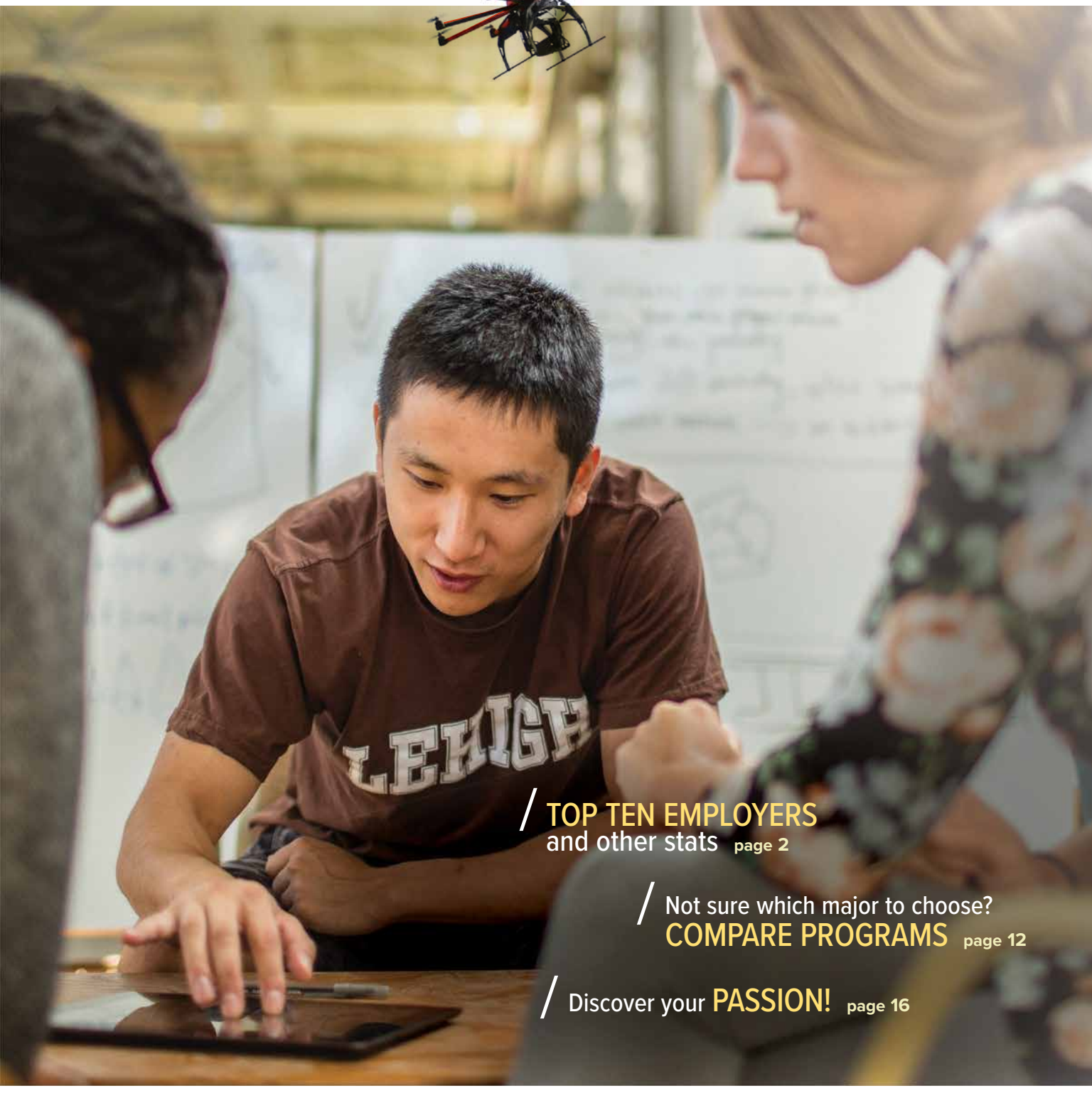
The Insider's Guide to

LEHIGH ENGINEERING

UNDERGRADUATE STUDIES



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LEHIGH UNIVERSITY | P.C. Rossin College of Engineering and Applied Science

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Welcome!

The P.C. Rossin College of Engineering and Applied Science at Lehigh University has some of the most innovative and dynamic engineering programs in the country. At Lehigh, our educational philosophy is founded upon inquiry-based learning—an integration of experiential learning, independent research endeavors, and instructional teaching. Our faculty share a passionate commitment to teaching, mentoring, and building cutting-edge new programs, and our instruction and research facilities are state-of-the-art. The result is a unique and dynamic learning environment.

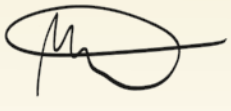
Our goal is to help you create an educational path that matches your talents, interests, and career aspirations. You may already know the area of engineering that's right for you, or, like most prospective students, you may be interested in science and mathematics, but aren't quite sure how that translates into a course of study in engineering. In either case, this guide can help you navigate your options.

For example, if you have a knack for physics and electronics or love building things, then mechanical, structural, or electrical aspects of engineering might suit your skills. In these fields, you'll encounter groundbreaking studies in advanced materials, nanotechnology, design, and manufacturing. If you're passionate about mathematics and information technologies, our programs related to computing, systems engineering, and data analytics provide fresh insight into a range of areas, including electronics, software design, computing architecture and optimization, wireless networks, systems theory, and financial engineering.

We know that many of our most talented engineering students have career interests that go beyond engineering. To foster such aspirations, Lehigh has designed some of the most innovative interdisciplinary programs in the world. They combine engineering with complementary fields of study, and include Integrated Business and Engineering (IBE), Computer Science and Business (CSB), and our Integrated Degree in Engineering, Arts and Sciences (IDEAS). Students graduate from these programs with the skills that will help them lead in the global economy.

Please don't hesitate to contact us—we are happy to answer any questions you might have. Thank you for your interest in Lehigh Engineering!

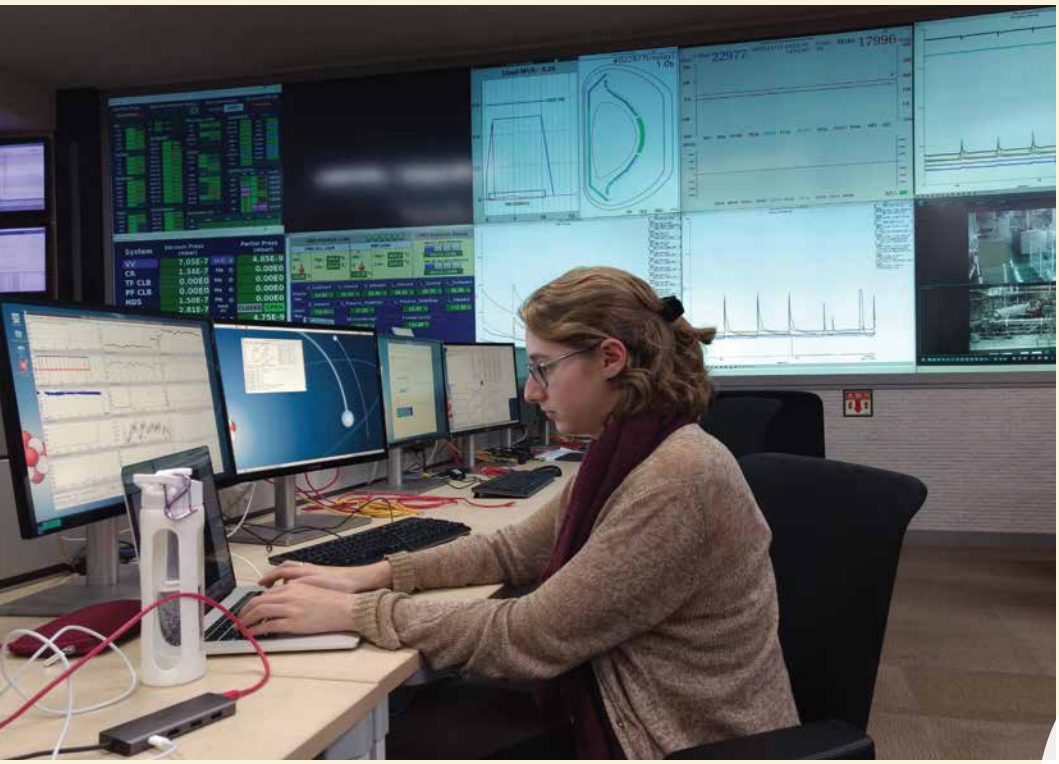
Sincerely,



STEPHEN P. DEWEERTH

Professor and Dean
P.C. Rossin College of Engineering and Applied Science

ROSSIN COLLEGE AT A GLANCE



2,179
UNDERGRADUATE STUDENTS

10:1
STUDENT-TO-FACULTY RATIO
(national average is 13:1)

40%
OF UNDERGRADS CONDUCT RESEARCH

"Ending up at Lehigh changed my life. I'm getting my PhD because a professor reached out to me during my senior year and asked if I wanted to work with him on nuclear fusion. I'm really happy with where I am."

—SHIRA MOROSOHK, *PhD student in mechanical engineering*
National Science Foundation Graduate Research Fellow

96%
OF STUDENTS ARE EMPLOYED OR ATTENDING GRADUATE SCHOOL WITHIN 6 MONTHS OF GRADUATION

$82,256
AVERAGE STARTING SALARY REPORTED BY THE ROSSIN COLLEGE CLASS OF 2022

$83,308
AVERAGE STARTING SALARY FOR 2022 GRADUATES OF INTERDISCIPLINARY PROGRAMS

TOP 10 EMPLOYERS

PwC

Lockheed Martin

EY

Deloitte

Meta

Merck

Naval Nuclear Laboratory

Air Products

W. L. Gore & Associates

Amazon

61%
OF THE MARCHING 97 *(Lehigh's marching band)* ARE ENGINEERS

1 IN 4
ATHLETES STUDIES ENGINEERING

38%
OF THE LEHIGH ENGINEERING CLASS OF 2027 ARE WOMEN

"My goal is to have 100% of our undergraduate students engage in meaningful experiential learning during their education at Lehigh."

—STEPHEN P. DeWEERTH, *Rossin College professor and dean*

EXPERIENTIAL LEARNING

Mickias Bekele

COMPUTER SCIENCE AND BUSINESS

A stint as a software development intern exposed Bekele to the pace and demands he'll encounter on the job.

COMPLETE AN INTERNSHIP

"I had just finished my freshman year, but I knew I wanted to do an internship over the summer. I thought getting more experience would give me an edge and help develop my skills, not just theoretically, but practically. Plus, experiencing the real world early in my college career meant I wouldn't be surprised or shocked by it after I graduated.

I was a software development intern at Altair Integrated Services, an IT consulting firm. I helped develop android and iOS apps, design websites, and build a business statistics board using Raspberry Pi. There were a lot of tasks to do in a short period of time, and I think having such a heavy workload made me stronger and better prepared for my future career.

I learned so much about workplace culture and the business side of software development. I thought I wanted to be a programmer, but now I think I want to work as a systems architect who codes and designs the technical end-to-end infrastructure for an organization. I'm really interested in the security and networking aspect.

My plan is to use my summers for internships. They're great opportunities to grow as an individual and as an engineer."

The Computer Science and Business (CSB) program (page 15) is a joint offering of the P.C. Rossin College of Engineering and Applied Science and Lehigh's College of Business. It combines rigorous computer science education with in-depth business training and prepares undergraduates for leadership positions in the business community.

Caleb Leaser

IDEAS MAJOR IN MECHANICAL ENGINEERING AND PRODUCT DESIGN

JOIN THE CO-OP PROGRAM

"I knew it was going to be important to have real-world experiences to complement my degree. With the co-op program, I took classes the summer before my junior year so I could work full time at Crayola that fall. I returned to the company the summer before my senior year.

While working at Crayola, I contributed to design engineering projects primarily through 3-D printing and injection molding of marker and toy parts. I assisted both the quality assurance and product design departments. After using the 3-D modeling software Solidworks in the professional setting (as opposed to in the classroom), I realized I love design engineering, and that's the field I've decided to pursue.

What I loved most about working at Crayola were the team projects where I got to sit with a designer and figure out, 'What do we want in this pen or marker, and how can we make it happen?' The co-op experience has helped me realize that I'd like to work for a smaller company, because I really enjoy the personal impact I can have on products. When I see things in a store that I helped engineer to life, I know that I brought a little more color and creativity to people.

IT'S REWARDING TO SEE A PROJECT COME TO LIFE, AND THAT'S THE KIND OF EXPERIENCE YOU GET WITH THE CO-OP PROGRAM.

I'm so happy that I had the opportunity to discover what I'm truly passionate about while still an undergraduate student. Because the co-op experience ended before my senior year, I was able to tailor my classes to better align with my design engineering interests. Now, I'll be able to make myself even more of an asset to a future employer."

IDEAS (Integrated Degree in Engineering, Arts and Sciences; page 15) is a four-year honors program where students design their own bachelor's degree, with heavy concentrations in the Rossin College and Lehigh's College of Arts and Sciences. Students apply for the co-op program in the spring semester of their sophomore year.

Over two semesters, Leaser worked at Crayola as part of the co-op program. He contributed to various projects and departments across the company and, ultimately, found his passion in design engineering.

Belle Sullivan

ENVIRONMENTAL ENGINEERING

Participating in the Global Social Impact Fellowship taught Sullivan how to grow mushrooms and what it takes to turn that production into a business.

BUILD A BUSINESS

"We're trying to address the 'hunger months' in Sierra Leone by building mushroom production houses for farmers. They grow rice, but it doesn't grow year-round. Mushrooms can be grown throughout the year off waste products farmers have in abundance, like rice straw.

MY DEFINITION OF DOING GOOD HAS CHANGED. TO ME, IT'S ABOUT MAKING A SUSTAINED IMPACT.

To get ready for our fieldwork in Sierra Leone, we spent the summer on campus experimenting with materials and temperature and humidity. We wanted to get comfortable with the process of growing mushrooms, which is surprisingly hard. But we definitely made some progress.

I grew up doing a lot of nonprofit mission work, and I thought maybe I'd eventually end up working with Engineers Without Borders or the United Nations or something. But the Global Social Impact Fellowship has changed my perspective on what's the best way to help people. I've learned that while the nonprofit approach might solve the immediate problem, it may not solve the long-term problem if donor fatigue affects how much money you're able to raise. We're about building sustainable businesses, and I've learned that making money isn't a bad thing. It's a good thing.

It allows your business to keep going. Initially I thought I wouldn't like having to sit through lectures on subjects like economic viability. I'm very STEM, and a lot more interested in engineering. But those lectures taught me a lot, and contributed to changing my perspective. You just can't just ignore the economics of something. My definition of doing good has changed. To me, doing good is about making a sustained impact.

I think opportunities like the GSIF are where education in general is heading. You get so much more out of doing things hands-on. There's only so much you can learn from a book."

Sullivan and her team tested their methods over nearly three weeks of fieldwork in Sierra Leone during the summer semester.

The Global Social Impact Fellowship (GSIF) attracts undergraduate and graduate students from all disciplines across the university and integrates experiential learning, research, and entrepreneurial engagement. Fellows advance Global Inquiry to Impact projects in the spring and fall semesters and conduct fieldwork in the summer session. These student-led projects take place in countries like Sierra Leone, Kazakhstan, and the Philippines.

DO STUFF / EXPERIENTIAL LEARNING AT A GLANCE

INTERNSHIPS

There's no better way to test-drive the real world. An internship can lead to future networking contacts and even a full-time position upon graduation. While most students intern during the summer, it's possible to do an internship during the semester if your schedule permits.

CO-OP PROGRAM

This selective honors program blends academic study with approximately eight months of full-time, resume-enhancing professional experience. Engineering students who have a cumulative GPA of 3.0 or higher after their first three semesters are eligible to participate.

MOUNTAINTOP PROGRAMS

Students leverage their curiosity to ask questions and seek answers through experiences and experiments. Opportunities include LearnX, MakeX, and SprintX events; the Mountaintop Summer Experience; Creative Inquiry projects; Inquiry to Impact projects; the Global Social Impact Fellowship; and the Lehigh Valley Social Impact Fellowship.

FACULTY-LED RESEARCH

Students participate in important research projects, working alongside our expert faculty in Lehigh's cutting-edge facilities.

INTERNATIONAL EXPERIENCE

Programs such as Lehigh's renowned Iacocca Internships last anywhere from a few weeks to a year and are available in more than 60 countries.

TEAMS, CLUBS & SERVICE LEARNING

There are hundreds of opportunities for Lehigh engineering students to get hands-on experience through student-led teams and activities and by participating in local and global community-based projects.

Yanqi Liu

COMPUTER SCIENCE AND ENGINEERING

Liu was on a multidisciplinary team of students developing an app that will simulate how kids with cochlear implants hear.

DESIGN A PRODUCT

"We do a lot of projects in our classes, but we do them for a grade. The Mountaintop program allowed us to be fully immersed in a long-term project with a real audience, not just professors and classmates. My team was designing an app for parents and care providers that will produce a close simulation of how children with cochlear implants hear different sounds. It's amazing that we can apply our engineering knowledge to help them.

THE MOUNTAINTOP PROGRAM ALLOWED US TO BE IMMERSED IN A LONG-TERM PROJECT.

Initially, I joined this project because I wanted to strengthen my computer science ability. But being on a team has exposed me to so many different perspectives on what it takes to make something like this work. My teammates introduced ideas that we as computer science students wouldn't think about, and that made this app better.

As an international student, working on this project gave me the opportunity to learn more about the United States. We went to the Clarke Schools for Hearing and Speech in Philadelphia, and I was able to see the opportunities available for children with disabilities. It was the first time I felt like I was really experiencing the U.S. society and its values. It's impressive.

It was also the first time I'd worked so closely with my professors. They were so nice, and always there to help if we had problems. I ended up applying for graduate school, and I was able to ask them for letters of recommendation. They're important connections to have for my future career."

Mountaintop projects are interdisciplinary deep dives that bring together faculty, students, and external partners. Teams take new intellectual, creative, and/or artistic pathways that lead to transformative innovations, original expressions, and novel questions.

Ashleigh Crawford

BIOENGINEERING

CONDUCT RESEARCH

"I worked on a lot of different research projects during my time at Lehigh. In my freshman year, I did some simulation research. The summer after that, I worked as an intern at a biotech startup. I also interned as a software engineer. It all helped me realize that I'm most interested in doing bench research—'wet lab' stuff, like pipetting and actually watching things happen in the lab, as opposed to sitting behind a computer.

As a senior, I helped my team develop a diagnostic test strip for sickle cell anemia as part of my Creative Inquiry and capstone design classes. I also got funding through the Clare Boothe Luce Research Scholars to help develop a microfluidic device that can separate pathogens from bodily fluids. These projects were really valuable because they were focused on biomaterials, and I'm studying biopharmaceutical engineering. So I got to diversify and expand my experiences. In the end, though, no matter what you're working on, it's all about problem-solving.

To me, the pace of learning in the lab was so much faster than in the classroom. And while the professor and graduate students will guide you, you're responsible for your own learning, which is really cool. Especially with the sickle cell project, we had so much independence and freedom. Within a year of starting that project, my teammates and I were writing proposals and abstracts for conferences. I never expected to be doing that at that point.

Initially, I wasn't sure if I wanted to go into industry or head to graduate school after graduation. But I've decided on grad school because I'm really interested in vaccines. And I don't think I would have been able to make that decision if I hadn't been in the lab."

Crawford also ran cross-country and competed in the steeplechase for Lehigh University's Women's Track and Field team.

The Clare Boothe Luce Scholarship is one of a number of programs supported by the Rossin College to increase the participation of women in science and engineering research. These programs focus on enriching the value of the student's academic experience through peer networking and mentorship from faculty, research scientists, and graduate students.

YOUR FIRST YEAR

Charting Your Course

Students begin their first year in the P.C. Rossin College of Engineering and Applied Science without formally declaring a major. While some schools require an upfront selection, we give you the time and exposure to make an informed and fulfilling choice.

Most engineering students take the same courses in their first year. You'll get to know your peers, participate in a wide variety of activities—some that relate to engineering, others that broaden your perspective–and become more familiar with your academic and vocational choices.

In addition to guidance from your academic advisor, you'll also receive mentoring and support from our college's student-ambassadors, the Rossin Junior Fellows, as well as Lehigh's Mentor Collective. Both of these groups link incoming engineering students with current engineers for help in selecting a major and navigating the variety of associated opportunities for Lehigh engineers. By the end of your first year, you'll have an academic plan in place and clear direction toward a meaningful experiential learning portfolio.

Academics in the First Year

All engineering majors—except Bioengineering (page 17), Integrated Business and Engineering (page 14), Integrated Degree in Engineering, Arts and Sciences (page 15), and Computer Science and Business (page 15)—share a common first-year curriculum that requires the following nine courses.

MATH	Calculus I, Calculus II
SCIENCE	Chemistry I, Physics I
ENGINEERING	Applied Engineering Computer Methods Intro to Engineering Practice
WRITING	Composition and Literature I Composition and Literature II
ELECTIVE	Your choice, based on academic record and personal interests

SACRED TIME

Since the 1920s, Lehigh has maintained a university-wide policy that avoids scheduling required undergraduate courses between 4 PM and 7 PM.

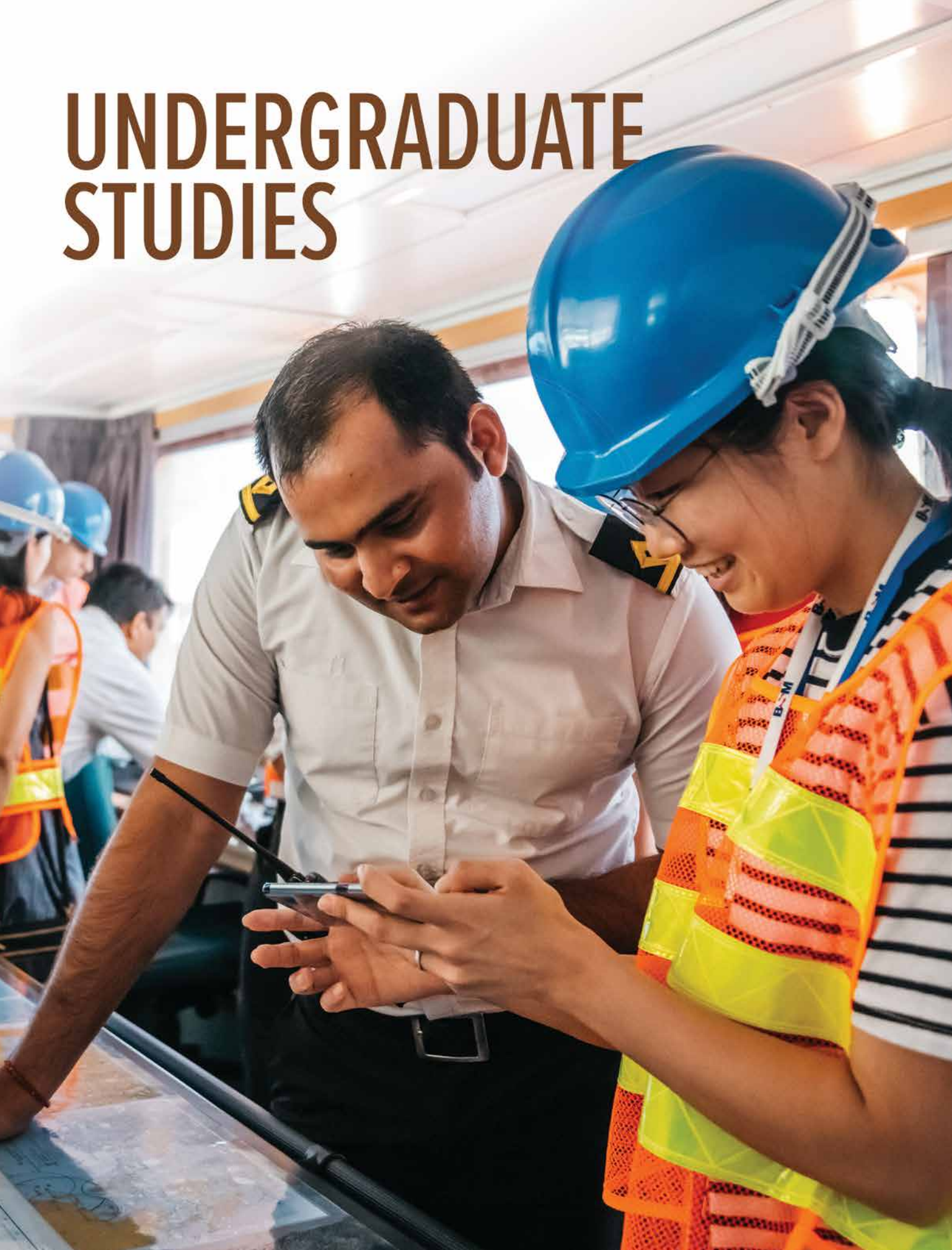
This "sacred" time gives students a common window to participate in theater, chorus, orchestra, intramural sports, or a host of extracurricular activities.

There are more than 300 student clubs, societies, and organizations on campus, with dozens of them focused on some facet of engineering. These groups are a great way to meet people with similar interests, enhance curricular studies with hands-on projects and valuable community service, and start establishing a professional network. Every year, Lehigh's Office of Student Affairs hosts a Student Club Expo on the first day of classes, so make sure you check it out!

There are many other opportunities for experiential learning like studying abroad, doing an internship, or conducting research. You can learn more about them on pages 4–9.

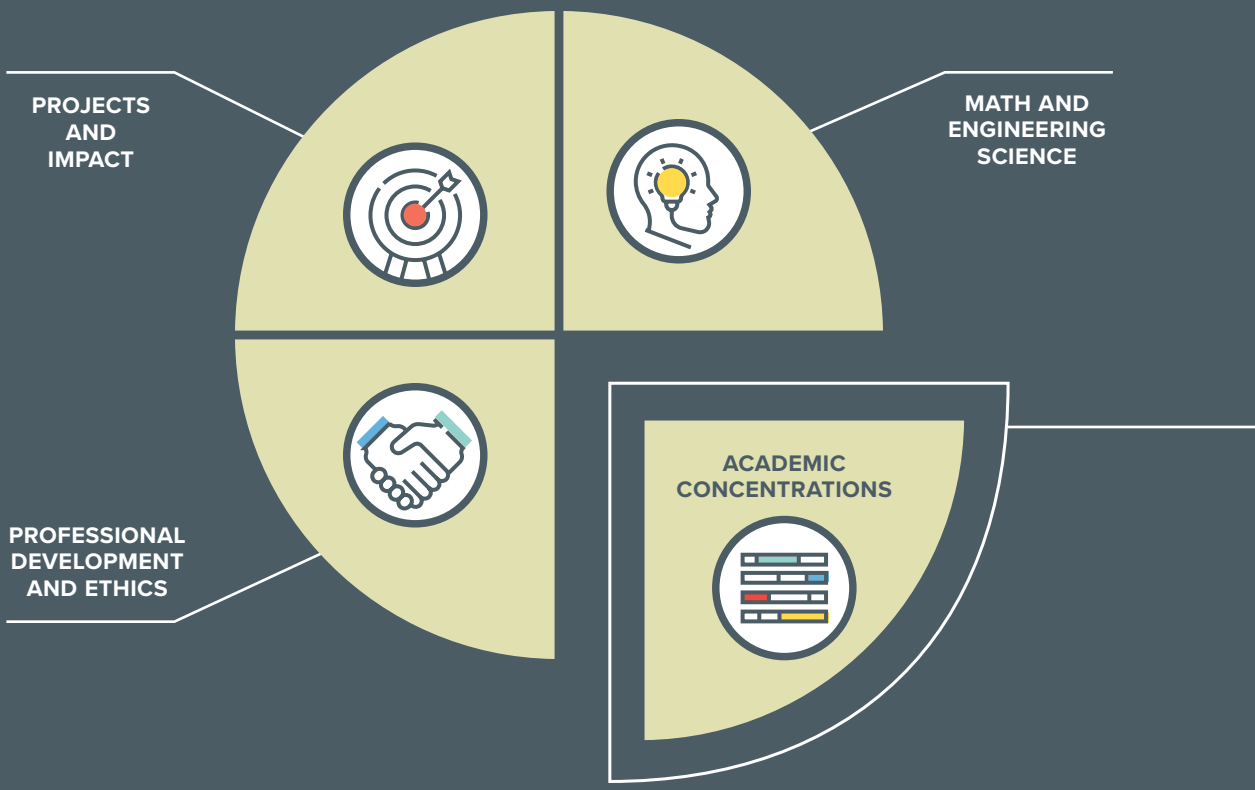
We're delighted that so many students take advantage of these opportunities for growth, enrichment—and fun!

UNDERGRADUATE STUDIES



CURRICULUM COMPARISON

No matter your major, you will develop core knowledge in engineering science and math, engage in professional development and ethics, and take part in project-based learning with opportunities for real-world impact. Each path of study emphasizes a different balance among other key subjects for engineers—data and computing, electrical physics, mechanical physics, and biology and chemistry.

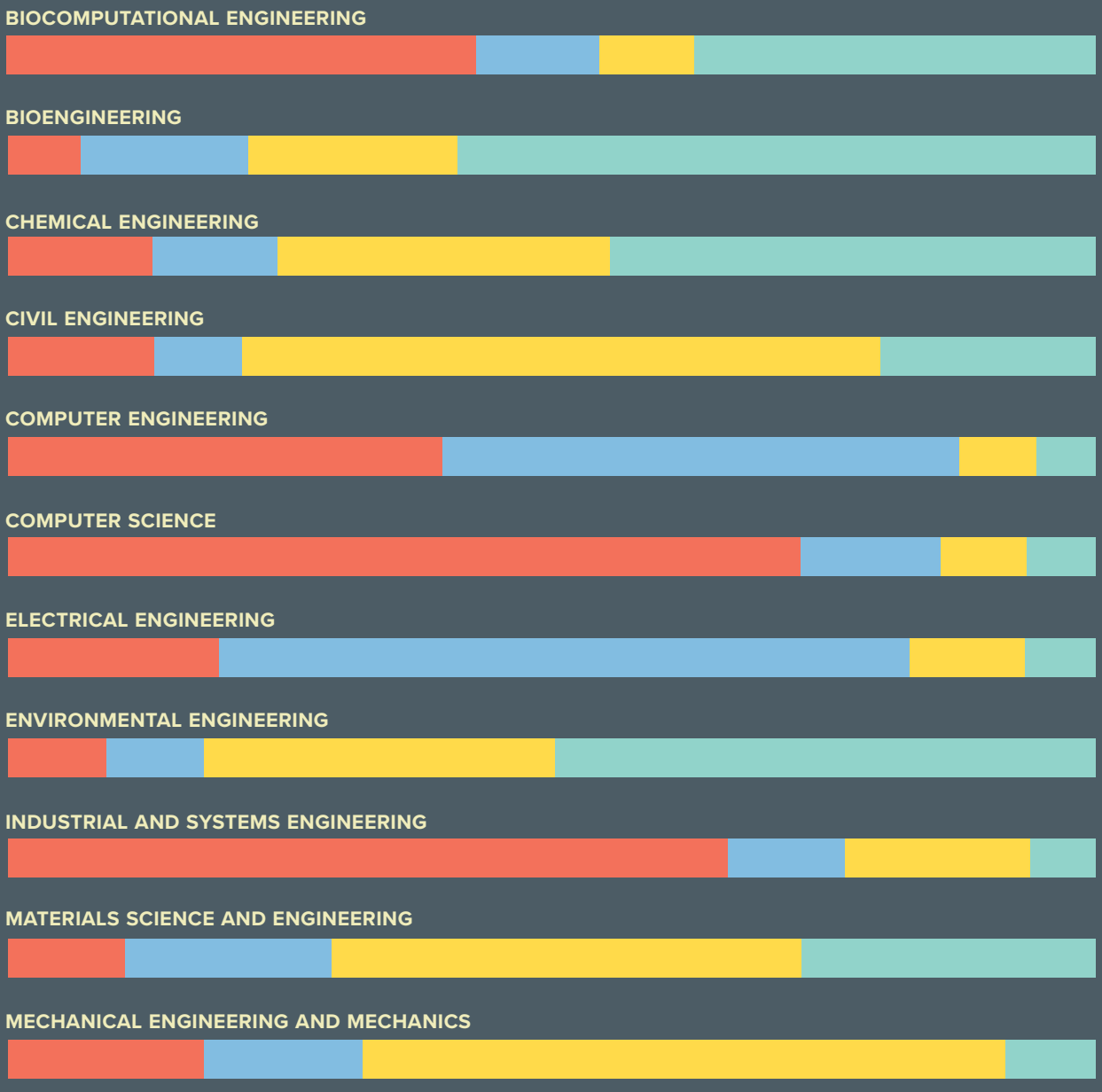


THERE'S MORE THAN ONE RIGHT PATH

You don't need to stress about choosing the "perfect" major. (Really!) Modern engineering projects require diverse skills, making specialization less critical. Embracing new technology and building an interdisciplinary mindset will unlock exciting career opportunities across a wide range of fields. Be open-minded, follow your interests (see pages 14–15 if you don't see a match here), and remember that adaptability and a willingness to learn are key to success in any engineering program!

ACADEMIC CONCENTRATIONS

Use this graph as a quick reference to see how the academic concentrations vary across degrees.



KEY: DATA AND COMPUTING | ELECTRICAL PHYSICS | MECHANICAL PHYSICS | BIOLOGY AND CHEMISTRY

INTERDISCIPLINARY PROGRAMS

Many of today's most pressing issues demand solutions that defy traditional academic boundaries. Real progress requires incorporating perspectives from business, science, arts, and the humanities. To encourage creative problem-solving, Lehigh has developed some of the most innovative and flexible programs in higher education. Our unique Interdisciplinary Programs blend engineering with fields of study within Lehigh's College of Business and its College of Arts and Sciences. Alumni go on to create their own paths in areas such as law, medicine, business, academia, and government.

INTEGRATED BUSINESS AND ENGINEERING (IBE)

Lehigh's IBE program prepares students for leadership roles in industrial research and development, entrepreneurial initiatives, management consulting, high-tech ventures, and innovative technology.

Students work with advisors to develop an academic plan that draws from both the P.C. Rossin College of Engineering and Applied Science and the College of Business. IBE is a four-year honors program that leads to an AACSB-accredited Bachelor of Science degree. Students can opt for a fifth year of study for a professionally accredited second BS in their engineering major.

IBE students must acquire proficiency in at least one foreign language and are encouraged to study or intern abroad. They must also complete a summer industrial internship and a two-semester senior capstone design project.

INTEGRATED DEGREE IN ENGINEERING, ARTS AND SCIENCES (IDEAS)

IDEAS cultivates liberally educated and technologically sophisticated individuals. This four-year program, jointly administered by the College of Arts and Sciences and the Rossin College, combines the breadth and depth of two programs of study. Graduates receive a Bachelor of Science degree granted by both colleges. Students interested in a professionally accredited degree in their chosen engineering discipline can opt for a fifth year of study.

Students will study diverse but complementary fields like bioengineering and religion, industrial engineering and international relations, and music and computer science. Coursework is highly writing intensive and presentation oriented to hone students' ability to communicate across disciplines. Students must also complete a senior-year capstone research project and thesis that integrates their passions.

COMPUTER SCIENCE AND BUSINESS (CSB)

Students who complete this demanding program receive a unique joint degree from the College of Business and the Rossin College.

Through a range of coursework and projects, students obtain the skills necessary to understand business-related functions and problems, analyze business-user information needs, design computer-based information systems, and implement systems solutions in organizations. Students can concentrate in areas such as finance, accounting, economics, and various subdisciplines within computer science. Required computing courses include database systems, operating systems, algorithms, computer architecture, programming, and software engineering. Business courses include accounting, finance, marketing, management, and economics.

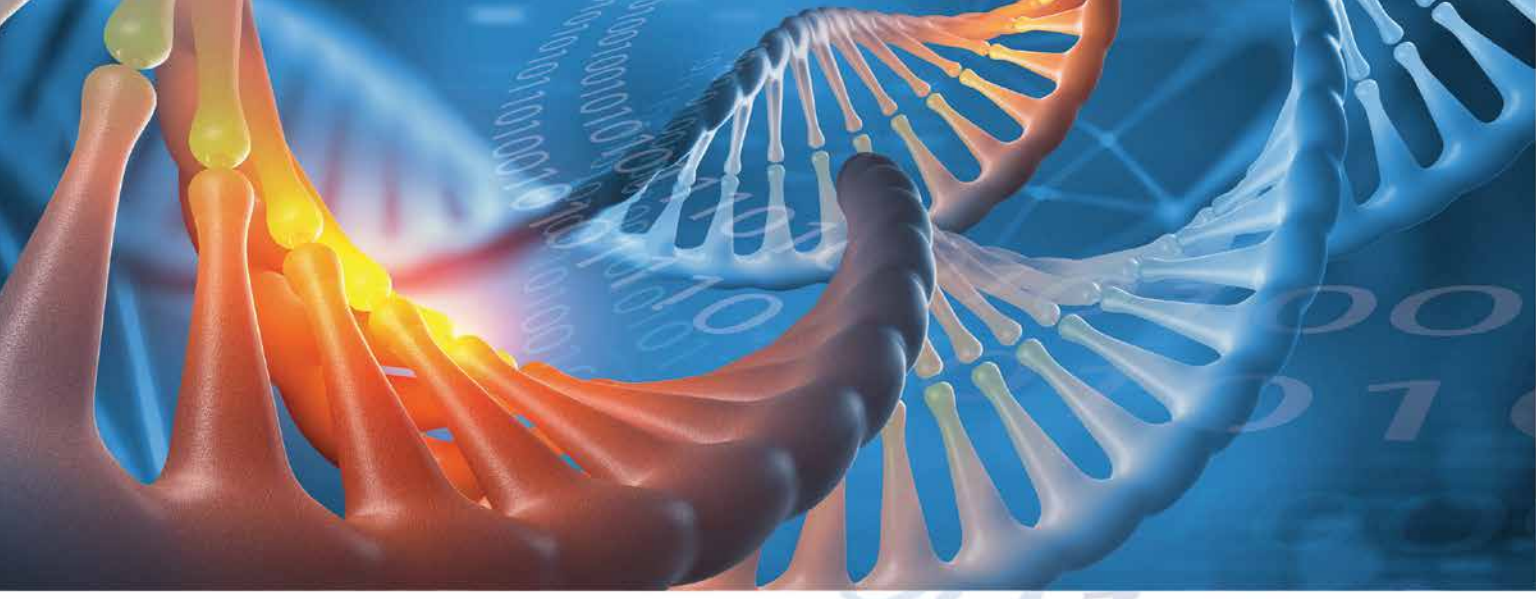
CSB graduates often join accounting, consulting, or computing firms; sign on with startups; or continue their studies to earn an advanced degree.

ARTS AND ENGINEERING

This five-year, dual-degree program allows students to pursue convergent and complementary interests. Students earn two Bachelor's degrees, one from the Rossin College and one from the College of Arts and Sciences.

Students fulfill all requirements for their professional engineering degree, with the first three years of science and engineering courses spread out over four years. During this time, students pursue a Bachelor of Arts or Bachelor of Science in the College of Arts and Sciences.

Students who are interested in the requirements for various arts programs should contact the specific department within the College of Arts and Sciences.



DEGREE PROGRAMS

ARE YOU A BIOCOMPUTATIONAL ENGINEER?

- You love biology, computer science, and engineering.
- You want to solve problems in health care, biotechnology, and big data, often under conditions of uncertainty.
- You're eager to enter an exciting and rapidly growing field.

BS, Biocomputational Engineering

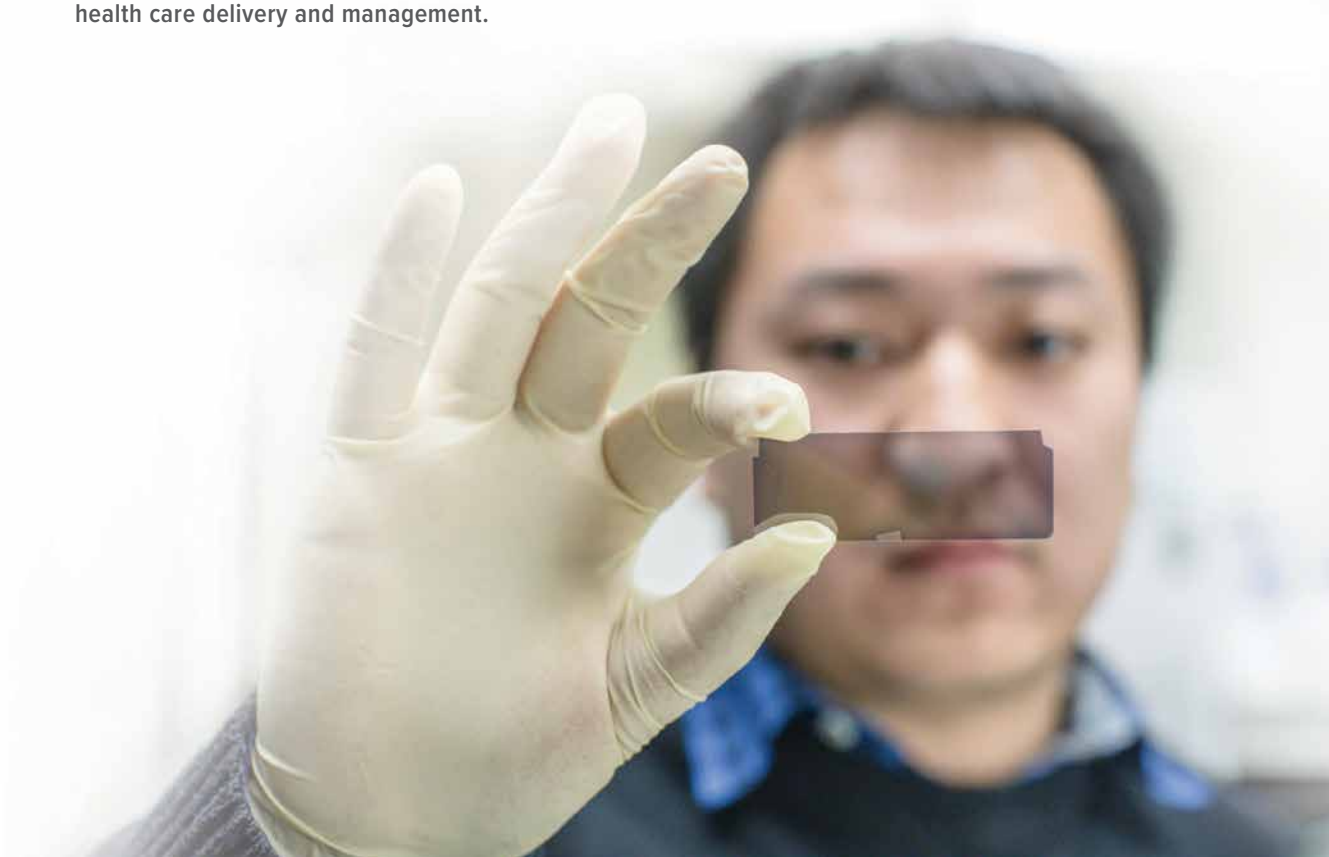
This program is one of very few available nationwide at the undergraduate level. Students build a foundation in the basic sciences, mathematics, and computer programming, and take a rigorous core of interdisciplinary engineering coursework. Graduates are prepared for opportunities at the interface of bioengineering and computational data sciences.

BS, Bioengineering

This highly interdisciplinary program bridges rigorous training in the engineering and physical sciences with biology and bioengineering applications. Students learn how biological systems work, develop analytical skills, and use advanced tools in experimentation, modeling, and simulation. The program complements formal instruction with opportunities for experiential learning via extended research with faculty members, team-based and industry-sponsored design projects, and seminar courses.

ARE YOU A BIOENGINEER?

- You're fascinated by both engineering and biology.
- You're eager to solve problems in the areas of health care, medicine, and biotechnology, in emerging fields like biomedicine and biomaterials.
- You're deeply curious about bioelectronics, biophotonics, biopharmaceutical engineering, and cell and tissue engineering.
- You're interested in designing and bringing to market medical devices and systems for health care delivery and management.



BS, Chemical Engineering

Chemical engineers are the driving force in many exciting areas of bioengineering and biotechnology, and they're vital in pollution abatement, developing efficient energy solutions, and national defense. Students have the opportunity to collaborate on a range of hands-on research projects that prepare them for industry. Lehigh's program offers technical minors in areas such as energy, information, biotechnology, materials engineering, environmental engineering, and polymer science and engineering.

ARE YOU A CHEMICAL ENGINEER?

- You want to use chemistry and physics to advance large-scale processes, create products, and engineer solutions.
- You're passionate about finding new perspectives and approaches to global challenges such as exploring traditional and emerging energy sources, incorporating sustainable manufacturing practices, and developing biochemicals and technologies for health care.
- You're curious how chemical products evolve from lab testing to broad consumer availability.

BS, Civil Engineering

Lehigh's civil engineering program prepares students to design and construct the systems and structures upon which society depends every day, from buildings and the plants that power them, to the roads, bridges, tunnels, and waterways that connect it all. Every civil engineer works on projects that involve great complexity, longevity, and cost. Students get rigorous training in the physical sciences, mathematics, and scientific methods, coupled with complementary studies in the humanities and social sciences.

ARE YOU A CIVIL ENGINEER?

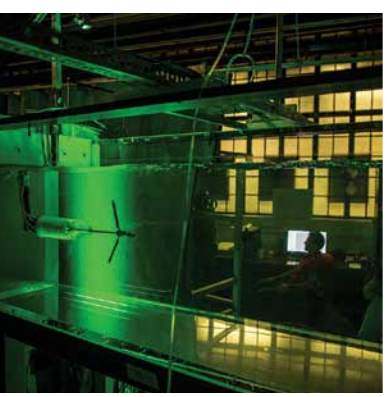
- You're excited about designing and building the next generation of infrastructure.
- You welcome the challenge of managing complicated, large-scale projects.
- You're creative and analytical and you enjoy working on teams.
- You're excited about the range of opportunities you'll encounter across the public and private sectors.

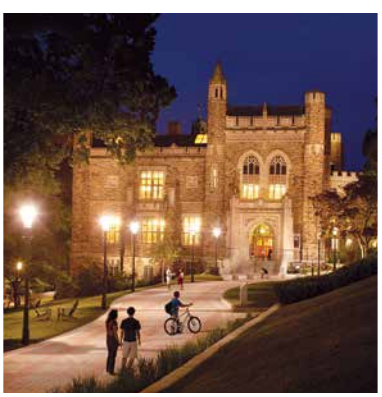
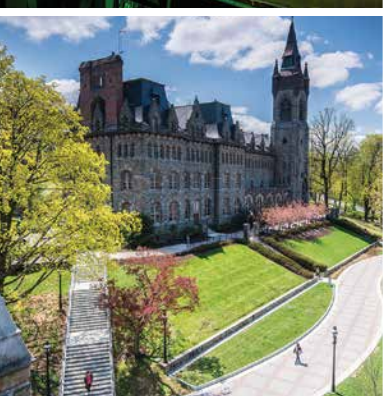
ARE YOU A COMPUTER ENGINEER?

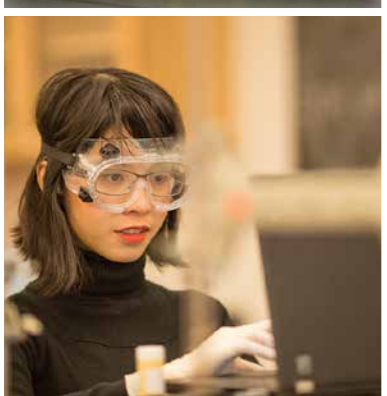
- You're fascinated by the integration of computer hardware and software systems.
- You want to model and build electronic systems that support a wide array of activities in areas such as health care, finance, and industrial design.
- You're eager to spend your days designing computers, microprocessors, supercomputers, robotics, biomedical devices, or automobile control systems.

BS, Computer Engineering

Computer engineers focus primarily on hardware, while computer scientists and programmers focus more on software. Students learn to design and analyze complex systems, work in teams with their peers to develop digital systems and software, and solve real-world problems. They also play active roles in research projects where they learn by designing hardware and software solutions applicable to industry needs. Graduates of the program work in areas such as circuit design, embedded systems, communications, and networking.



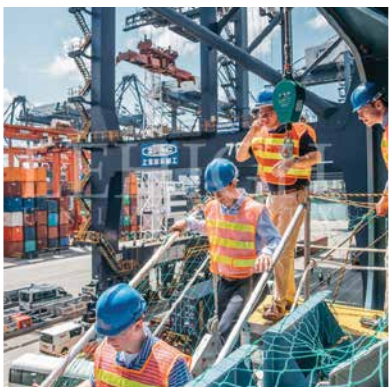
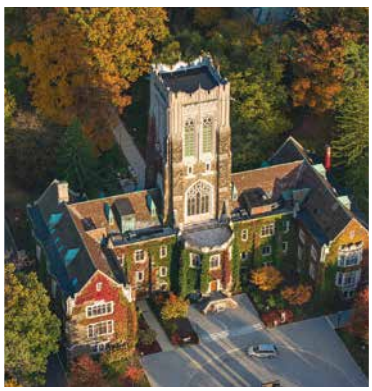




BS, BA, Computer Science

Lehigh's computer science program promotes the fundamentals of discrete mathematics, structured programming, algorithms, computer architecture, operating systems, and programming languages. Students collaborate with professors on cutting-edge research projects in gaming intelligence, smart web search, medical image processing, robotics, data mining, computer security, and mobile computing.

ARE YOU A COMPUTER SCIENTIST?

- You want to create, design, implement, and improve computer algorithms and software in a field that is constantly growing and evolving.
- You're intrigued by the range of interdisciplinary, highly collaborative projects associated with artificial intelligence and robotics, machine learning and data mining, and human-computer interaction and social computing.
- You're curious how to integrate computer science with other fields such as biology, design, and business.




ARE YOU AN ELECTRICAL ENGINEER?

- You like solving problems through the modeling and application of electronic systems.
- You're fascinated by devices like circuit boards and electronics and you want to understand how they work—and how to make them work better.
- You're interested in designing medical equipment; controlling airplanes, missiles, and satellites; creating faster communication with computers; making vehicles safer; or creating new renewable sources of energy.

BS, Electrical Engineering

Students build a foundation in how to solve multidisciplinary problems using mathematics, science, and engineering. Graduates are innovators in health care, aviation, defense, manufacturing, technology, and energy. They use nanoelectronics, tiny computer chips, and photonic devices to harness alternative sources of energy, create biomedical instrumentation that saves lives, and develop sensor networks that protect the environment and improve quality of life.

BS, Environmental Engineering

Lehigh's environmental engineering program gives students a foundation in the causes, control, and prevention of environmental problems and trains them to ultimately solve those problems. Students study chemistry, environmental science, chemical engineering, hydraulic engineering, pollution control, waste engineering, and geo-environmental engineering. They compete in research symposia, present at national conferences, and contribute to real-world design challenges as well as government- or industry-sponsored projects.

ARE YOU AN ENVIRONMENTAL ENGINEER?

- You care deeply about protecting the environment and human health.
- You are interested in using chemistry and biology to improve the quality of air, water, and soil.
- You're committed to building a more sustainable world.

BS, Industrial and Systems Engineering

Lehigh's industrial and systems engineering program is one of the most highly regarded in the country. Students benefit from the ISE department's strong interaction with industry, particularly through a well-established capstone senior design course in which students work on real-world projects. State-of-the-art facilities expose students to advances in computing, electronics, manufacturing, robotics and automation, and manufacturing technology. Graduates go on to design, improve, and optimize processes, systems, products, and services.

ARE YOU AN INDUSTRIAL ENGINEER?

- You love engineering, science, and math and want to apply your problem-solving and analytical skills to manage and optimize complex systems.
- You are interested in design and analysis that involves the interaction of people and technology under conditions of uncertainty.
- You enjoy working on multidisciplinary teams and may aspire to senior-level positions in consulting, finance, transportation, logistics, software, telecommunications, or health care.

ARE YOU A MATERIALS SCIENTIST?

- You're excited about engineering and processing materials that will enable new products and technologies.
- You're curious how the atomic structure of materials controls their properties.
- You're looking forward to career options in fields like chemicals, electronics, transportation, communications, and aerospace.

BS, Materials Science and Engineering

Advances in materials drive technological progress. Materials scientists use existing materials to improve a product or develop new materials and processing methods, often within nano-, bio-, structural, and electronics engineering pursuits. Materials science and engineering students engage in hands-on laboratory experience, research opportunities, and summer internships. They can also pursue minors in nanotechnology, polymer science and engineering, and mechanics of materials.

ARE YOU A MECHANICAL ENGINEER?

- You're fascinated by how machines work.
- You want to design and create machinery and other products for consumers and industry.
- You are excited about modeling systems of physical processes through computation and data analysis.

BS, Mechanical Engineering

This comprehensive program teaches students the fundamentals of solid and fluid mechanics, engineering materials, product design and manufacturing, thermodynamics, and control systems. Lehigh mechanical engineers work in diverse industries such as aerospace, transportation, bioengineering, communications, electronics, computers, energy, environment, machinery, and manufacturing.

MINORS

Engineering Minors

- Aerospace Engineering
- Biotechnology
- Chemical and Biomolecular Engineering
- Computer Science
- Data Science
- Electrical Engineering
- Energy Engineering
- Engineering Leadership
- Environmental Engineering
- Manufacturing Systems Engineering
- Materials Science and Engineering
- Mechanics of Materials
- Nanotechnology
- Polymer Science and Engineering

Other Minors

Lehigh University offers a full slate of minor options across business and entrepreneurship, education and the arts, humanities, and social sciences. For more on these options, review the *Lehigh University Course Catalog* or contact the Rossin College Office of Student Learning and Academic Affairs via ***engineering@lehigh.edu***.

ADVANCED STUDIES & RESEARCH

JUMP-START GRADUATE STUDIES

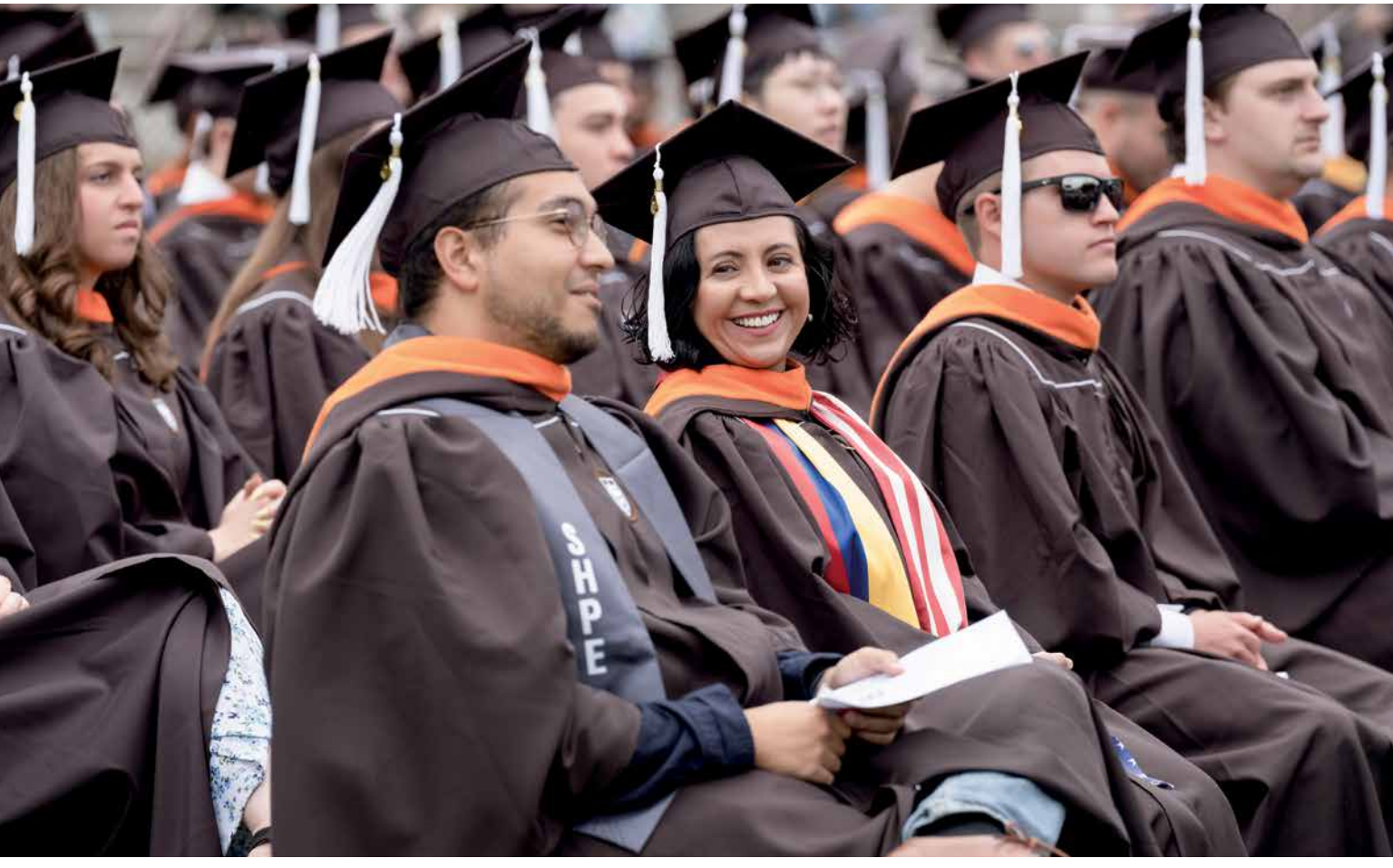
The **BACHELOR'S TO MASTER'S ACCELERATED PROGRAM** allows eligible undergraduates to leverage up to 12 credits taken during undergraduate studies toward a master's degree within the Rossin College (or any of Lehigh's colleges). In addition, the accelerated program allows students to enroll in graduate (400-level) courses during their junior and senior years, which are included in the Lehigh undergraduate tuition. Doing so can effectively save participants up to 40 percent on the cost of a traditional MS degree. Often, this enables students to complete the credits for a master's in one additional year of study beyond their four-year degree.

Engineering Master's Degree Programs

- Bioengineering (MS)
- Biological Chemical Engineering (M.Eng.)
- Catastrophe Modeling (MS)
- Chemical Engineering (MS, M.Eng.)
- Civil Engineering (MS, M.Eng.)
- Computer Engineering (MS, M.Eng.)
- Computer Science (MS, M.Eng.)
- Data Science (MS)
- Electrical Engineering (MS, M.Eng.)
- Energy Systems Engineering (M.Eng.)
- Environmental Engineering (MS, M.Eng.)
- Financial Engineering (MS)
- Healthcare Systems Engineering (M.Eng.)
- Industrial and Systems Engineering (MS, M.Eng.)
- Materials Science and Engineering (MS, M.Eng.)
- Mechanical Engineering (MS)
- Photonics (MS)
- Polymer Science and Engineering (MS, M.Eng.)
- Structural Engineering (MS, M.Eng.)
- Technical Entrepreneurship (M.Eng.)

Master's degrees are becoming increasingly common in the workplace. During graduate study, students build new skills and expand existing abilities, whether they continue in their undergraduate discipline or change fields. Opportunities for study also exist in programs that reside outside of the traditional engineering departments. Graduate students can build professional credentials in energy, healthcare systems, technical entrepreneurship, structural engineering, or data science.

Students interested in the Accelerated BS-Master's Program must have a cumulative GPA of at least 3.00 by the end of the fifth undergraduate semester. Courses that will be counted toward the master's degree must be above and beyond the undergraduate degree requirements.



Is a PhD in your future?

Doctoral programs offered across our engineering departments provide a pathway for students to create new knowledge through groundbreaking, multidisciplinary research. PhD students engage in ongoing faculty research that matters, including health and health care, energy and its environmental impact, sustainable infrastructure, nanotechnology, and high-performance computing. Graduates become leaders in their fields and researchers of the highest caliber.

INTERDISCIPLINARY RESEARCH INSTITUTES

Lehigh's Interdisciplinary Research Institutes (IRI) are communities of scholars dedicated to incubating and catalyzing big ideas in areas crucial to academic and societal progress, while promoting the impact and visibility of Lehigh research. Lehigh's IRIs enable the university to further develop its strengths in key areas that resonate with our academic community and wield significant impact on the world around us.

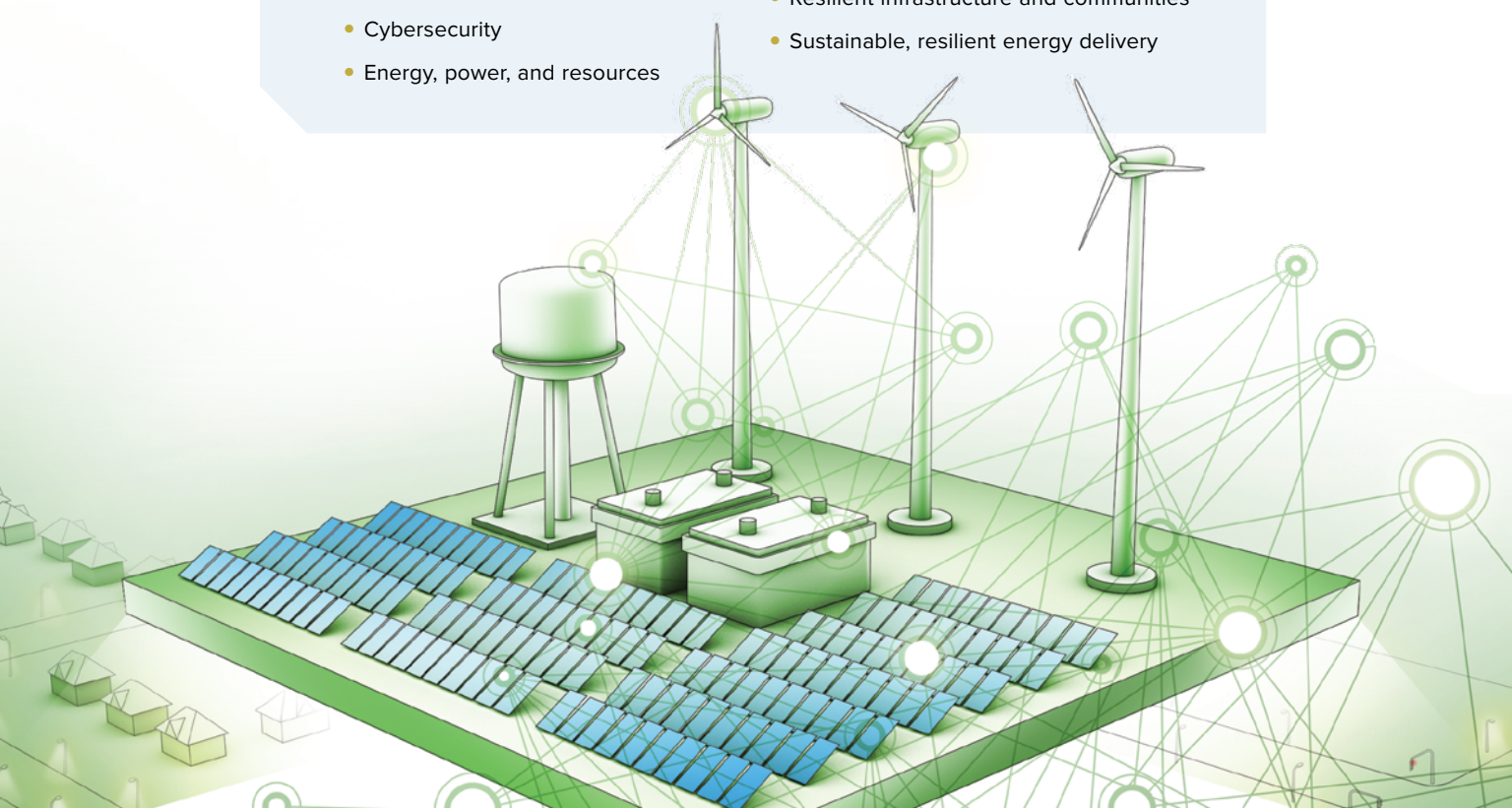
INSTITUTE FOR CYBER PHYSICAL INFRASTRUCTURE AND ENERGY (I-CPIE)

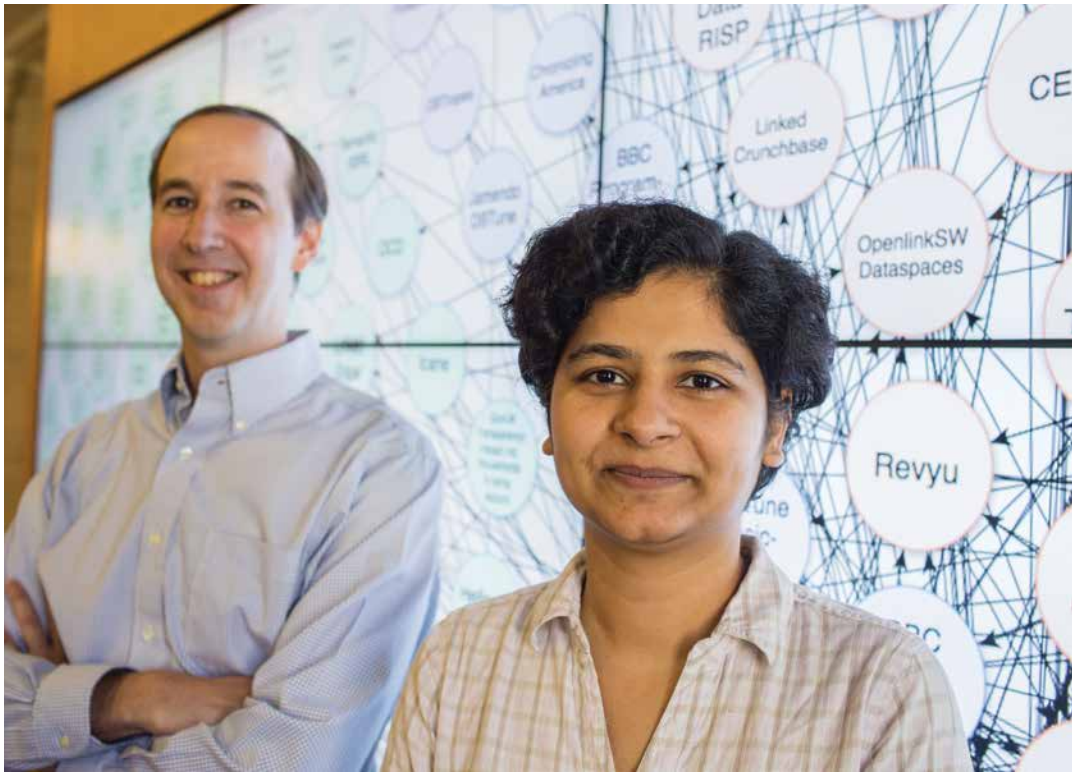
Understanding how humans and society influence the risks surrounding infrastructure and energy systems—and how they cause damage and address the need for restoration—is a challenge that goes beyond engineering. A 360-degree view of the problem requires expertise from fields such as sociology, psychology, and economics. Creating an intellectual space for addressing these complex issues—and nurturing large-scale research initiatives as they flourish—is the key focus for I-CPIE researchers.

ICPIE.lehigh.edu

Current Research

- Cyber-physical systems and Internet of Things
- Connected communities
- Cybersecurity
- Energy, power, and resources
- Energy-water nexus
- Large structural systems
- Resilient infrastructure and communities
- Sustainable, resilient energy delivery





INSTITUTE FOR DATA, INTELLIGENT SYSTEMS, AND COMPUTATION (I-DISC)

I-DISC cultivates and supports collaboration with industrial, academic, and governmental partners in attacking some of the most pressing challenges in technology and society. Building upon a foundation of Lehigh research expertise and resources in computationally intensive and computationally focused research, I-DISC research teams combine fundamental computational approaches with those focused on such critical applications as robotics and computer vision, business and management science, privacy and security, cyber-physical systems and infrastructure, energy, and the interface of biology, nanotechnology, and materials science.

IDISC.lehigh.edu

Current Research

- Data-driven inference/control of dynamic systems
- Fintech and blockchain
- Machine learning in materials science
- Operations research and machine learning
- Probabilistic modeling
- Reinforcement learning
- Robotics
- Scalable systems software

INSTITUTE FOR FUNCTIONAL MATERIALS AND DEVICES (I-FMD)

I-FMD pursues innovative new materials and devices that underpin many of society's greatest challenges, from detecting and treating disease to implementing large-scale renewable energy sources to securing food and fresh water for all. I-FMD brings together Lehigh's interdisciplinary expertise in synthesis, fabrication, processing, and materials characterization as applied to sensors, actuators, and other devices that have critical functionality across mechanical, electronic, photonic, and chemical domains.

IFMD.lehigh.edu

Current Research

- Materials synthesis and growth under extreme conditions
- Renewable energy to products: sustainable chemicals for life
- Photonics and optoelectronics
- Active soft materials toward biofunctional nanorobotics
- Wound healing and biomaterials
- High-performance material processing and additive manufacturing

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