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, as well as a unique master’s degree in entrepreneurship.

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

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

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

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

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

Xuan Gao, PhD
(Columbia University)
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)
Warren E. Rupp Assistant Professor
Optical microscopy; experimental biophysics; soft condensed matter physics; interfacial/surface science

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

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
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

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*  
Opto-plasmonics of soft composite metamaterials; liquid crystal photonics

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)  
*Assistant Professor*  
Theoretical condensed matter physics: spintronics, plasmonics, and topological quantum materials

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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

Tanvir Baig, PhD  
(Case Western Reserve University)  
*Adjunct Assistant Professor of Physics; University Hospitals Seidman Cancer Center*  
Medical Physics

Pierre Carlès, PhD, Habilitation  
(National Polytechnic Institute, Toulouse)  
*Adjunct Associate Professor of Physics; Associate Professor, Université Pierre et Marie Curie, Paris*  
Fluid mechanics; critical behavior; stability

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

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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
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 Professor of Physics, Assistant Professor of Physics,  
Norwich University  
Theoretical physics; atomic physics; astrophysics

Emmanuelle Lacaze, PhD  
(Université Denis Diderot - Paris VII, Université Pierre et Marie Curie -  
Paris VI)  
Adjunct Professor of Physics  
Experimental condensed matter; soft materials

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

Irina Shiyanskaya, PhD  
(Institute of Physics, National Academy of Science of Ukraine, Kiev)  
Adjunct Assistant Professor of Physics; Kent Displays, Inc.  
General physics research and development

Shmaryu Shvartsman, PhD  
(Tomsk State University)  
Adjunct Professor of Physics; Principal Scientist, ViewRay, Inc.  
History and philosophy of science, nuclear and particle physics, and  
learning theory

Michael Thompson, PhD  
(Case Western Reserve University)  
Adjunct Assistant Professor of Physics; Director of Research, Development,  
and Advanced Applications, AllTech Medical Systems America  
MRI signal acquisition

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

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**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)  
Perkins Emeritus Professor of Physics

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**Programs**

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

- Undergraduate Programs toward Graduate or Professional Degrees