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 with a major 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 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
Magnetic particles, magneto-optics, disease detection, and medical imaging; industrial physics; particle physics theory; cosmology; education research

Edward M. Caner, MS
(Case Western Reserve University)
Instructor
Science entrepreneurship

Carlos Cardona, PhD
(University of Buenos Aires)
Visiting Assistant Professor
Theoretical Physics. High energy and Mathematical Physics.

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

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

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

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

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

Kathleen Kash, PhD
(Massachusetts Institute of Technology)
M. Roger Clapp University Professor in Arts and Sciences
Experimental condensed matter and mesoscopic physics; synthesis and characterization of novel nitride semiconductors

Lydia Kisley, PhD
(Rice University)
Assistant Professor
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
Medical imaging physics, high energy particle physics, accelerator physics
Harsh Mathur, PhD  
(Yale University)  
Professor  
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)  
Assistant Professor  
Experimental astrophysics and cosmology

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

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

Anuj Saini, PhD  
(Case Western Reserve University)  
Visiting Assistant Professor  
Optical microscopy; experimental biophysics; soft condensed matter physics

Evangelos I. Sfakianakis, PhD  
(Massachusetts Institute of Technology)  
Visiting Assistant Professor  
Theoretical Cosmology, Particle Physics, Astrophysics, Nonlinear Dynamics

Kenneth D. Singer, PhD  
(University of Pennsylvania)  
Ambrose Swasey Professor of Physics, Faculty Distinguished Researcher  
Experimental condensed matter physics; nonlinear optics

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  
(Max Planck Institute for Physics)  
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)  
Assistant Professor  
Theoretical condensed matter physics: spintronics, plasmonics, and topological quantum materials

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Secondary Faculty

Roger H. French, PhD  
(Massachusetts Institute of Technology)  
F. Alex Nason Professor, Department of Materials Science and Engineering, Case School of Engineering  
Optical materials and technologies; experimental VIS/UV/VUV optical properties and long range interactions

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

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

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Adjunct Faculty

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

Michael Crescimanno, PhD  
(Youngstown State University)  
Adjunct Professor of Physics; Professor of Physics, Youngstown State University  
Theoretical physics
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

Daniel R. Hart, PhD
(Hampton University)
Adjunct Assistant Professor of Physics
Solid-state spectroscopy, quantum optics and devices; machine/deep learning-informed physics modeling

David M. Jacobs, PhD
(Case Western Reserve University)
Adjunct Assistant Teaching Professor of Physics, Arizona State University
Theoretical physics; atomic physics; astrophysics

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

Irina Shyanovskaya, 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

Emeritus Faculty

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

Arnold J. Dahm, PhD
(University of Minnesota)
Emeritus Professor of Physics

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

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

Kenneth L. Kowalski, PhD
(Brown University)
Emeritus Professor of Physics

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

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

Benjamin Segall, PhD
(Eberhard Karls Universität Tübingen)
Emeritus Professor of Physics
Philip L. Taylor, PhD
(Cambridge University)
_Distinguished University Professor and Perkins Emeritus Professor of Physics_

**Programs**

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

**Dual Degrees**

- Programs toward Graduate or Professional Degrees