



Physics

GRADUATE STUDIES AT UNIVERSITY OF CALIFORNIA, MERCED (M.S., Ph.D.)

PROGRAM HIGHLIGHTS: Our research program is strongly focused on interdisciplinary collaborations, which allows us to work in both established research areas such as condensed matter; atomic, molecular and optical (AMO) physics; and statistical physics and nanoscience, while pursuing emerging fields, including soft matter, metamaterials, quantum information, solar energy and biological physics.

The researchers in our group have access to major facilities, such as state-of-the-art laser systems, computing clusters, an electron microscopy facility, a nanofabrication facility and NMR on campus. Other large facilities, such as synchrotron light sources located at Stanford and Berkeley, are a short drive away and are routinely used by students and faculty members. We also collaborate with other nearby institutions such as Lawrence Livermore National Laboratory and UC Davis, Santa Cruz, and San Francisco.

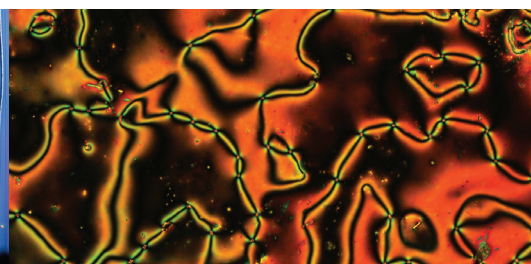
RESEARCH AREAS

UC Merced offers a unique academic atmosphere that fosters interdisciplinary research – connecting physical sciences research to life sciences, materials science and engineering. Our graduate students have the opportunity to pursue doctoral degrees while working on a broad range of research topics:

- › Experimental condensed matter: nanoparticles, metamaterials, strongly correlated systems, magneto-optical phenomena
- › Theoretical condensed matter and atomic physics: optoelectronic and photovoltaic materials, superfluids, superconductivity, ultra-cold atoms, quantum optics, quantum computing, nanomechanics
- › Experimental atomic, molecular and optical physics: photonic and electronic quantum information systems, ultrafast lasers
- › Experimental biophysics and soft matter: single-molecule studies, ensembles of molecular motors, biomaterials, liquid crystals
- › Theoretical biophysics and soft-matter physics: biopolymers, disordered proteins, motors, elasticity
- › Theoretical statistical physics and nonlinear dynamics: non-equilibrium systems, swarming, chaos
- › Thermodynamically efficient solar energy conversion: non-imaging optics, energy materials

AFFILIATED RESEARCH CENTERS AND INSTITUTES

- › NSF-CREST Center for Cellular and Biomolecular Machines (CCBM)
- › Merced NAnomaterials Center for Energy and Sensing (MACES)
- › University of California Advanced Solar Technologies Institute (UC Solar)
- › Health Sciences Research Institute (HSRI)



FUNDING OPPORTUNITIES: All doctoral students in good standing are eligible for year-round financial support, including payment of fees and tuition. Teaching assistantships normally provide initial funding that can be supplemented by research assistantships, fellowships or other forms of financial assistance including travel awards.

Application fee waivers are available for qualified domestic applicants.

TO APPLY: Apply online at graduatedivision.ucmerced.edu.

- › **PRIORITY DEADLINE:** December 31, 2017 (*applications will receive priority review*)
- › **GENERAL DEADLINE:** January 15, 2018 (*any applications after this date will be reviewed on a rolling basis if space is available*)

FOR MORE INFORMATION: Visit physics.ucmerced.edu and contact Sayantani Ghosh, graduate group chair, or David Strubbe, admissions chair.

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physics.ucmerced.edu

Faculty

PHYSICS



CHIH-CHUN CHIEN

Theoretical condensed matter, superfluids and superconductors, non-equilibrium physics of ultra-cold atoms, energy transport, novel hybrid quantum systems

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RAYMOND CHIAO

Nonlinear and quantum optics, experiment and theory; detection of gravitational radiation

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SAYANTANI GHOSH

Experimental condensed matter physics, magnetism, metamaterials, nanoscience and quantum systems

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Theoretical biophysics and soft condensed matter physics

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Experimental soft condensed matter physics, biophysics, liquid crystals, nano-materials and colloids

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DUSTIN KLECKNER

Experimental soft condensed matter, fluids and colloids

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BIN LIU

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Nonlinear dynamics and chaos, with applications to AMO (atomic, molecular and optical) physics and fluid dynamics

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MICHAEL SCHEIBNER

Light-matter interactions, nanostructured materials, coupled quantum systems and quantum information

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JAY SHARPING

Ultrafast laser technology and applications in physics, chemistry and biology

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DAVID STRUBBE

Theoretical condensed matter and materials science, electronic and optical properties, amorphous materials, photovoltaics, nanoscience, high-performance computing

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LINTIAN

Theoretical quantum optics, quantum information processing and quantum simulation in condensed matter systems

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ROLAND WINSTON

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JING XU

Experimental biophysics, quantitative biology, optical trapping, single-molecule ensemble experiments, molecular motors

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AFFILIATED FACULTY:

Venkatraman Ayyaswamy, plasma physics

Mehmet Baykara, tribology and surfaces

Mike Colvin, biomolecular simulation

Arvind Gopinath, biophysics

Jennifer Lu, functional materials synthesis

Victor Munoz, biophysics

Alex Noy, biomaterials

Anand Subramaniam, biomaterials

Vincent Tung, energy materials synthesis

Tao Ye, bio/nano interfaces

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Chemistry and Chemical Biology

GRADUATE STUDIES AT UNIVERSITY OF CALIFORNIA, MERCED (M.S., Ph.D.)

Research in chemistry and chemical biology at UC Merced is cutting edge and highly interdisciplinary, occurring at the ever-blurring interface between chemistry, biology, physics and engineering. Our collaborative environment, coupled with strong research ties inside UC Merced and across the country, provides students with opportunities to become excellent scientists while answering challenging, topical questions.

Graduate students work with highly motivated and active research faculty members on a diverse range of topics, including:

- › Computational and experimental studies into the structure and dynamics of biomolecules;
- › Developing methods to rapidly elucidate reaction pathways using experimental and computational techniques;
- › Integration of biological molecules with nano-electronic components for novel applications in bioelectronic interfaces, protein function control and signaling;
- › Quantify rewiring of systems biology networks in human cancer and metabolic disease using NMR spectroscopy, GCMS, functional genomics, structural and computational biology;
- › Scanning probe microscopy studies of single biomolecules, molecular scale characterization of biointerfaces for sensing, novel architectures for biointerfaces;
- › Design, discovery and investigation of new organo- and organometallic catalysts;
- › Study of organic reaction mechanism to explain chemo and stereoselective processes;
- › Development and application of density-functional theory applied to intermolecular interaction;
- › The ultrafast dynamics and spectroscopy of semiconductor nanoparticles for solar-energy conversion;
- › Discovery of new materials and nanoarchitectures for solar cells and batteries;
- › Developing electronic structure theory and molecular dynamics for modeling photochemistry.



FUNDING OPPORTUNITIES

All doctoral students in good standing are eligible for year-round financial support, including payment of fees and tuition. Teaching assistantships normally provide initial funding, which can be supplemented by research funding, fellowships or other forms of financial assistance. In addition, travel and application fee fellowships are available for qualified applicants.

TO APPLY

Apply online at graduatedivision.ucmerced.edu. Applications are due by Jan. 15. Early admission may be granted if applications are submitted by Dec. 1.

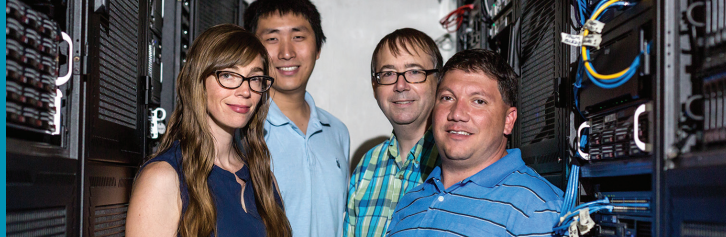
For more information, contact Admissions Chair Professor Ryan Baxter at rbaxter@ucmerced.edu.

ABOUT UC MERCED

UC Merced is the 10th campus of the University of California system and the first new American research university of the 21st century. Merced is located in California's San Joaquin Valley, within driving distance of Yosemite National Park and the Sierra Nevada, the Bay Area and the Monterey peninsula.

Faculty

CHEMISTRY AND CHEMICAL BIOLOGY



RYAN BAXTER

Design and synthesis of redox-active ligands; new strategies for organometallic catalysis from inexpensive materials; development of new synthetic methods guided by kinetic analysis.

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MIKE COLVIN

Molecular simulations of semi-structured biomolecular systems, including intrinsically disordered proteins and chemically modified DNA.

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FABIAN V. FILIPP

Quantifying rewiring of systems biology networks using chemical biology; NMR spectroscopy, GCMS, functional genomics, structural and computational biology.

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HRANT HRATCHIAN

Developments in quantum chemistry and potential energy surface exploration; computational inorganic chemistry; mechanistic study and rational design of transition metal catalysts.

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CHRISTINE ISBORN

Developing and applying electronic structure theory, molecular dynamics and QM/MM methods to the modeling of photochemistry and solvation.

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ANNE MYERS KELLEY

Linear and nonlinear Raman spectroscopies, experiment and theory; surface enhanced spectroscopies.

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DAVID F. KELLEY

Ultrafast dynamics and spectroscopy of semiconductor nanoparticles for solar energy conversion.

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ANDY LIWANG

Determining the oscillating mechanism of a biological clock at the protein-structural and dynamics level using biochemistry and NMR spectroscopy.

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PATRICIA LIWANG

Protein biochemistry and structural biology; NMR; structure and function of anti-HIV proteins and anti-inflammatory proteins.

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ERIK MENKE

New materials and nanoarchitectures for solar cells and batteries.

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VICTOR MUÑOZ

Conformational-functional behavior of proteins; kinetic techniques, steady state spectroscopy, nuclear magnetic resonance, single molecule studies, and high performance computing.

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SON NGUYEN

Nanomaterials for photocatalysis; spectroscopic and mechanistic studies

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ALEKSANDR NOY

Bionanoelectronics, biophysics, and nanofluidics; combining nanowires with membrane proteins to create electronic devices that mimic cellular transport.

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LIANG SHI

Nanomaterials for photocatalysis; spectroscopic and mechanistic studies

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BENJAMIN STOKES

Developing new reactions for organic synthesis; exploring organic reaction mechanisms using principals of physical organic chemistry; asymmetric metal catalysis and ligand design; drug candidate identification.

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DAVID STRUBBE

Computational and theoretical chemistry; excited-state electronic-structure methods, amorphous materials, photovoltaics, thermoelectrics, scientific code development for high-performance computing.

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ANAND BALA SUBRAMANIAM

Colloid and interface science, synthetic biology; Understanding biophysical processes through in vitro reconstitution, active biomimetic materials design, colloidal, polymeric, and biologically active interfaces.

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TAO YE

Scanning probe microscopy study of interfaces; nanoscale machines on surfaces; single molecule analysis of biopolymers.

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