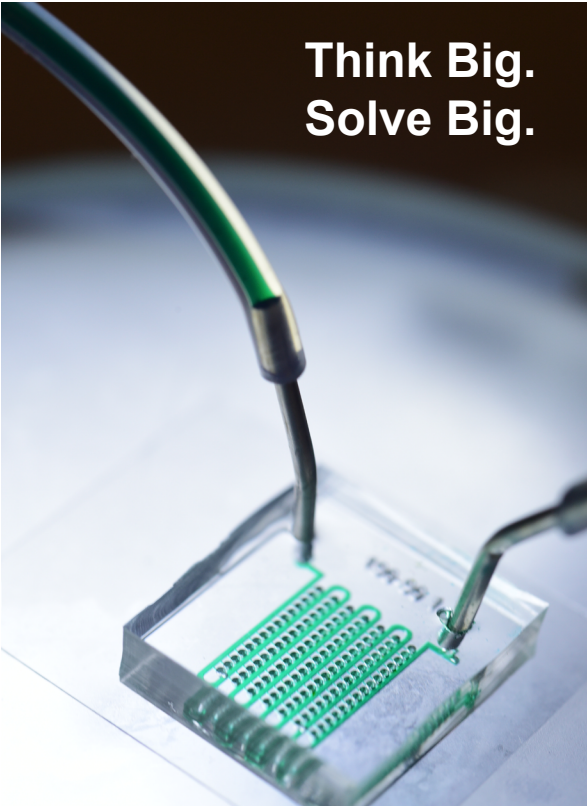
Georgia Tech College of Engineering
**School of Chemical and
Biomolecular Engineering**



Graduate Programs



About Georgia Tech's School of Chemical & Biomolecular Engineering (ChBE)



**Think Big.
Solve Big.**

Established in 1901, the School of Chemical and Biomolecular Engineering ([ChBE](#)) is consistently recognized as one of the top chemical engineering programs in the nation. And we still have big ambitions.

We continually strive to be the best – to produce the finest engineers, to conduct the most influential research, and to solve the world's toughest problems.

With faculty members who are leaders in their fields, state-of-the-art research facilities, and numerous opportunities for interdisciplinary collaboration, our Graduate Program will position you at the leading edge of innovation.

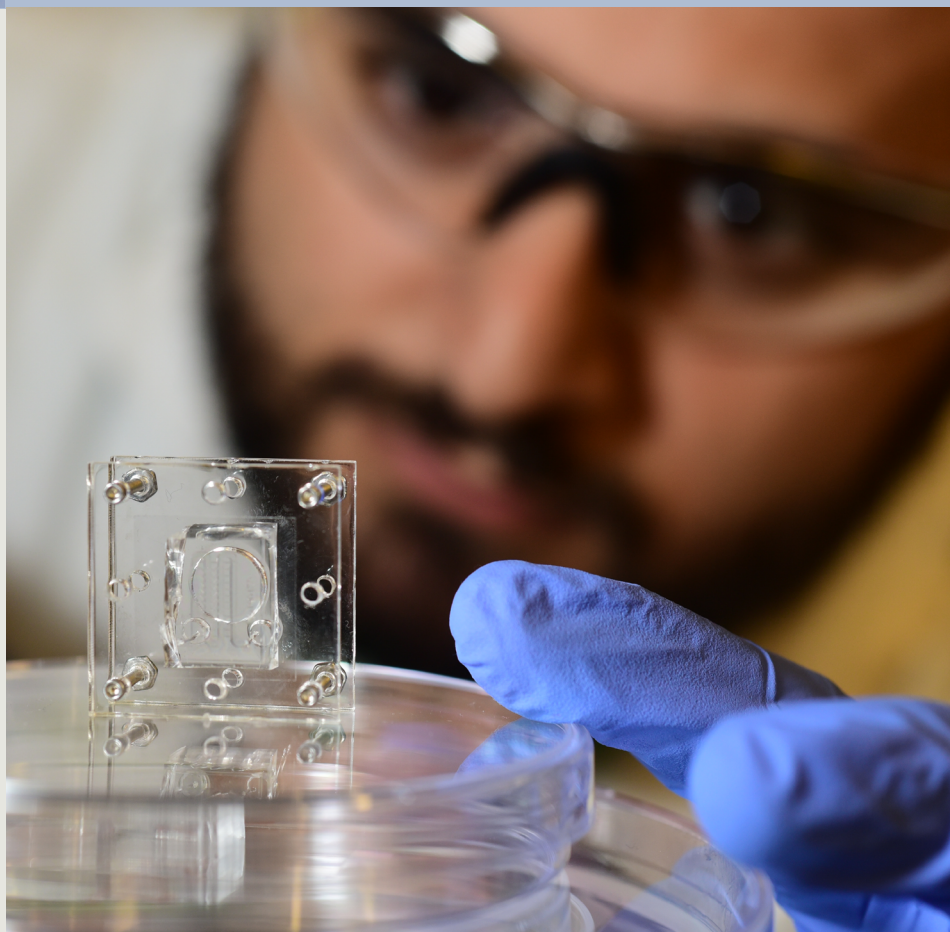
We offer financial assistance to all of our PhD students, providing exceptional opportunities to extraordinary people.

ChBE faculty members are involved in a comprehensive range of topics in education, research, and commercialization, with a strategic focus on energy & sustainability, biotechnology, materials & nanotechnology, and complex systems.

Ranked in the top 5 engineering programs in the nation for both its graduate and undergraduate programs by U.S. News & World Report, the School is one of the oldest and most diverse programs in the nation.

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STRENGTH & BREADTH

ChBE by the Numbers

#5

Best Graduate Chemical Engineering Program in the Nation
- U.S. News & World Report



#6

Best Chemical Engineering Department in the World
- Shanghai Ranking Consultancy

#4

Best Graduate Engineering College
- U.S. News & World Report,

22

National Science Foundation Career Award winners on the faculty



17

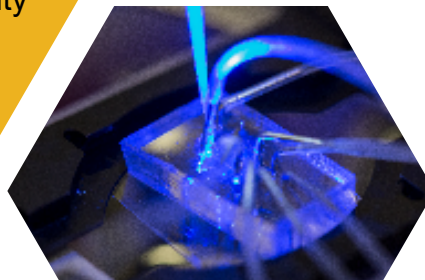
ChBE faculty members hold major editorial positions with top technical journals

9

Faculty members elected to the National Academy of Engineering

13

AIChE Fellows serving on the faculty



Student Statistics

263 graduate students
- 240 PhD & 23 MS

17 NSF Fellows

102 women students

52 Black, Hispanic, and Native-American students

Faculty Statistics

45 faculty members (15 women)
2 affiliated faculty
4 academic professionals



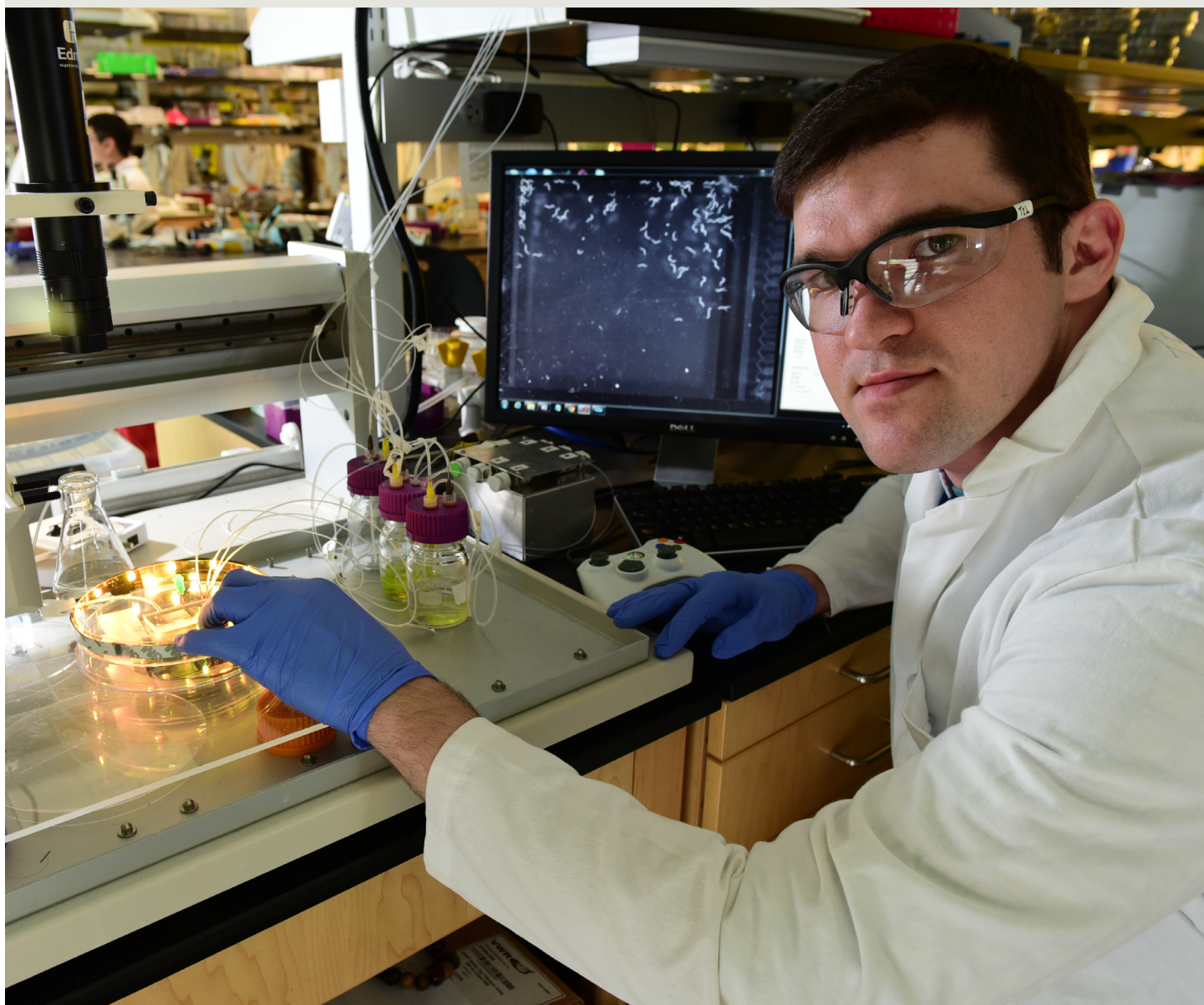
PhD/MS Programs

The School of Chemical and Biomolecular Engineering offers graduate programs involving advanced-level coursework and independent research leading to [MS and PhD degrees](#) in chemical engineering. The MS degree can usually be obtained by coursework only, without a thesis. Course selection for both the MS and doctoral degrees is quite flexible, with individual plans of study developed for each student.

Research opportunities exist in a broad range of areas of importance to chemical engineers and society, including catalysis, reaction kinetics, complex fluids, microelectronics,

microfluidics, optimization, bioinformatics, polymers, sustainable development, pulp and paper, separations, CO₂ capture, biomedicine, solar energy, thermodynamics, environmental science, reaction engineering, cancer diagnostics and therapeutics, biofuels, air quality, data-driven modeling, and process synthesis and control.

Furthermore, the School of Chemical and Biomolecular Engineering participates with other schools in offering MS and PhD degrees in [Bioengineering](#), as well as a PhD in [Machine Learning](#).





PhD Program

The PhD program in ChBE forges a close professional relationship between graduate students and faculty members. Working together on cutting edge research, you and your faculty mentors will develop an academic and research program tailored to meet your individual needs.

Although the typical program takes about five years to complete, you may finish the requirements in slightly less, or more, time.

We offer financial assistance to all of our PhD students, providing exceptional opportunities to extraordinary people.

PhD students at Georgia Tech ChBE can earn doctoral degrees in:

- Chemical and Biomolecular Engineering
- Bioengineering

To read frequently asked questions and learn more about the specific curricula for our graduate programs, minors offered, and other details, please visit this site:

chbe.gatech.edu/graduate-degrees

MS Program

The MS program in ChBE is a coursework-based, non-thesis degree designed for students who want to develop a deeper knowledge of the fundamentals and learn about emerging applications. It is ideal for students who plan to enter industry or who are returning to school after working in industry.

The MS program requires 31 hours of coursework, which can be completed in two or three semesters (see the schedule below), depending on the student's pace and the availability of elective courses of interest.

Students admitted to the MS ChBE program do not do thesis research and are not eligible for ChBE graduate research assistant positions or tuition waivers. Thus, it is a self-paying program. Just like PhD students, MS students can take advantage of Georgia Tech's Career Services, which hosts career fairs and connects students with the large number of employers that come to Georgia Tech seeking talent.

Note: Applicants who do not have a ChBE or equivalent BS degree should read the information at the bottom of the [MS Degree Requirements page](#), under "for applicants without a BS chemical engineering degree."

GT-EQUAL: Graduate Training for Equality in Underrepresented Academic Leadership

The GT-EQUAL Program is one of two sites at Georgia Tech for the American Chemical Society's (ACS) Bridge Program, which aims to increase the number of Black, Hispanic, and Native-American students who receive doctoral degrees in chemical sciences.

[GT-EQUAL](#) is based in the School of Chemical and Biomolecular Engineering (ChBE), while another Bridge site resides in the School of Chemistry and Biochemistry.

The GT-EQUAL Bridge Site enrolls at least two Bridge Fellows annually who will earn a thesis MS in chemical engineering while receiving full funding, extensive support, mentoring, and training to prepare for success in a PhD program.

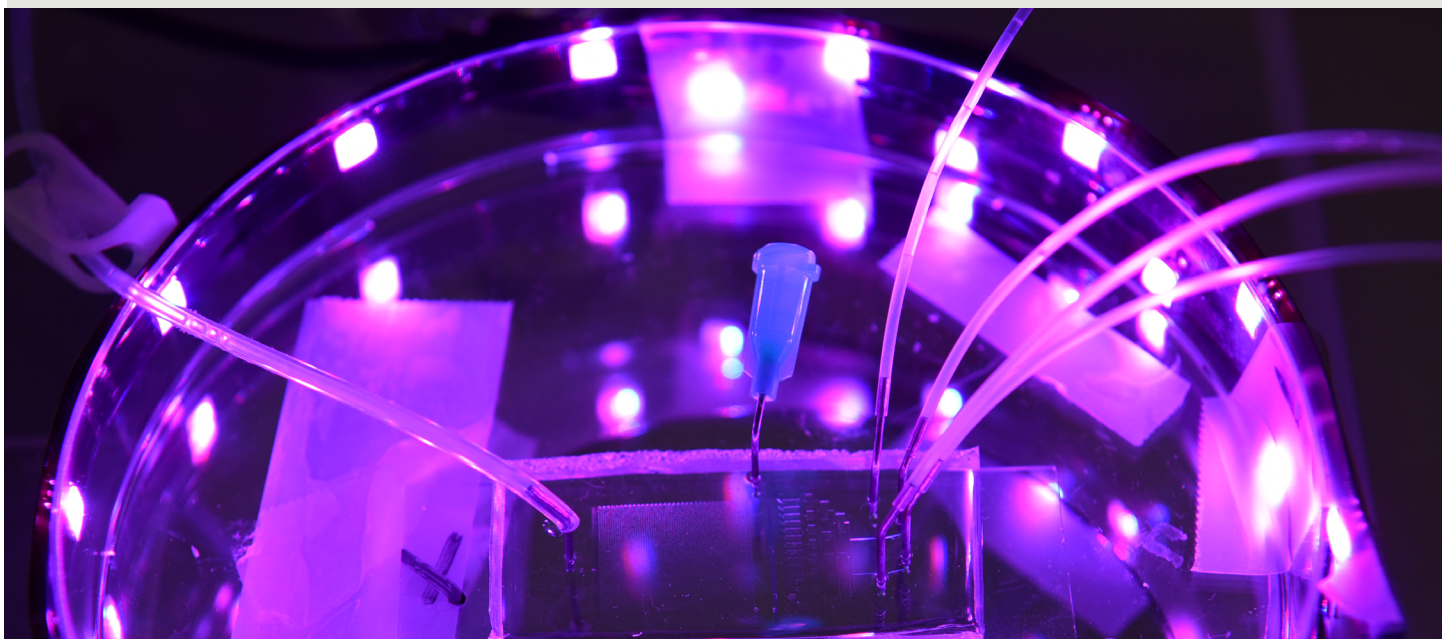
ChBE was one of the two programs nationwide selected in 2019 to become the inaugural sites for the ACS Bridge Program. [Apply here.](#)

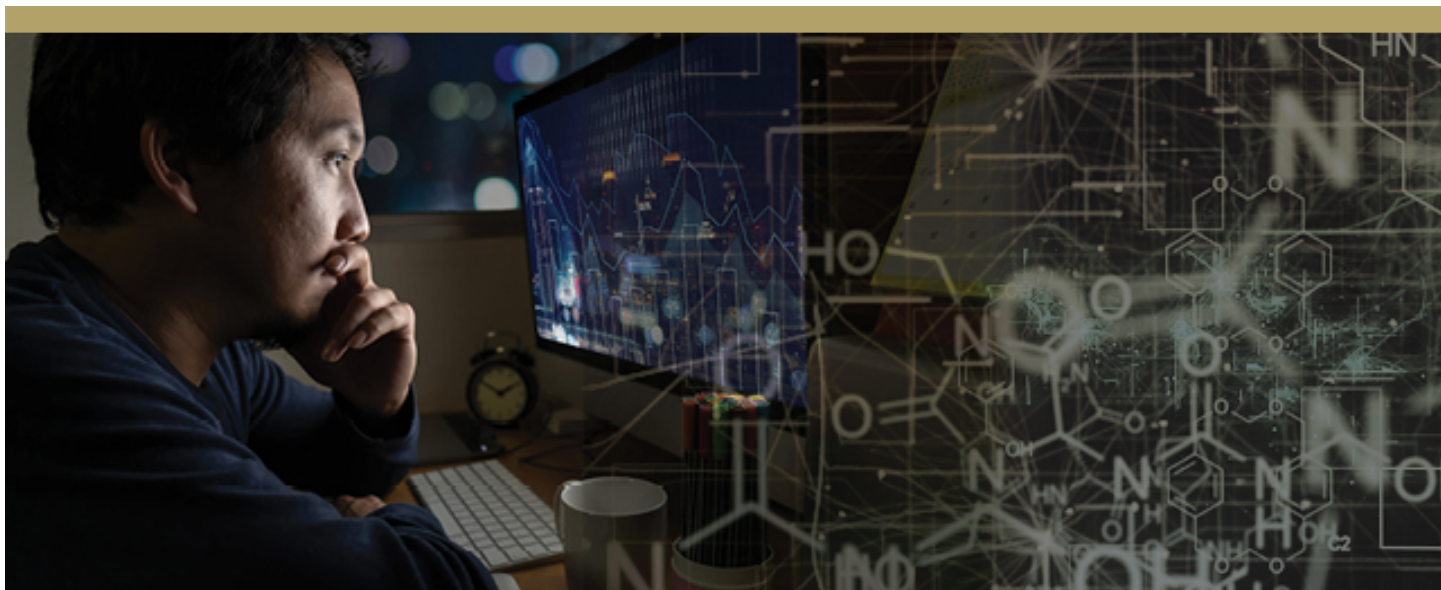
The Bridge Program came about after ACS joined the Inclusive Graduate Education Network (IGEN), a coalition of five scientific societies formed to bolster the number of underrepresented students in the physical sciences, in 2019. In 2020, the School of Chemistry and Biochemistry at Georgia Tech has also become a Bridge site.

The ACS Bridge Program supports this national effort by assisting chemical science departments in creating a "bridge" for these students to earn their doctorates in chemistry or chemical engineering.



"So far, it's been an amazing, outstanding experience," said Andre Berry, who enrolled as a primary single parent to a young daughter. "Most people understand the situation I'm in, and there has always been someone to help if I need something, especially academically, from tutors to other Bridge students to the faculty."





Online Graduate Certificate in Data Science for the Chemical Industry

Chemicals, energy and manufacturing companies around the globe are racing to take advantage of the big data trends in what has become known as Industry 4.0. A key need in this sector is professionals with strong domain knowledge in chemical engineering who are skilled in the tools of data science and can lead data-driven efforts in their companies.

In 2019, ChBE launched a fully online [Graduate Certificate](#) that will equip professional chemical engineers for this critical field. This program is available to non-degree students and core courses are taught by ChBE's world-renowned faculty.

What is a graduate certificate at Georgia Tech?

A graduate certificate is comprised of 12 credit hours of coursework, typically 4 3-credit hour courses. For comparison, a Master's degree requires 36 credit hours of coursework. Credit from a graduate certificate can be used towards a future Master's degree at Georgia Tech.

What courses are offered in the Data Science for the Chemical Industry graduate certificate?

All students will complete two core courses that will focus on foundational data science methods with a strong emphasis on applications in the chemical process industry. Students will then select two elective courses from a wide variety of courses that are already available within Georgia Tech's highly successful online Master's degrees in Data Analytics and Cybersecurity.

How long will the graduate certificate take to complete?

Most students will complete one course per semester, so the certificate will take 4 semesters to complete. Core courses will be offered in the fall and spring semesters, but elective courses may also be available in Georgia Tech's summer semester.

Are these courses suitable for people who are working full time?

Yes. The course delivery and structure will be similar to Georgia Tech's existing online MS programs, which currently serve thousands of working professionals.

Are the courses easier than regular college-level classes?

No. Each course is also part of Georgia Tech's graduate curriculum and will require serious effort by students. But careful attention has been paid in developing the core courses to ensure that they are accessible to students who have an undergraduate degree in chemical engineering or a related discipline.

What will tuition be for this certificate?

Tuition and fees will be charged using Georgia Tech's standard rate for Professional Education courses. Although we note that these tuition rates are adjusted incrementally each year, with this cost the complete 12 unit graduate certificate can be completed for about \$15,000. *Current ChBE graduate students can earn the certificate at no additional cost.*

Our School's research is remarkable for its quality and innovation, as well as its depth and breadth. Our award-winning faculty's range of interests include both traditional and emerging areas of research.

The school boasts a diverse set of research projects, with each professor leading a group of students investigating a variety of interdisciplinary topics.

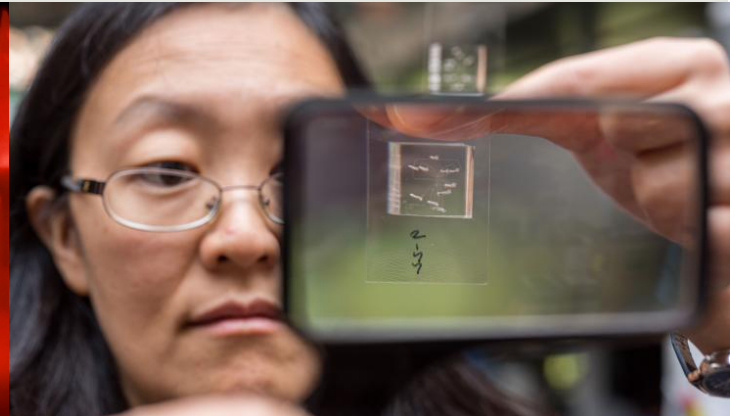
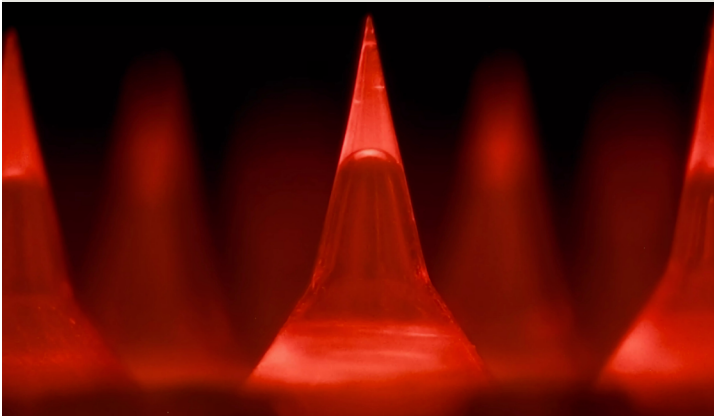
Our faculty members focus

Research Areas

on four strategic areas — energy and sustainability, biotechnology, materials and nanotechnology, and complex systems — while incorporating elements of classical engineering principles into their work, such as thermodynamics, fluid mechanics, kinetics and reaction engineering, separations, and transport phenomena. Not only is our research large in scope, it also

has the potential to make a big impact on the world.

Current projects in the school address some of the largest global challenges of the 21st century, including developing new therapeutics for diseases, designing sustainable systems for improving the environment, and creating more efficient methods for producing new and better technologies.



Biotechnology

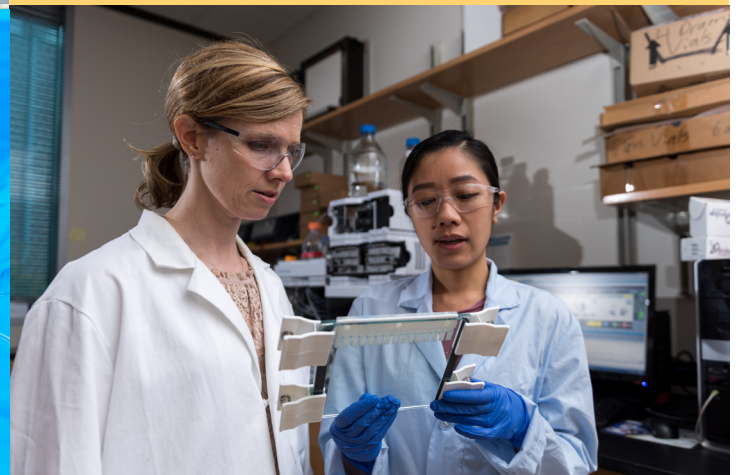
[Biotechnology](#) research combines biological sciences, chemistry, and chemical engineering to solve practical problems in the fields of medicine, agriculture, and bio-based fuels.

ChBE researchers develop novel approaches to transform health care and pharmaceuticals, as well as opening up numerous possibilities for sustainable resource management.

Complex Systems

[Complex Systems](#) research aims to design efficient systems that are safe and adaptable with applications in a variety of research areas and industries, including supply chains, environmental systems, and manufacturing.

By using mathematical tools to simulate process behavior and identify optimum operating conditions, ChBE researchers design novel systems with improved economy, reliability, and safety.

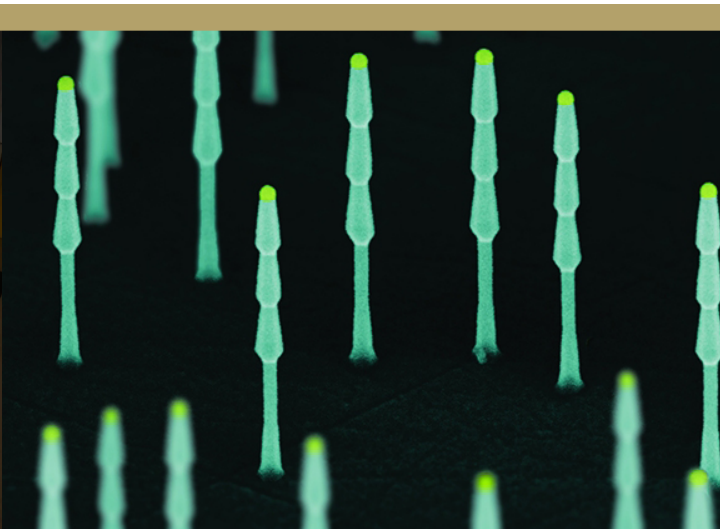




Energy and Sustainability

[Energy & Sustainability](#) research addresses the challenges in developing systems and products that meet the energy needs of society while considering environmental impact and economic feasibility.

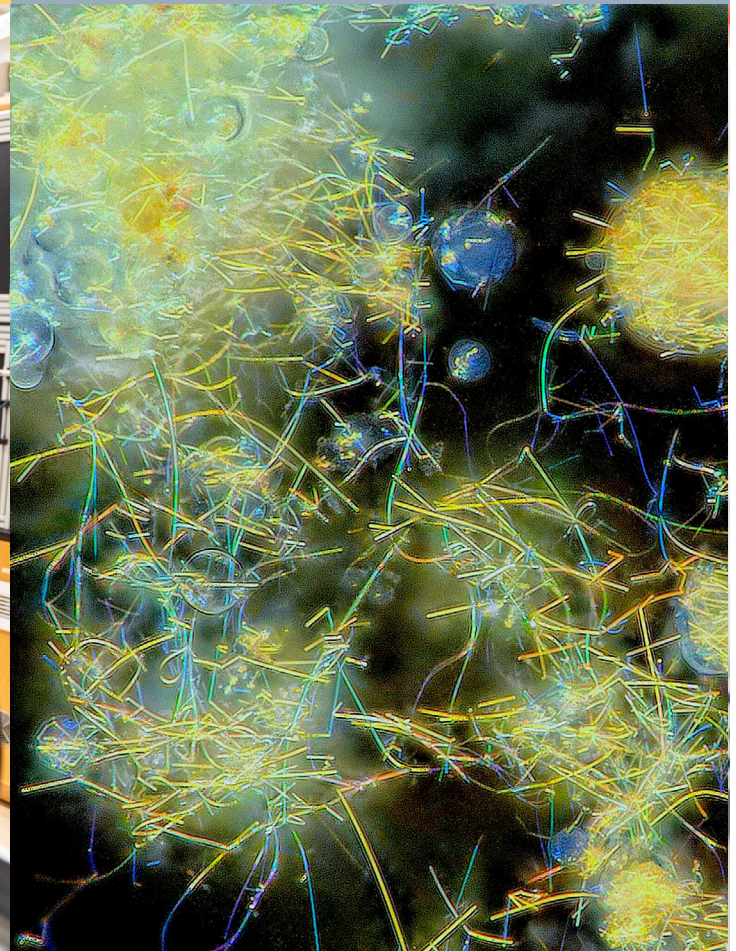
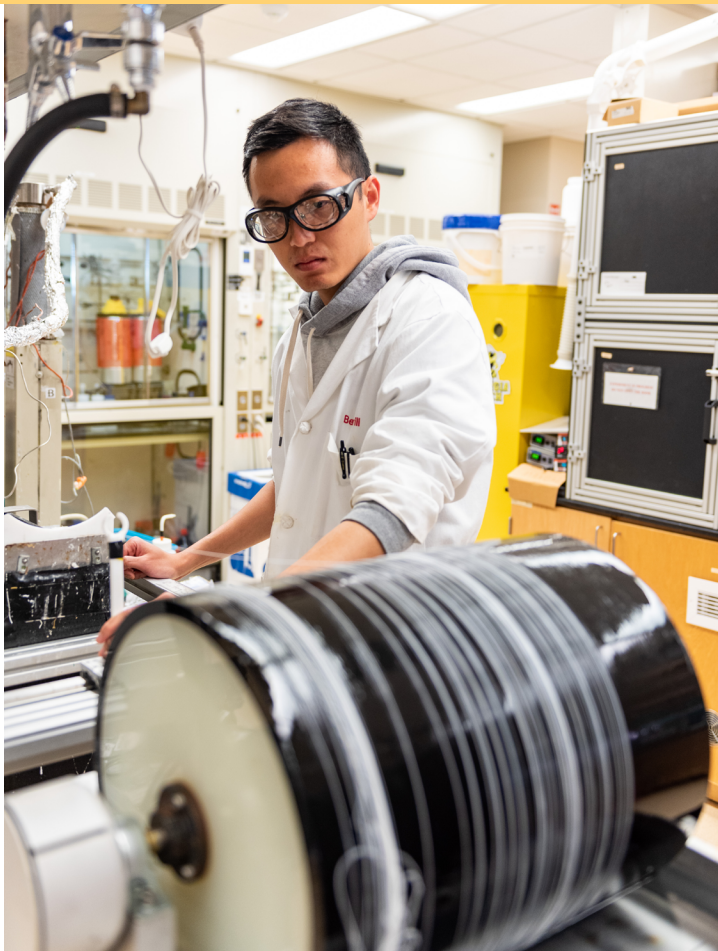
ChBE researchers create technologies that generate, distribute, store, consume, and recycle energy and materials in a cleaner and more efficient manner.



Materials and Nanotechnology

[Materials and Nanotechnology](#) research focuses on creating new materials that improve construction and performance of devices in numerous industries, including healthcare, electronics, and environmental management.

Manipulating atoms, molecules, and supramolecular structures allows ChBE researchers to generate larger structures with superior features.



Graduate Careers

A PhD in chemical engineering from Georgia Tech's School of Chemical Biomolecular Engineering (ChBE) is excellent preparation for a career in academia or industry.

Many of our PhD alumni have obtained faculty positions at many leading institutions around the world. And thanks to our strong industry ties, our graduates earn jobs with top companies in a wide range of industries year after year. All the top companies recruit from ChBE.

Whatever career path you choose, ChBE's graduate programs offer many benefits:

Top Quality Research & Teaching

You will conduct cutting-edge research with top faculty who will challenge you to be your best. You will also be able to take advantage of numerous opportunities to collaborate with experts in core and frontier areas of chemical and biomolecular engineering and other disciplines at one of the nation's top universities.

You will learn to be a better teacher by watching our faculty, who are passionate about teaching both undergraduate and graduate students.

Big Network

Being part of one of the biggest chemical and biomolecular engineering programs in the nation's largest college of engineering means you are going to be part of a huge alumni network. About 7,500 of those College of Engineering alumni are currently in senior level positions, such as CEOs, CIOs, CEOs, presidents, executive vice presidents, and board chairs.

Career Services

Georgia Tech's Career Services office exists to help you get into the career of your dreams. They offer numerous events and services, including career fairs, mock interviews, seminars, and counseling.

Leadership Development

Students learn to be better leaders by supervising and mentoring undergraduate researchers. Additionally, AChEGS, and other student organizations provide opportunities to develop leadership skills.

Conferences

Most of our students present their papers at research conferences that provide opportunities to develop a network of contacts.

Publication in Top Journals

It's not just for building an academic CV. Industry also appreciates the fact that our PhD students regularly publish their work in top journals.

Graduate Symposium

This annual event brings together industry and academia over a day and a half for discussion, recruiting, and networking. Participants present their research to representatives from numerous corporations, including Fortune 500 companies.

Technical Communications Program

Employers in industry have consistently ranked communication skills as one of the most important attributes for employees. This program will give you the tools you need to be successful in any job.



“One of the great advantages of Chemical Engineering is that it is very broadly applicable. Having a Chemical Engineering background has prepared me to work in different research areas: colloidal science, microfluidics, and systems biology. It is important to have the support and guidance of Professors that believe in what you are doing, such as my mentors Dr. Hang Lu and Dr. Sven Behrens.

Another piece of advice is to not be afraid of exploring new research avenues or opportunities. In fact, it may be crucial to pursue those new opportunities and research avenues, even if it is a bit scary.”

- Dr. Adriana San Miguel Delgadillo, PhD 2011, Assistant Professor, North Carolina

For Academic Track

Workshops on Finding a Job in Academia

Each year, ChBE faculty lead workshops teaching PhD students the ins and outs of finding a job in academia.

Tech to Teaching

The Tech to Teaching program is designed to prepare Georgia Tech graduate students for college teaching positions.

Through this certificate program, participants will develop a thorough understanding of the scholarship of teaching and learning, and will demonstrate their ability to apply these skills in the classroom.

Teaching Assistant Experience

You will gain ample experience interacting with undergraduates and graduates during your three or four semesters as a teaching assistant.



"I suggest that graduate students who truly enjoy research seriously consider seeking a faculty position. Graduate student research is full of discovery and excitement. But conducting research as a faculty member is even more fun and rewarding, given the additional time, support and resources."

- Dun Yen Kang, PhD 2012, Assistant Professor, National Taiwan University

Select Universities Where Recent ChBE PhD Graduates Are Professors

- Massachusetts Institute of Technology
- Georgia Institute of Technology
- University of Notre Dame
- University of California, Riverside
- Texas Tech University
- Indian Institute of Technology Madras, India
- KAIST, Korea
- University of Puerto Rico, Mayagüez
- Nanyang Technological University, Singapore
- Louisiana State University
- Koç University, Turkey
- National Tsing Hua University, Taiwan

Select Postdoctoral Positions Earned by Recent ChBE PhD Graduates

- Argonne National Laboratory
- Cornell University
- Georgia Institute of Technology
- Lawrence Berkeley National Laboratory
- Lehigh University
- Massachusetts Institute of Technology
- NASA Goddard Space Flight Center
- NASA Langley Research Center
- NIST
- Oak Ridge National Laboratory
- Sandia National Laboratories
- University of California, Berkeley
- University of California, San Francisco
- University of California, Santa Barbara
- University of Colorado
- University of Massachusetts



Graduate Careers



Industry Benefits

Industry Research

Many of our research projects are conducted in collaboration with corporate partners. Students working on these projects participate in research directly relevant to industry. They also build their networks and learn from experienced practitioners, as the work often involves direct collaboration with industrial scientists and engineers.

Reputation

According to corporate recruiters surveyed by the Wall Street Journal for their recruiter rankings, Georgia Tech produces the best graduates in engineering and is among the best for corporate recruiting overall.

Internship Opportunities

MS and PhD students may perform an internship during one semester of study.

The internships are facilitated and supported through Georgia Tech's [Graduate Internship Program](#).

The program provides graduate students with the opportunity to work with industry and government leaders in their respective areas of study.

Research for master's and doctoral theses may be related to

the work assignments.

Recent companies where students interned include:

- **Abbott**
- **Alcon**
- **Amgen**
- **Eastman Chemical Company**
- **Invista**
- **Merck**
- **Praxair**

Select Companies Hiring Recent PhD Graduates

- Air Products
- Amgen
- Boston Consulting Group
- Celanese
- CH2M HILL
- Chevron
- Conoco Phillips
- Dow
- Enka Chemicals
- Evonik
- ExxonMobil
- Ford Motor Company
- Frito Lay
- GE
- Georgia Pacific
- Hewlett Packard
- Honeywell
- Intel
- Merck
- Mitsubishi Chemical Corporation
- Nalco
- Owens Corning
- Park Systems
- Samsung
- Shell
- Texas Instruments

**Georgia Tech
Career Center:**

career.gatech.edu

Professional Preparation

To help students develop the “soft,” non-technical skills that are vital to navigating the workforce, ChBE has adopted a “[Professional Preparation](#)” requirement that helps with areas such as project management, leadership, and effective communications and presentations.

The goal is to provide more formalized training in these areas without placing undue time burdens on students. We strive to make the training accessible, relevant, and not duplicative of opportunities already available on campus.

Over the course of their four or more years here, students are required to complete at least 10 “Professional Preparation Units” (PPU) via workshops that are designed to give both training and the opportunity to practice these “soft,” non-technical skills to prepare them for their future professional endeavors.

One PPU is roughly equal to one hour of in-class training time, and students must participate in at least three different PPU-granting activities.

This structure was designed to give students optimal flexibility in what kinds of professional preparation they get and when they get this training, potentially allowing for just-in-time training on, for example, project management or team leadership just before taking on undergraduate researcher mentees.

A selection of workshops or courses will be offered every year, with an announcement to all graduate students sent at the beginning of the fall semester listing the expected offerings for that academic year and the number of Professional Preparation Units fulfilled by each respective offering.

All required Professional Preparation Units must be completed before the Thesis Defense; students



Learn to give effective technical presentations like this past Three-Minute Thesis Competition winner.

are encouraged to complete most before their Pre-Doctoral Review meeting.

If students participate in non-ChBE Professional Preparation-related workshops at Tech, they may petition to have those efforts count toward their required Professional Preparation Units.

Workshop Examples:

Project Management for University Researchers

From a complex team project to a single experiment, clear-sighted planning and organizing can significantly improve the efficiency of research. This is particularly valuable in non-ideal research conditions, such as limited funding, restricted access to equipment and labs, and short-handed projects. Much of project management seems intuitive, but is challenging to implement without appropriate tools and structures.

Effective Technical Presentations

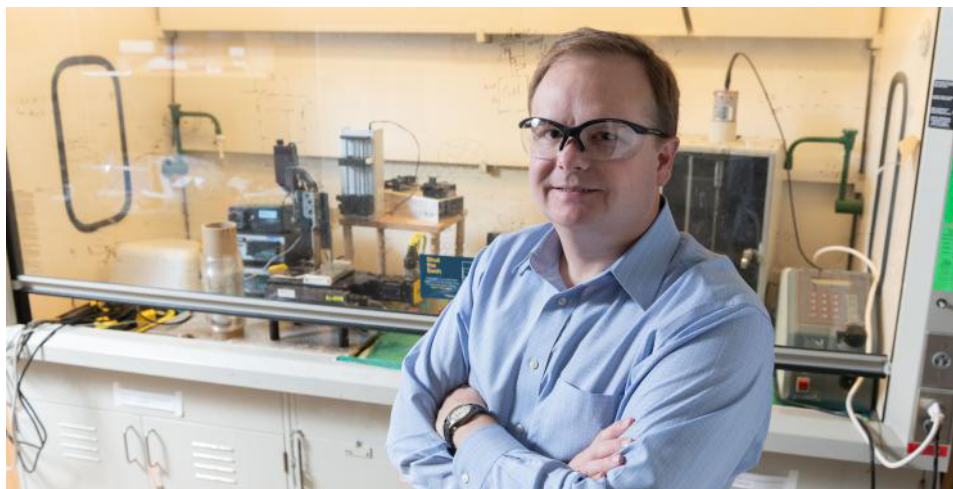
Technical presentations can be on dry and/or complex topics, but effectively communicating this technical content can be the difference between success and failure. This short course will provide guidance, heuristics, and practice for giving technical oral presentations that engage the audience and effectively communicate content.

You Can Get There from Here: Guide to Writing your PhD Thesis Proposal

For many engineers, writing can seem like a time-consuming and even confusing task. Yet, developing effective communication skills is a key success factor for engineers in both academia and industry. This two-part workshop will teach you principles of technical communication that will help you write an effective thesis proposal in an organized and efficient way.

Faculty Interests

- **Alex Abramson:** drug delivery, bioelectronic medical devices
- **Saad Bhamla:** ultra-fast organic physics, biological soft matter, frugal science
- **John Blazeck:** cellular and Immunoengineering
- **Andreas Bommarius:** biocatalysis, protein stability, pharmaceutical processing, green chemistry, lignin valorization
- **Fani Boukouvala:** data-driven modeling, optimization of energy efficiency and drug design
- **Victor Breedveld:** complex fluids, microfluidics
- **Blair Brettmann:** polymers, pharmaceuticals, processing
- **Julie Champion:** drug delivery, biomaterials
- **Lily Cheung:** plant systems biology, quantitative fluorescence microscopy
- **Michael Filler:** nanomanufacturing, electronics, energy conversion
- **David Flaherty:** sustainable manufacturing of chemicals and energy carriers
- **Tom Fuller:** systems for energy conversion and storage
- **Martha Grover:** systems engineering, materials processing
- **Marta Hatzell:** sustainable catalysis and separation processes
- **Yuhang Hu:** soft materials, bio-inspired materials
- **Vida Jamali:** nanostructured soft materials, statistical thermodynamics
- **Christopher Jones:** CO₂ capture, catalysis
- **Ravi Kane:** polyvalency and biotherapeutics, nanobiotechnology, optogenetics
- **Paul Kohl:** microelectronics, electrochemistry
- **William Koros:** polymers, carbons, membranes



- **Bjarne Kreitz:** plastic waste up-cycling, renewable fuel synthesis, and biomass conversion
- **Nian Liu:** battery technologies, nanoscale materials design and manufacturing
- **Ryan Lively:** energy, polymers, separations
- **Hang Lu:** microfluidics, systems biology, neuroscience
- **Peter Ludovice:** polymer science
- **Christopher Luetgen:** renewable bioproducts
- **Martin Maldovan:** thermal and diffusion processes, energy conversion/storage
- **Andrew J. Medford:** computational catalysis, nitrogen chemistry, data science and machine learning
- **Carson Meredith:** renewable materials, nanotechnology
- **Sankar Nair:** novel materials, nanoscale systems
- **Nga Lee “Sally” Ng:** aerosol chemistry, air quality, and health effects
- **Solomon Tolulope Oyakhire:** energy systems related to climate and food security
- **Anant Paravastu:** structural biology, regenerative medicine
- **Pamela Peralta-Yahya:** metabolic and protein engineering
- **Mark Prausnitz:** bioengineering, biophysical drug delivery
- **Matthew Realff:** process systems engineering
- **Nick Sahinidis:** optimization, process & systems engineering
- **Joseph Scott:** optimization theory and algorithms, control theory, and process modeling and simulation,
- **Carsten Sievers:** heterogeneous catalysis, renewable energy, spectroscopy
- **Patricia Stathatou:** accelerating decarbonization
- **Natalie Stingelin:** organic functional materials
- **Mark Styczynski:** synthetics and synthetic biology
- **Zhaohui Tong:** sustainable materials, catalytical process design
- **Krista Walton:** nanomaterials, separations, energy storage
- **Corey Wilson:** synthetic biology and protein engineering
- **Younan Xia:** nanocrystal synthesis, nanomedicine
- **Julia Yang:** sustainable solutions for energy storage and electrification
- **Micah Ziegler:** sustainable energy and chemical technologies,

[Online Faculty Directory with Bios](#)

About Atlanta

A truly global city, Atlanta is brimming with exciting opportunities.

As a business hub, Atlanta is home to the headquarters of 26 Fortune 1,000 and 15 Fortune 500 companies. The city is also one of the fastest growing high-tech urban centers, with about a dozen incubators for innovative emerging businesses.

Georgia Tech is located in midtown Atlanta, one of the city's most energetic and vibrant neighborhoods for business, education, the arts, and entertainment.

Here, you'll enjoy all the benefits of a major city, with the mountains and coast within reasonable distance.

Read the Chamber of Commerce's [Profile of Metro Atlanta](#).



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Atlanta, GA 30332-0100

Visit us online at
chbe.gatech.edu

APPLY:

chbe.gatech.edu/gradapply

Think Big. Solve Big.

