



School of Engineering
and Applied Science

PRINCETON

Finding Your Place

Princeton Engineering combines deep expertise in the core disciplines of engineering and applied science with broad opportunities for collaboration, creating an excellent environment for learning and for high-impact research. Prospective students apply to only one of the school's six departments, but frequently collaborate with professors and students from other engineering departments and from across the University, including the natural sciences, the School of Architecture, the Woodrow Wilson School of Public and International Affairs, and the Bendheim Center for Finance.

To help you find your place among the many possibilities, the following pages provide general information and directories for the research areas in each department. They also list nine cross-disciplinary areas — such as bioengineering and materials science — and indicate the departments that would be a good base from which to pursue research in those topics.

For more details, please visit the School of Engineering and Applied Science website and the sites for each department.

www.princeton.edu/engineering

Nondiscrimination Statement







In compliance with Title IX of the Education Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, Title VI of the Civil Rights Act of 1964, and other federal, state, and local laws, Princeton University does not discriminate on the basis of age, race, color, sex, sexual orientation, gender identity, religion, national or ethnic origin, disability, or veteran status in any phase of its employment process, in any phase of its admission or financial aid programs, or other aspects of its educational programs or activities. The vice provost for institutional equity and diversity is the individual designated by the University to coordinate its efforts to comply with Title IX, Section 504 and other equal opportunity and affirmative action regulations and laws. Questions or concerns regarding Title IX, Section 504 or other aspects of Princeton's equal opportunity or affirmative action programs should be directed to the Office of the Vice Provost for Institutional Equity and Diversity, Princeton University, 205 Nassau Hall, Princeton, NJ 08544 or 609-258-6110.

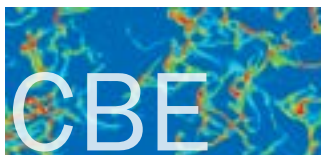
Photos by Denise Applewhite, Frank Wojciechowski, or courtesy of the subject

Produced by the Office of Communications

Copyright © 2016 by The Trustees of Princeton University
Princeton in the nation's service and the service of humanity

Degree-Granting Departments

DEGREE-GRANTING DEPARTMENT	APPLICATION DEADLINE	DEGREES OFFERED	GRE	ADDITIONAL DEPARTMENT REQUIREMENTS	WEBSITE
 <p>CHEMICAL AND BIOLOGICAL ENGINEERING</p>	Dec. 15	Ph.D.	general test	M.S.E. and M.Eng. applicants typically have support from their employer or from external fellowships.	www.princeton.edu/cbe
	Dec. 15	M.S.E.			
	Dec. 15	M.Eng.			
 <p>CIVIL AND ENVIRONMENTAL ENGINEERING</p>	Dec. 31	Ph.D.	general test	Applicants are required to select one of the following subplans: environmental engineering and water resources, or materials, mechanics, and structures.	www.princeton.edu/cee
	Dec. 31	M.S.E.			
	Dec. 31	M.Eng.			
 <p>COMPUTER SCIENCE</p>	Dec. 15	Ph.D.	general test	Applicants are required to select a subplan.	www.cs.princeton.edu
	Dec. 15	M.S.E.			
 <p>ELECTRICAL ENGINEERING</p>	Dec. 15	Ph.D.	general test	Applicants are required to select a research area of interest when applying.	www.ee.princeton.edu
 <p>MECHANICAL AND AEROSPACE ENGINEERING</p>	Dec. 1	Ph.D.	general test		www.princeton.edu/mae
	Dec. 1	M.S.E.			
	Dec. 1	M.Eng.			
 <p>OPERATIONS RESEARCH AND FINANCIAL ENGINEERING</p>	Dec. 31	Ph.D.	general test; Mathematics subject test strongly recommended	Applicants are required to select one of the following subplans: statistics, finance, operations research, probability, and stochastic models.	www.orfe.princeton.edu
	Dec. 31	M.S.E.			



Chemical and Biological Engineering

Chemical and biological engineering addresses a range of problems in human health, energy, materials science, and industrial processes. Areas of excellence at Princeton include: applied and computational mathematics, bioengineering, environmental and energy science and technology, materials, process-systems engineering, thermodynamics and statistical mechanics, and transport phenomena.

- Faculty members: **18**
- Graduate students: **81**
- Undergraduate students: **184**
- Research and technical staff members: **36**
- Degrees offered: **M.Eng., M.S.E., Ph.D.**



Allison Simi

A recipient of the New Jersey Commission on Cancer Research Pre-Doctoral Fellowship, Simi investigates how the stiffening of a tissue during tumor formation affects the behavior of the surrounding cells. Her work as a doctoral student suggests that a soft, normal environment protects the cells from acquiring genetic abnormalities that drive cancer. Understanding this relationship provides potential targets for new therapeutics.

RESEARCH AREAS

	CBE	CEE	COS	ELE	MAE	ORF
Applied and Computational Math	●	●	●	●	●	●
Applied Physics	●	●	●	●	●	
Bioengineering	●	●	●	●	●	●
Computing and Information Sciences			●	●		●
Energy and Environment	●	●		●	●	●
Materials Science and Nanotechnology	●	●		●	●	
Multimedia and Arts		●	●	●		
Process Engineering and Optimization	●					●
Security and Risk		●	●	●		●



Rodney D. Priestley

Priestley is an associate professor as well as associate director of the Princeton Center for Complex Materials. His research interests focus on polymer glasses, nano-confined polymer dynamics, polymer thin film and nanoparticle formation, matrix-assisted pulsed laser evaporation, and responsive polymers. He is the recipient of the Presidential Early Career Award for Scientists and Engineers, an Alfred P. Sloan Fellowship, the Camille Dreyfus Teacher-Scholar Award, an American Chemical Society new investigator grant, a 3M non-tenured faculty grant, a National Science Foundation CAREER Award, and the Air Force Office of Scientific Research Young Investigator Research Program.

Faculty by Research Area

Applied & Computational Mathematics

Brynildsen, Debenedetti, Kevrekidis, Shvartsman

Bioengineering

Avalos, Brangwynne, Brynildsen, Debenedetti, Link, Nelson, Shvartsman

Environmental & Energy Science and Technology

Avalos, Benziger, Debenedetti, Kevrekidis, Koel, Loo, Panagiotopoulos

Materials Synthesis, Processing, Structure and Properties

Aksay, Brangwynne, Koel, Loo, Nelson, Panagiotopoulos, Priestley, Register, Russel

Process Engineering and Science

Benziger, Kevrekidis, Sundaresan

Thermodynamics and Statistical Mathematics

Debenedetti, Panagiotopoulos

Transport Phenomena

Brangwynne, Prud'homme, Register, Russel, Shvartsman, Sundaresan



Mechanical and Aerospace Engineering

Mechanical and aerospace engineers at Princeton have played leading roles in fluid modeling and measurement, propulsion, combustion, and aerospace dynamics over the past half-century. With ties to many other areas of science and engineering, MAE faculty have a major impact in bioengineering; pollution and alternative fuels; energy harvesting, storage, and use; space exploration; satellite technology; propulsion systems; vehicle stability and control; aircraft performance; instrumentation; and laser technology and materials.

- Faculty members: **25**
- Graduate students: **96**
- Undergraduate students: **145**
- Research and technical staff members: **71**
- Degrees offered: **M.Eng., M.S.E., Ph.D.**



Jesse Ault

A doctoral student, Ault studies the properties of fluids in different states, including liquid, plasma, and gas, along with the forces that act upon them. He tries to understand how these fluids behave in complex, curving geometric systems, like nuclear power plants, chemical reactors, natural ecosystems, and even the human body. More broadly, Ault is motivated by grand challenges that bring engineering to bear on societal needs. His work has broad possible uses such as avoiding dangerous gas buildup in a chemical plant, designing a new drug delivery system, or understanding blood-vessel disorders.

RESEARCH AREAS	CBE	CEE	COS	ELE	MAE	ORF
Applied and Computational Math	●	●	●	●	○	●
Applied Physics	●	●	●	●	○	
Bioengineering	●	●	●	●	○	●
Computing and Information Sciences			●	●		●
Energy and Environment	●	●		●	○	●
Materials Science and Nanotechnology	●	●		●	○	
Multimedia and Arts		●	●	●		
Process Engineering and Optimization	●					●
Security and Risk		●	●	●		●



Andrej Kosmrlj

Kosmrlj, an assistant professor, pursues theoretical and computational research of complex systems, ranging from materials science to the physics of living systems. His current research includes the design and mechanics of metamaterials, where geometrical shape of structures gives rise to unusual material properties. He also studies protein aggregates, which have been implicated in a wide variety of diseases, such as Alzheimer's and Parkinson's, and are also one limiting factor for drugs that are used for regulating diabetes. He has excelled as a teacher, earning a Princeton Engineering commendation for outstanding teaching.

Faculty by Research Area

Applied Physics

Arnold, Carter, Choueiri, Glaser, Kolemen, Mikhailova

Dynamics and Controls

Kasdin, Kolemen, Leonard, Littman, Rowley, Stengel

Fluid Mechanics

Arnold, Hultmark, Law, Martinelli, Mueller, Nosenchuck, Rowley, Smits, Stone

Materials Science

Arnold, Carter, Haataja, Kosmrlj, Steingart

Propulsion and Energy Sciences

Choueiri, Ju, Law, Mueller



Civil and Environmental Engineering

Civil and Environmental Engineering at Princeton is a dynamic and growing department. Its research and teaching address broad questions associated with the built environment, the natural environment, and interactions between the two, with an evolving emphasis on sustainability. Focus areas include structural art, structural design, and building materials; urban environments; water and air quality; climate-change mitigation; and the impacts of climate change on water resources and the hydrologic cycle.

- Faculty members: **16**
- Graduate students: **54**
- Undergraduate students: **65**
- Research and technical staff members: **37**
- Degrees offered: **M.Eng., M.S.E., Ph.D.**



Ryan Edwards

A doctoral student, Edwards studies the fate of hydraulic-fracturing fluid in subsurface shale-gas reservoirs. He has investigated the injection of captured carbon dioxide into depleted shale-gas reservoirs as a carbon-mitigation option, and is currently comparing hydraulic-fracturing regulations in different countries. Edwards is a member of the Princeton Energy and Climate Scholars program and a Princeton Environmental Institute-Science, Technology and Energy Policy (PEI-STEP) fellow at the Woodrow Wilson School of Public and International Affairs.

RESEARCH AREAS	CBE	CEE	COS	ELE	MAE	ORF
Applied and Computational Math	●	●	●	●	●	●
Applied Physics	●	●	●	●	●	
Bioengineering	●	●	●	●	●	●
Computing and Information Sciences			●	●		●
Energy and Environment	●	●		●	●	●
Materials Science and Nanotechnology	●	●		●	●	
Multimedia and Arts		●	●	●		
Process Engineering and Optimization	●					●
Security and Risk		●	●	●		●



Sigrid Adriaenssens

An associate professor, Adriaenssens develops algorithms for finding novel structural forms and creates design methodologies that enable unique large-span bridge and building forms for a resilient and sustainable built environment. These forms can be very thin, cost-effective, and have a low carbon footprint while maintaining strength, stability, aesthetic appeal, and comfort. Her most recent research, funded by the National Science Foundation, focuses on how elastic deformations found in plant movements can be appropriated into adaptive shape-shifting building façades that substantially reduce the structure’s energy demand.

Faculty by Research Area

- Atmospheric Dynamics**
Bou-Zeid, Mauzerall, Smith, Wood, Zondlo
- Carbon Mitigation**
Bourg, Celia, Jaffé, Peters, Prévost, Scherer, White
- Civil Engineering**
- Materials**
Garlock, Glišić, Prévost, Scherer, White
- Climate**
Bou-Zeid, Lin, Mauzerall, Smith, Wood, Zondlo
- Computational Mathematics and Hydrodynamics**
Bou-Zeid, Glišić, Prévost
- Ecohydrology**
Celia, Jaffé, Smith, Wood
- Risk Assessment and Earthquake Engineering**
Garlock, Glišić, Lin, Prévost
- Sensors and Remote Sensing**
Bou-Zeid, Glišić, Smith, Wood, Zondlo
- Structures and Structural Art**
Adriaenssens, Garlock, Glišić, Prévost, Scherer
- Subsurface Hydrology**
Celia, Jaffé, Prévost
- Surface Hydrology and Hydrometeorology**
Bou-Zeid, Smith, Wood
- Sustainability**
Adriaenssens, Bou-Zeid, Glišić, Jaffé, Lin, Peters, Smith, White, Zondlo
- Water Quality, Biogeochemical Cycles, and Bioremediation**
Jaffé, Peters, Smith



Electrical Engineering

Princeton's electrical engineering program, established in 1889 as one of the first in the United States, remains at the forefront of the field, with teaching and research aimed at developing fundamental understanding, innovative new technologies, and addressing applications in information sciences, human health, environmental protection, and renewable-energy production. The graduate program focuses on advanced study and research toward the doctoral degree. Doctoral research is undertaken in a wide range of areas, including applied mathematics, circuits and computers, and applied physics.

- Faculty members: **31**
- Graduate students: **179**
- Undergraduate students: **126**
- Research and technical staff members: **38**
- Degrees offered: **Ph.D.**



Cameron Chen

Chen is pursuing his doctoral degree jointly in the Department of Electrical Engineering and the Princeton Neuroscience Institute. His primary research interests lie at the intersection of machine learning and computational neuroscience. He is currently focused on developing machine learning models for intersubject variability among people undergoing brain imaging, with the aim of using multisubject human brain data to learn more about how the brain works. Cameron was recently awarded a Google fellowship.

RESEARCH AREAS	CBE	CEE	COS	ELE	MAE	ORF
Applied and Computational Math	●	●	●	●	●	●
Applied Physics	●	●	●	●	●	
Bioengineering	●	●	●	●	●	●
Computing and Information Sciences			●	●		●
Energy and Environment	●	●		●	●	●
Materials Science and Nanotechnology	●	●		●	●	
Multimedia and Arts		●	●	●		
Process Engineering and Optimization	●					●
Security and Risk		●	●	●		●



Mung Chiang

The Arthur LeGrand Doty Professor of Electrical and Engineering and director of the Keller Center, Chiang is a pioneer in optimizing the performance and reliability of communications networks, such as the internet and cell-phone systems. His lab bridges the theory-practice gap in edge-networking research by spanning proofs to prototypes. He co-founded several start-up companies and co-founded the Open Fog Consortium. Chiang received the Alan T. Waterman Award, the National Science Foundation's highest honor to young scientists and engineers. His textbook, "Networked Life: 20 Questions and Answers," and online course, "Networks: Friends, Money, and Bytes," have reached 250,000 students.

Faculty by Research Area

Biological and Biomedical

Chou, Fleischer, Jha, Kung, Ramadge, Sengupta, Sturm, Verma, Wysocki

Energy and Environment

M. Chen, Jha, Kahn, Rand, Sturm, Wentzlaff, Wysocki

High Performance Computing

Jha, Lee, Malik, Mittal, Verma, Wentzlaff

Nanotechnologies

Chou, de Leon, Jha, Rand, Sturm

Quantum Information

Cuff, Houck, Jha, de Leon, Lyon, Shayegan, Thompson, Tureci

Security

Abbe, Chiang, Cuff, Jha, Lee, Malik, Mittal, Poor, Prucnal

Applied Physics

Bhatt, de Leon, Fleischer, Gmachl, Houck, Lyon, Prucnal, Rand, Rodriguez, Shayegan, Thompson, Tureci, Wysocki

Computing and Networking

Chiang, Lee, Jha, Kung, Malik, Mittal, Poor, Verma, Wentzlaff

Information Sciences and Systems

Abbe, Y. Chen, Chiang, Cuff, Kulkarni, Kung, Mittal, Poor, Ramadge, Verdú

Integrated Electronic Systems

M. Chen, Jha, Malik, Sengupta, Verma

Materials and Devices

Chou, de Leon, Gmachl, Kahn, Prucnal, Rand, Rodriguez, Shayegan, Sturm

Photonics

Chou, de Leon, Fleischer, Gmachl, Houck, Lyon, Prucnal, Rodriguez, Thompson, Tureci, Wysocki



Computer Science

Princeton has been at the forefront of computing since Alan Turing, Alonzo Church, and John von Neumann were among its residents. The department has experienced significant growth over the past few years with strong groups in theory, systems, networking, computer architecture, graphics and media, programming languages, computational science, security, artificial intelligence, and computational biology.

- Faculty members: [31](#)
- Graduate students: [132](#)
- Undergraduate students: [401](#)
- Research and technical staff members: [19](#)
- Degrees offered: [M.S.E.](#), [Ph.D.](#)



Marcela Melara

Melara is developing novel methods for protecting against data leaks in user applications that collect large amounts of sensor data. Her goal is to enable more secure “smart devices” that can rely on sensitive data to enrich personal and business productivity. In her master’s thesis, Melara developed a new system for securing encrypted messaging tools against attackers attempting to intercept or manipulate encrypted conversations. She was named a Siebel Scholar and is a doctoral student fellow in Princeton’s Center for Information Technology Policy.

RESEARCH AREAS	CBE	CEE	COS	ELE	MAE	ORF
Applied and Computational Math	●	●	●	●	●	●
Applied Physics	●	●	●	●	●	
Bioengineering	●	●	●	●	●	●
Computing and Information Sciences			●	●		●
Energy and Environment	●	●		●	●	●
Materials Science and Nanotechnology	●	●		●	●	
Multimedia and Arts		●	●	●		
Process Engineering and Optimization	●					●
Security and Risk		●	●	●		●



Elad Hazan

Professor Hazan's research focuses on the design and analysis of algorithms for basic problems in machine learning and optimization. He is a two-time recipient of the IBM Goldberg best paper award, a European Research Council grant awardee, a Marie Curie fellowship winner, and a two-time recipient of a Google Research Award. He serves on the steering committee of the Association for Computational Learning and was a program co-chair for the association's 2015 Conference on Learning Theory.

Faculty by Research Area

Computational Biology

Engelhardt, Li, Raphael, Seung, M. Singh, Troyanskaya

Computational Markets, Game Theory, Economics

Braverman, J. Singh

Computer Architecture

August, Li, Martonosi

Graphics and Vision

Dobkin, Finkelstein, Funkhouser, Rusinkiewicz

Machine Learning

Engelhardt, Hazan, M. Singh, Troyanskaya

Programming Languages and Compilers

Appel, August, Gupta, Kernighan, Kincaid, Walker

Security, Privacy, Policy

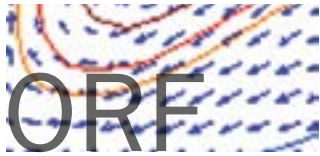
Appel, Dobkin, Feamster, Felten, Freedman, Kernighan, LaPaugh, Martonosi, Narayanan

Systems and Networks

Feamster, Freedman, Jamieson, Li, Martonosi, Peterson, Rexford

Theory

Arora, Braverman, Chazelle, Dvir, Kol, Raphael, Sedgewick, Tarjan, Zhandry



Operations Research and Financial Engineering

The Department of Operations Research and Financial Engineering is unique in the United States, combining deep roots in mathematics with engineering, business, and finance. Much of the research in the department focuses on managing risk and optimizing operations. Faculty and students develop tools that are used to make better decisions, improve the performance of complex systems, and manage resources efficiently.

- **Faculty members:** 15
- **Graduate students:** 52
- **Undergraduate students:** 201
- **Research and technical staff members:** 14
- **Degrees offered:** M.S.E., Ph.D.



Georgina Hall

Hall, a doctoral student, works on large-scale polynomial optimization, specifically how to replace current techniques with more computationally efficient alternatives. Applications of her work include collision detection and machine learning problems such as convex regression. She won the Princeton University Graduate School Teaching Award as well as an E-Council Excellence in Teaching Award in the course “Probability and Stochastic Systems.”

RESEARCH AREAS	CBE	CEE	COS	ELE	MAE	ORF
Applied and Computational Math	●	●	●	●	●	●
Applied Physics	●	●	●	●	●	●
Bioengineering	●	●	●	●	●	●
Computing and Information Sciences			●	●		●
Energy and Environment	●	●		●	●	●
Materials Science and Nanotechnology	●	●		●	●	●
Multimedia and Arts		●	●	●		●
Process Engineering and Optimization	●					●
Security and Risk		●	●	●		●



Amir Ali Ahmadi

Ahmadi, an assistant professor, has research interests in optimization, computational aspects of dynamics and control, and computational complexity theory. His recent awards include the INFORMS Computing Society Prize, the Air Force Office of Scientific Research Young Investigator Program Award, the National Science Foundation (NSF) CAREER Award, the Google Faculty Award, the Goldstine Fellowship of IBM Research, the NSF Oberwolfach Fellowship, and the teaching award of Princeton University's Engineering Council. He has won best paper awards at the IEEE International Conference on Robotics and Automation, and in the Society for Industrial and Applied Mathematics' Journal on Control and Optimization.

Faculty by Research Area

Financial Mathematics

Carmona, Fan, Mulvey, Sircar, Vanderbei

Machine Learning

Fan, Kpotufe, Liu

Operations Research

Ahmadi, Kornhauser, Liu, Massey, Mulvey, Powell, Vanderbei

Optimization

Ahmadi, Kornhauser, Liu, Powell, Vanderbei, Wang

Probability

Carmona, Massey, Powell, van Handel, Vanderbei

Statistics

Carmona, Fan, Kpotufe, Liu, Powell, van Handel

Interdisciplinary Centers

Andlinger Center for Energy and the Environment

The Andlinger Center for Energy and the Environment's (ACEE) mission is to develop solutions to ensure our energy and environmental future. The center supports a vibrant and expanding program of research and teaching in areas of sustainable-energy technology development, energy efficiency, and environmental protection and remediation. A chief goal of the center is to translate fundamental knowledge into practical solutions that enable sustainable energy production, and the protection of the environment and global climate from energy-related anthropogenic change. At the graduate level, ACEE offers a wide range of interdisciplinary courses related to energy and the environment under the ENE subject code and awards the Maeder Graduate Fellowship annually.

Center for Information Technology Policy

The Center for Information Technology Policy is a nexus of expertise in technology, engineering, public policy, and the social sciences. In keeping with the University tradition of service, the center's research, teaching, and events address digital technologies as they interact with society. It produces leading research as well as practical demonstrations of issues at the crossroads of technology and policy. CITP integrates graduate and undergraduate students at all levels of its work, including an undergraduate certificate offered in cooperation with the Keller Center.

Keller Center

The Keller Center's mission is to educate leaders for a technology-driven society, through innovating education and fostering entrepreneurship, innovation, and design. The Keller Center shares the engineering school's vision for bridging disciplines to ensure that all students are prepared to put science and technology to use in solving critical societal challenges. The Keller Center thus serves as a hub, connecting students in engineering, the humanities, arts, social sciences, and natural sciences with each other, as well as connecting them with the broader campus community and beyond.

PRISM

The Princeton Institute for the Science and Technology of Materials (PRISM) integrates fundamental theory and applied research in investigating and inventing materials of broad importance in energy, medicine, electronics, information technology, and many other fields. At the graduate level, PRISM offers joint degree programs in cooperation with academic departments. This multidisciplinary approach includes access to state-of-the-art central research facilities and extensive interaction with industry.