DEPARTMENT OF PHYSICS

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Corbin Covault, Chair
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More Information: https://physics.case.edu

The Department of Physics offers programs leading to the following undergraduate degrees: Bachelor of Arts in physics, Bachelor of Science in physics, Bachelor of Science in mathematics and physics, and Bachelor of Science in engineering with an engineering physics major. Associated with the Bachelor of Science in physics degree are optional concentrations in mathematical physics and in biophysics. The department also offers the graduate degrees Master of Science and Doctor of Philosophy. The Master of Science in physics has a unique optional entrepreneurship track.

All of these programs involve the study of the basic laws of nature and the properties of energy and matter in their various forms. The curriculum reflects the varied interests of the faculty and will prepare students for a wide range of future activities. At the undergraduate level, open electives and engineering physics concentration area courses make it possible to tailor the programs to the student's interests and career plans. Employment opportunities at the bachelor's level include research, development, and technical assistance (engineering, computer programming, management) in industrial, government, and university settings.

A similar flexibility exists in the first few years of graduate study. The research leading to the PhD degree normally centers on a specific area of physics. However, even at this stage, the broad background and training characteristic of a physics degree are emphasized.

Department Faculty

Corbin E. Covault, PhD
(Harvard University)
Professor and Chair
Experimental high-energy astrophysics

Jesse Berezovsky, PhD
(University of California, Santa Barbara)
Associate Professor
Imaging coherent transport in mesoscopic graphene; optical readout of single spin dynamics in a quantum dot; spin dynamics in layered core/shell nanocrystal quantum dots; measurements of nuclear and electron spin at a ferromagnetic/semiconductor interface; spatio-temporal imaging and simulation of magnetization dynamics in ferromagnetic structures

Robert W. Brown, PhD
(Massachusetts Institute of Technology)
Distinguished University Professor and Institute Professor
Medical physics - radiation and imaging; magnetic particles, magneto-optics, disease detection; industrial physics; particle physics; cosmology; education research

Edward M. Caner, MS
(Case Western Reserve University)
Instructor
Innovation & Entrepreneurship; Industrial Physics; Medical Physics

Craig J. Copi, PhD
(University of Chicago)
Senior Instructor
Theoretical cosmology; particle physics; astrophysics

Diana I. Driscoll, PhD
(Case Western Reserve University)
Senior Instructor, Lab Director
Introductory physics

Pavel Fileviez, PhD
(Max Planck Institute for Physics)
Associate Professor
Particle and astro-particle physics

Krista G. Freeman, PhD
(Carnegie Mellon University)
Assistant Professor
Experimental biophysics; cryo-electron microscopy; bacteriophage engineering; bacteriophage immunology

Xuan Gao, PhD
(Columbia University)
Ohio Eminent Scholar in Condensed Matter Physics and Professor, Director, Engineering Physics
Experimental condensed matter physics; nanomaterials; electron transport in nanostructures; correlated electrons in low dimensions

David W. Gerdes, PhD
(University of Chicago)
Professor; Dean, College of Arts and Sciences
Experimental astrophysics, cosmology, and astronomy; small body populations in the solar system

Michael Hinczewski, PhD
(Massachusetts Institute of Technology)
Professor
Theoretical biophysics

Kurt Hinterbichler, PhD
(Columbia University)
Associate Professor
Theoretical physics; gravitation; cosmology

Lydia Kisley, PhD
(Rice University)
Ambrose Swasey Associate Professor of Physics
Optical microscopy; experimental biophysics; soft condensed matter physics; interfacial/surface science

Walter R. L. Lambrecht, PhD
(Ghent University)
Perkins Professor of Physics, Faculty Distinguished Researcher
Theoretical condensed matter physics; electronic structure-based physics of materials

Mhlambululi Mafu, PhD
(University of KwaZulu-Natal, South Africa)
Visiting Assistant Professor
Quantum communication, quantum optical implementations, quantum computation

Michael A. Martens, PhD
(Case Western Reserve University)
Professor; Graduate Program Director
Medical imaging physics, AI and physics, high energy particle physics, accelerator physics

Harsh Mathur, PhD
(Yale University)
Professor; Associate Dean, College of Arts and Sciences
Theoretical Physics: Condensed matter physics, particle-astrophysics and cosmology

Benjamin Monreal, PhD
(Massachusetts Institute of Technology)
Agnar Pytte Professor in Physics; Associate Professor
Experimental particle astrophysics

Johanna M. Nagy, PhD
(Case Western Reserve University)
Warren E. Rupp Associate Professor of Physics
Experimental astrophysics and cosmology

Hari Padma, PhD
(Penn State University)
Frederick Reines Assisitant Professor of Physics
Experimental condensed matter physics; ultrafast phenomena; THz spectroscopy; resonant x-ray scattering

John E. Ruhl, PhD
(Princeton University)
Connecticut Professor
Experimental astrophysics and cosmology

Glenn D. Starkman, PhD
(Stanford University)
Distinguished University Professor; Director, Institute for the Science of Origins; Director, Center for Education and Research in Cosmology and Astrophysics (CERCA)
Theoretical cosmology, particle physics, astrophysics

Giuseppe Strangi, PhD
(University of Calabria, Italy)
Professor and The Ohio Research Scholar in Surfaces of Advanced Materials
Condensed Matter Physics, Nanophotonics and Optical Metamaterials.

Cyrus C. Taylor, PhD
(Massachusetts Institute of Technology)
Albert A. Michelson Professor in Physics; Graduate Program Director
Climate change; theoretical and experimental particle physics; physics entrepreneurship

Idit Zehavi, PhD
(Hebrew University of Jerusalem)
Professor
Astrophysics, cosmology, large-scale structure

Shulei Zhang, PhD
(University of Arizona)
Associate Professor
Theoretical condensed matter physics: spintronics, plasmonics, and topological quantum materials

Claire Zukowski, PhD
(University of California, Berkeley)
Assistant Professor
Theoretical physics; quantum gravity; holography; quantum information

Secondary Faculty

Roger H. French, PhD
(Massachusetts Institute of Technology)
Distinguished University Professor and Kyocera Professor, Department of Materials Science and Engineering, Case School of Engineering
Materials Data Science using study protocols, FAIR linked data, deep learning and semantic reasoning; optical materials and technologies; long range interactions

Mark A. Griswold, PhD
(University of Wuerzburg)
Professor, Department of Radiology, School of Medicine
Medical imaging, MRI

Kathy Harper, PhD
(Ohio State University)
Associate Professor, Division of Engineering Leadership and Professional Practice, Case School of Engineering

Eckhard Jankowsky, PhD
(Dresden Institute of Technology)
Associate Professor, Department of Biochemistry, School of Medicine
Proteins and enzymes; structural biology; regulation of gene expression

Stacy S. McGaugh, PhD
(University of Michigan)
Professor, Department of Astronomy
Galaxy formation and evolution, low surface brightness galaxies, cosmology, dark matter, and gravity

J. Christopher Mihos, PhD
(University of Michigan)
Worcester R. and Cornelia B. Warner Professor of Astronomy, Department of Astronomy
Galaxy formation and evolution; galaxy interactions; clusters of galaxies; observational and computational astrophysics

Jacob G. Scott, MD, DPhil
(Case Western Reserve University)
Professor of Physics
Biophysics

Ping Xia, PhD
(University of Virginia)
Professor of Radiation Oncology of Cleveland Clinic Lerner College of Medicine of CWRU
Medical Physics in Radiation Therapy, Intensity Modulated Radiotherapy, Treatment planning, Imaging guided Radiotherapy

Adjunct Faculty

Yashar Akrami, PhD
(Institute for Theoretical Physics (IFT) UAM-CSIC)
Adjunct Assistant Professor of Physics
Theoretical physics, cosmology, gravity

James H. Andrews, PhD
(Case Western Reserve University)
Adjunct Professor of Physics; Professor of Physics, Youngstown State University
Optical materials

De-Chang Dai, PhD
(YangZhou University)
Adjunct Professor of Physics
Gravity, cosmology, astrophysics, particle physics, field theory

Claudia de Rham, PhD
(University of Cambridge)
Adjunct Professor of Physics
Gravity, cosmology, quantum field theory and particle physics

Jeffrey S. Dyck, PhD
(Case Western Reserve University)
Adjunct Professor of Physics ; Professor, John Carroll University
Experimental condensed matter physics

Karsten Eggert, PhD
(RWTH Aachen University)
Adjunct Professor of Physics
Experimental particle physics; cosmic ray physics; diffractive physics; TOTEM experiment at CERN

Hiroyuki Fujita, PhD
(Case Western Reserve University)
Adjunct Professor of Physics; President and CEO, Quality Electrodynamics
Hardware technology in imaging

Evalyn Gates, PhD
(Case Western Reserve University)
Adjunct Professor of Physics
Cosmology and particle astrophysics

John T. Giblin, Jr., PhD
(Yale University)
Adjunct Associate Professor of Physics
Theoretical cosmology; high energy physics and particle physics; high performance computing and gravitational waves

E. Mark Haacke, PhD
(University of Toronto)
Adjunct Professor of Physics; Professor, Wayne State University
Physics of imaging; experimental biophysics

Andrew Lininger, PhD
(Case Western Reserve University)
Adjunct Assistant Professor of Physics
Experimental condensed matter physics; Director of MORE Center

Ina T. Martin, PhD
(Colorado State University)
Adjunct Associate Professor of Physics; Director of Research Cores and Operations
Photovoltaics; functional materials

Clara Murgui, PhD
(University of Valencia)
Adjunct Assistant Professor of Physics
Particle and astroparticle physics

Irina Shiyanovskaya, PhD
(Institute of Physics, National Academy of Science of Ukraine, Kiev)
Adjunct Assistant Professor of Physics; Kent Displays, Inc.

Shmaryu Shvartsman, PhD
(Tomsk State University)
Adjunct Professor of Physics; Principal Scientist, ViewRay, Inc.
General physics research and development

Mano Singham, PhD
(University of Pittsburgh)
Adjunct Associate Professor of Physics
History and philosophy of science, nuclear and particle physics, and learning theory

Michael Thompson, PhD
(Case Western Reserve University)
Adjunct Assistant Professor of Physics; Senior Scientist, Fujifilm Healthcare America
Physics of magnetic resonance imaging

Andrew Tolley, PhD
(University of Cambridge)
Adjunct Professor of Physics
Early universe cosmology; dark energy; gravity; extra dimensions; branes

Mesfin Tsige, PhD
(Case Western Reserve University)
Adjunct Professor of Physics
Theory of solids; polymers and other materials

Emeriti Faculty

Gary S. Chottiner, PhD
(University of Maryland)
Professor Emeritus of Physics

David E. Farrell, PhD
(Imperial College London)
Professor Emeritus of Physics

William J. Fickinger, PhD
(Yale University)
Professor Emeritus of Physics

Kathleen Kash, PhD
(Massachusetts Institute of Technology)
M. Roger Clapp Professor Emerita in Arts and Sciences

Rolfe G. Petschek, PhD
(Harvard University)
Professor Emeritus of Physics

Charles Rosenblatt, PhD
(Harvard University)
Faculty Distinguished Researcher, Ohio Eminent Scholar Emeritus, and Professor Emeritus of Physics

Kenneth Singer, PhD
(University of Pennsylvania)
Faculty Distinguished Researcher, Ambrose Swasey Professor of Physics, and Professor Emeritus of Physics

Philip L. Taylor, PhD
(Cambridge University)
Distinguished University Professor and Perkins Professor Emeritus of Physics

Programs

- **Engineering Physics, BSE**
- **Physics, BA**
- **Physics, BS**
- **Physics, Minor**
- **Physics, MS**
- **Physics, PhD**

Dual Degrees

- **Programs Toward Graduate or Professional Degrees**