



Graduate Study and Research in Physics

Wake Forest University | Winston-Salem, North Carolina

Graduate Program Director: Fred Salsbury | salsbufr@wfu.edu

PhD and MS Physics | MS and certificate in Quantum Information Sciences

Research spans biophysics, condensed matter, quantum information science, gravitational physics, and astrophysics.

PROGRAMS

PhD and MS in Physics

MS and graduate certificate in QIS

APPLICATION

Fall 2027 deadline: Jan. 8

Recommendations through Jan. 15

GRE optional

CURRENT FUNDING (AY 2026–27)

PhD: \$31,236 plus full tuition, fees, and health insurance

MS: 75% tuition; RA/TA support is not guaranteed

Reviewed annually

Computational Biophysics

Machine learning and AI: Computational biophysics groups use AI to study molecular systems and develop simulation methods.

Sam Cho develops coarse-grained and atomistic molecular dynamics methods for biomolecular systems, working with experimental groups.

Fred Salsbury studies cancer drug discovery, dynamic allostery, and mutation effects with molecular simulations, statistical methods, and machine learning.

Experimental Biophysics

Daniel Kim-Shapiro studies nitric oxide, blood flow, stored blood, and cardiovascular disease. His lab combines basic biophysics with translational work and clinical trials.

Martin Guthold studies fibrin fibers, blood clots, and the physical properties of cancer and normal cells. His lab uses atomic force and fluorescence microscopy, nanotechnology, molecular biology, and next-generation sequencing.

Gravitational Physics & Astrophysics

Alejandro Cárdenas-Avendaño

Studies black holes, neutron stars, and tests of general relativity with analytic and computational methods. Current work includes black-hole imaging and extreme mass-ratio inspirals for LISA.

Caitlin Witt

Studies supermassive black-hole binaries with electromagnetic and gravitational-wave data, using pulsars, time-domain optical surveys, and supercomputers to probe long-period signals and galaxy mergers.

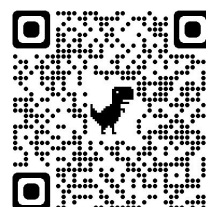
Greg Cook

Studies computational astrophysics and gravitational physics, especially coalescing compact binaries. His group develops theoretical and computational tools to simulate black-hole collisions.

Program information, FAQs, and application



Faculty research and lab websites



Research Areas and Faculty

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Faculty research and assistantship availability depends on current projects and funding. Applicants should name the faculty whose work best matches their interests.

Quantum Information Sciences

Faculty work in quantum materials (Huffman, Winter, Carroll), quantum optics (Kandada), and quantum computing (Carroll), with related materials research from Jurchescu and Thonhauser. Wake Forest offers an MS and graduate certificate in Quantum Information Sciences.

Computational Condensed Matter Physics

Timo Thonhauser develops first-principles electronic-structure methods and applies them to biological, nanoscale, and energy-related materials. His theoretical work connects closely with experiment.

Steve Winter studies quantum materials, including quantum magnets, superconductors, and topological insulators. His group develops theoretical models of experiments and predicts new quantum phases.

Emilie Huffman studies strongly interacting fermions and quantum spins on spatial lattices. Her group uses quantum Monte Carlo on classical computers and algorithms for quantum hardware to study quantum materials, particle field theories, and nuclear theories.

Experimental Condensed Matter Physics

David Carroll studies how dimension, topology, and symmetry shape low-dimensional quantum materials. His quantum-computing work examines massively parallel and neuromorphic architectures using topologically stabilized qubits.

Oana Jurchescu studies charge transport in organic and halide-perovskite electronic materials. Her lab uses organic semiconductor single crystals to measure intrinsic properties and determine how processing and interfaces affect devices.

Ajay Ram Srimath Kandada uses ultrafast and quantum-entangled light to measure optical coherence in materials. His group studies the coherent dynamics and control of excitons in two-dimensional materials.

Affiliate Faculty

Lauren Lowman, an affiliate faculty member in Engineering, can mentor Physics graduate students. She studies how vegetation controls exchanges of water, energy, and carbon between land and atmosphere using numerical models, geospatial analysis, and field experiments. Her work examines responses to wet conditions, drought, and wildfire. Contact Dr. Lowman before applying.