

APPLIED PHYSICS (GRADUATE FIELD)

Program Website (<http://www.aep.cornell.edu/>)

Field Description

The applied physics program combines a core physics curriculum with research and study in areas that also includes the application of physics to the broader scientific and engineering communities. Students in applied physics may pursue research in any one of several broad areas, including nanoscience, advanced materials, condensed matter physics; renewable energy; quantum information and photonics; biological physics; astrophysics and plasma physics.

The Ph.D. program in the graduate field of Applied Physics (AP) is a flexible, research-oriented doctoral program tailored to individual interests. AP combines a core physics curriculum with research and study usually in one of the areas discussed above. Graduate students can engage in a wide range of cross-disciplinary research activities, bringing their expertise as an applied physicist to bear, often in a collaborative environment. Instead of a qualifying exam, students are expected take classes in a common core of physics subjects, being quantum mechanics, electrodynamics, statistical mechanics, and advanced laboratory techniques.

The two-year Master of Science in Applied Physics program offers advanced study and training in the three cores of AP. Quantum Systems and Photonics, Nanotechnologies, and Biotechnologies. This program provides training and research/design project experience sought after by industry, government and R&D organizations.

The professional Master of Engineering program in Engineering Physics prepares you for engineering design and development employment or further graduate work. You can broaden and deepen your preparation in AP, or prepare for professional engineering in quantum, photonic and optical technology, nanostructure science and technology, device physics, materials characterization, or computational physics and engineering.

Data and Statistics

- Doctoral Program Statistics (<https://gradschool.cornell.edu/about/program-metrics-assessments-and-outcomes/doctoral-program-statistics/?SelectGradField=23>)

Subject and Degrees

Applied Physics

- Applied Physics (MS) (<https://catalog.cornell.edu/programs/applied-physics-ms/>)
- Applied Physics (PhD) (<https://catalog.cornell.edu/programs/applied-physics-phd/>)

Engineering Physics

No results were found.

Concentrations by Subject

Applied Physics

- applied physics

Engineering Physics

- engineering physics

Faculty

Tomas Alberto Arias (<http://physics.cornell.edu/tomas-arias/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** Development and application of novel first principles ab initio electronic structure calculations to first-in-kind applications, including fundamental studies of many-body physics, numerical analysis to solve the resulting equations, novel software development paradigms for high performance computing, development of multiscale theories to connect microscopic physical results to complex macroscopic materials properties

Nicole Ann Benedek (<http://www.mse.cornell.edu/faculty-directory/nicole-benedek/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** first-principles studies of complex materials structure and properties, materials design

Joel Donald Brock (<http://www.engineering.cornell.edu/faculty-directory/joel-donald-brock/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** x-ray diffraction; synchrotron radiation; charged density waves; thin film growth and surface processing

Itai Cohen (<http://physics.cornell.edu/itai-cohen/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** complex matter physics with focus on colloidal suspensions; biological tissues; fluid-membrane interfaces

Ankit S Disa (<http://disa.aep.cornell.edu/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** Optical control of quantum materials; thin films, interfaces, and atomically layered heterostructures; ultrafast THz, optical, and x-ray spectroscopy; picoscale structure and dynamics of quantum solids; condensed matter and materials physics.

David Erickson (<http://www.mae.cornell.edu/faculty-directory/david-erickson/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** microfluidics and nanofluidics as applied to optofluidics; biomolecular detection; biologically enabled robotics; nanomedicine; programmable matter; fluid and thermal dynamics; nanophotonics; nanofabrication; chemistry and biology

Valla Fatemi (<http://www.aep.cornell.edu/faculty-directory/valla-fatemi/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics

- **Research Interests:** Quantum coherent devices, superconductivity, nanoscopic and mesoscopic physics, condensed matter and materials physics, quantum microwave systems

Craig J. Fennie (<http://www.engineering.cornell.edu/faculty-directory/craig-j-fennie/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** applied physics

Gregory Fuchs (<http://physics.cornell.edu/gregory-fuchs/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** understanding controlling spin in solid state physics

Emmanuel P Giannelis (<http://www.mse.cornell.edu/faculty-directory/emmanuel-p-giannelis/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** hybrid nanomaterials for energy, biomedical, transportation and packaging

David A Hammer (<http://www.ece.cornell.edu/faculty-directory/david-hammer/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** plasma physics; fusion; gas discharges; high-energy-density plasmas

Melissa A Hines (<http://chemistry.cornell.edu/melissa-hines/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** surface physics and chemistry

Debdeep Jena (<http://www.ece.cornell.edu/faculty-directory/debdeep-jena/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics

Amit Lal (<http://www.ece.cornell.edu/faculty-directory/amit-lal/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** micro/nano-electromechanical systems; physical acoustics; ultrasonic engineering; biomedical MEMS; microfluidics; analog and digital circuit design; solid-state electronics; radioactive thin films for autonomous microsystems and nanofabrication

Kin Fai Mak (<http://physics.cornell.edu/kin-fai-mak/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics; Engineering Physics: engineering physics

Peter McMahon (<http://www.aep.cornell.edu/faculty-directory/peter-mcmahon/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics; Engineering Physics: engineering physics

Karan Kartik Mehta (<http://www.engineering.cornell.edu/faculty-directory/karan-mehta/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** trapped ions, integrated photonics, quantum optics, quantum information science and engineering

Jeffrey Andrew Moses (<http://www.aep.cornell.edu/faculty-directory/jeffrey-moses/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics; Engineering Physics: engineering physics
- **Research Interests:** Ultrafast laser spectroscopy and technology, Physical chemistry, Biophysics, Ultrafast dynamics in condensed matter, materials and nanostructures, Nonlinear optics

David A. Muller (<http://www.aep.cornell.edu/faculty-directory/david-anthony-muller/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** structure and properties of nanoscale materials; atomically-engineered materials for energy applications; atomic resolution electron spectroscopy and microscopy

Lois Pollack (<http://www.aep.cornell.edu/faculty-directory/lois-pollack/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** biophysics; RNA folding; electrostatics and DNA; protein conformational dynamics

Daniel C Ralph (<http://physics.cornell.edu/daniel-ralph/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** nanoelectronics and magnetism

Richard D. Robinson (<http://www.engineering.cornell.edu/faculty-directory/richard-douglas-robinson/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** physics and chemistry of low-dimensional materials and to produce a variety of nano-materials targeted for energy applications

Chris Roh (<http://cals.cornell.edu/chris-roh/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** fluid dynamics, in vivo engineering, biological cybernetics, comparative biomechanics, entomology, evolutionary biology, ecology, agricultural engineering

Chris B. Schaffer (<http://www.bme.cornell.edu/faculty-directory/chris-schaffer/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** focuses on the use of nonlinear interactions between femto-second-duration laser pulses and biological materials

Darrell G. Schlom (<http://www.mse.cornell.edu/faculty-directory/darrell-schlom/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** heteroepitaxial growth and characterization of oxide thin films; preparation of oxide superlattices and metastable phases by reactive molecular-beam epitaxy

Jie Shan (<http://physics.cornell.edu/jie-shan/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics

Kyle Shen (<http://physics.cornell.edu/kyle-shen/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** Spectroscopy and synthesis of thin film quantum materials; unconventional and high-temperature superconductivity

Gennady Shvets (<http://www.aep.cornell.edu/faculty-directory/gennady-shvets/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics

Michael Olgar Thompson (<http://www.mse.cornell.edu/faculty-directory/michael-thompson/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** ultralow temperature processing of silicon; point defect and impurity diffusion in Si; rapid phase transformations

Zhiting Tian (<http://ztgroup.org/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** computational modeling and experimental characterization of energy transport

Robert Bruce van Dover (<http://www.mse.cornell.edu/faculty-directory/r-b-van-dover/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** growth and properties of magnetic, dielectric, superconducting and optical thin films; fabrication and characterization of thin film devices; properties of magnetic and superconducting ceramics; development and use of high throughput synthesis/evaluation experimental strategies

Zheng Jane Wang (<http://physics.cornell.edu/jane-wang/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** insect flight as a model system to study the role of aerodynamics on the evolution of flapping flight in nature

Michelle D Wang (<http://physics.cornell.edu/michelle-wang/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics

Mark McMahon Wilde (<http://www.ece.cornell.edu/faculty-directory/mark-wilde/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** Areas of research: quantum information theory, quantum communication, quantum computation (algorithms and complexity), quantum error correction, bosonic Gaussian states and channels

Huili (Grace) Xing (<http://www.ece.cornell.edu/faculty-directory/huili-grace-xing/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** nanofabrication, thin films, physics of semiconductors, superconductors and their devices

Chunhui (Chris) Xu (<http://www.engineering.cornell.edu/faculty-directory/chris-xu/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** biomedical imaging; optical instrumentation; optical communications

Kenji Yasuda (<http://www.aep.cornell.edu/faculty-directory/kenji-yasuda/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** atomically-engineered heterostructures and interfaces, nanotechnology, condensed matter and material physics, semiconductor physics and functional devices.

Warren R. Zipfel (<http://www.bme.cornell.edu/faculty-directory/warren-r-zipfel/>)

- **Campus:** Ithaca
- **Concentrations:** Applied Physics: applied physics
- **Research Interests:** biomedical imaging and instrumentation