General University Information
President: James P. Clements
Dean of Graduate School: Karen Burg
University website: http://www.clemson.edu
Control: Public
Setting: Suburban
Total Faculty: 1,329
Total number of Students: 21,303
Total number of Graduate Students: 4,372

Department Information
Department Chairman: Prof. Terry M. Trott, Chair
Department Contact: Risé Sheriff, Office Manager
Total full-time faculty: 32
Total number of full-time equivalent positions: 34
First-Year Graduate Students: 63
Female First-Year Students: 11
Total Post Doctorates: 4

Department Address
118 Kinard Laboratory
Clemson, SC 29634-0978
Phone: (864) 656-3416
Fax: (864) 656-0805
E-mail: risem@clemson.edu
Website: http://www.clemson.edu/ces/physics-astro/

Department Information
Admission Contact Information
Address admission inquiries to: Dr. Murray Daw, Graduate Student Recruiter, Department of Physics and Astronomy.
Phone: (864) 656-3419
E-mail: daw@clemson.edu
Admissions website: http://www.grad.clemson.edu/prospective

Application deadlines
Fall admission:
U.S. students: January 15
International students: January 15
Spring admission:
U.S. students: September 1
International students: September 1

Application fee
U.S. students: $80
International students: $90

Admissions information
For Fall of 2015:
Number of applicants: 108
Number admitted: 41
Number enrolled: 14

Admission requirements
Bachelor’s degree requirements: Bachelor’s degree is required.
Minimum undergraduate GPA: 3.0

GRE requirements
The GRE is required.
No minimum scores set

Advanced GRE requirements
The Advanced GRE is not required.

TOEFL requirements
The TOEFL exam is required for students from non-English-speaking countries.
PBT score: 570
iBT score: 90

Other admissions information
Additional requirements: Usual preparation is undergraduate major in physics. Students from other fields will have an opportunity to make up deficiencies.
Undergraduate preparation assumed: Courses are based upon texts such as Hecht, Optics; Griffiths, Introduction to Electrodynamics; Marion and Thornton, Mechanics, Eisberg; Modern Physics, Stowe, Introduction to Statistical Mechanics and Thermodynamics; Griffiths and Townsend, Quantum Physics. Included with these standard areas of study should be an advanced undergraduate laboratory in experimental physics, mathematics including differential equations, complex variable, Fourier analysis, and operational mathematics. Some knowledge of computer programming including standard methods using Mathematica, Maple, MatLab, etc., will also be helpful.

TUITION
Tuition year 2014–2015:
Tuition for in-state residents
Full-time students: $4,033 per semester
Part-time students: $560 per credit
Tuition for out-of-state residents
Full-time students: $8,429 per semester
Part-time students: $1,122 per credit
Credit hours per semester to be considered full-time: 12
Deferred tuition plan: Yes
Health insurance: Available at the cost of 492.00 per year.
Other academic fees: Graduate assistantship fees, $1,052 per semester (fall and spring).
Academic term: Semester
Number of first-year students who received full tuition waivers: 1

Teaching Assistants, Research Assistants, and Fellowships
Number of first-year
Teaching Assistants: 11
Fellowship students: 2
Average stipend per academic year
Teaching Assistant: $19,500
Research Assistant: $23,000
Fellowship student: $24,000

FINANCIAL AID
Application deadlines
Fall admission:
U.S. students: September 1
International students: September 1
Spring admission:
U.S. students: September 1
International students: September 1
South Carolina

Clemson U., Phys. & Astr.

Loans
Loans are available for U.S. students. Loans are not available for international students. GAPSFAS application required: No FAFSA application required: Yes

For further information
Address financial aid inquiries to: Clemson University, Financial Aid Counselor, G-01 Sikes Hall, Box 345123, Clemson, SC 29634. Phone: (864) 656-2280 E-mail: finaid@clemson.edu

HOUSING

Availability of on-campus housing
Single students: Yes Married students: No

For further information
Address housing inquiries to: University Housing, 200 Mell Hall, Box 344075, Clemson, SC 29634-4075. Phone: (864) 656-2295 E-mail: housinginfo-l@clemson.edu Housing aid website: http://www.clemson.edu/campus-life/housing/

SPECIAL EQUIPMENT, FACILITIES, OR PROGRAMS

The department is housed in the four-story 64,000 sq. ft. physics and astronomy building. A fully equipped research/instrument laboratory and computing facilities is available, along with a state-of-the-art planetarium. Office space is provided for graduate students. Extensive research facilities include an electron beam ion trap facility for highly charged ion beam production; an atomic molecular and optical physics laboratory; a scanning tunneling microscope nanomaterial processing laboratory with electric arc discharge, pulsed laser vaporization, and CVD synthesis capabilities; bulk and thin film thermoelectric materials growth facilities; Raman scattering, infrared/visible spectroscopy, electron microscopy, atomic force microscopy, and electrical transport measurements are used extensively for characterizing carbon nanotubes, nanodiamond, semiconducting oxide nanobelts, and nanowires. Access is also available to the SARA and Super Lotis telescopes.

Table B—Separately Budgeted Research Expenditures by Source of Support

<table>
<thead>
<tr>
<th>Source of Support</th>
<th>Departmental Research</th>
<th>Physics-related Research Outside Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal government</td>
<td>$3,622,098</td>
<td></td>
</tr>
<tr>
<td>State/local government</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-profit organizations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business and industry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>$246,950</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$3,869,048</td>
<td></td>
</tr>
</tbody>
</table>

Table C—Separately Budgeted Research Expenditures by Research Specialty

<table>
<thead>
<tr>
<th>Research Specialty</th>
<th>No. of Grants</th>
<th>Expenditures ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Astrophysics</td>
<td>10</td>
<td>$375,360</td>
</tr>
<tr>
<td>Atmosphere, Space Physics, Cosmic Rays</td>
<td>20</td>
<td>$686,511</td>
</tr>
<tr>
<td>Atomic, Molecular, &amp; Optical Physics</td>
<td>2</td>
<td>$1,199,683</td>
</tr>
<tr>
<td>Biophysics</td>
<td>3</td>
<td>$640,606</td>
</tr>
<tr>
<td>Condensed Matter Physics</td>
<td>11</td>
<td>$986,888</td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
<td>$3,869,048</td>
</tr>
</tbody>
</table>

FACULTY

Professor


Hartmann, Dieter H., Ph.D., University of California, Santa Cruz, 1989. Astronomy, Astrophysics. Gamma-ray astronomy, nucleosynthesis, galactic structure.


Larsen, M. F., Ph.D., Cornell University, 1979. Atmosphere, space physics.

Leising, Mark D., Ph.D., Rice University, 1987. Department Chair, Astronomy, Astrophysics. Gamma-ray astronomy, supernovae.

Marinescu, D. C., Ph.D., Purdue University, 1996. Condensed Matter Physics, Theoretical Physics. Condensed-matter theory.


Associate Professor


Lehmacher, Gerald, Ph.D., University of Bonn, 1993. Atmosphere, space physics, Atmospheric physics, turbulence in the mesosphere and lower thermosphere, suborbital rocket instrumentation.

Oberheide, Jens, Ph.D., Wuppertal University, 2000. Climate/Atmospheric Science. Atmosphere, space physics, Atmospheric and geospace physics, climate and weather of the sun-earth system.


Assistant Professor


Ding, Feng, Ph.D., Boston University, 2004. Biophysics, Computational Physics. Multi-scale modeling of biomolecules and molecular complexes, Understanding the interface between nanomaterials and biology, and designing functional molecular components, including proteins and RNA.

Lu, Xian, Ph.D., University of Illinois, Urbana-Champaign, 2011. Atmospheric, Space Physics, Cosmic Rays.

Marler, Joan P., Ph.D., University of California, San Diego, 2005. Atomic, Molecular, & Optical Physics. Experimental low-temperature atomic and molecular ion physics, laser trapping and cooling, cold chemistry.

Sanabria, Hugo, Ph.D., University of Houston, 2005. Biophysics. The focus of my research is to understand how biomolecules interact, store and transfer information. We try to answer what are the principles underlying the relation between structure and dynamics of biomolecules, and how these relate to their biological function. We address this by using state-of-the-art single-molecule fluorescence spectroscopy.


Research Professor


Research Assistant Professor


Lecturer

Brown, Jason, Ph.D., Clemson University, 1999. Physics and other Science Education.


Puneet, Pooja, Ph.D., Clemson University, 2013.


DEPARTMENTAL RESEARCH SPECIALTIES AND STAFF

Theoretical

Astrophysics. Nucleosynthesis; space astrophysics; stellar atmospheres; cosmic rays; gamma-ray bursts; supernova theory; origin of solar system; stellar evolution; cosmology. Brittain, Flower, Hartmann, King, Leising, Meyer, The, Valentini.

Atmosphere, Space Physics, Cosmic Rays. Atmospheric wave dynamics, propagation, and interaction with chemical and airglow processes; ionospheric electrodynamics: plasma; climate and weather of the sun-earth system. Larsen, Lehmacher, Meriwether, Oberheide.

Biophysics. DNA repair mechanisms; quantum biology. Alexov, Ding, Podila.

Computational Physics. Computational biophysics and bioinformatics; developing methods for modeling electrostatics in biological systems (DelPhi package); understanding the effects of missense mutations causing mental disorders and intellectual disability; predicting protein-protein interactions and 3D structures of the protein-protein complexes; computer simulations of protein-protein interactions modeling the role of conformation changes, pH, and salt concentration on biological function. Alexov, Ding.

Condensed Matter Physics. Surface phenomena, including scattering; anharmonic effects in crystal lattices; magnetic, optic, and transport properties of semiconductor mesoscopic structures (quantum wells and superlattices); broken symmetry states; charge and spin density waves; non-equilibrium superconductivity; topological computation; high-temperature superconductivity; cold atomic physics in optical traps and lattices. Daw, He, Marinescu, Rao, Sosolik, Tewari, Tritt.

Quantum Foundations. Foundations of quantum mechanics and astrophysics; cosmology; black holes. Valentini.
Experimental
Astronomy. Gamma-ray astronomy; observational astronomy; stellar evolution; stellar atmospheres; circumstellar evolution; planet formation; stellar accretia; abundance determinations; galactic chemical evolution; star clusters; close binary star systems. Ajello, Alper, Brittain, Flower, Hartmann, King, Leising, Meyer, The.

Atmosphere, Space Physics, Cosmic Rays. Rocket, radar, and spacecraft studies of ionospheric dynamics, electrodynamics, and plasma physics; studies of atmospheric dynamics and composition with LIDAR and Fabry-Perot systems; sounding rocket instrumentation, density, temperature, and turbulence in the mesosphere and lower thermosphere; satellite data analysis of vertical coupling processes. Larsen, Lehmacher, Meriwether.

Atomic, Molecular, & Optical Physics. Experimental low-temperature atomic and molecular ion physics; laser trapping and cooling; cold chemistry; physics with highly charged ions. Marler, Sosolik, Takacs.

Biophysics. Biomedical optical imaging; fluorescence tomography; optical spectroscopy; microwave imaging; ultrasound tomography; bioluminescence tomography; X-ray tomosynthesis; spectroscopy; DNA repair mechanisms; structure of biological molecules; biological effects of radiation damage; mechanisms of carcinogenesis; mechanisms for single-event effects in microelectronics; microdosimetry using microelectronic technology; structural biology of RNA; biomolecular structure function relationships; NMR spectroscopy; fluorescence spectroscopy; single-molecule biophysics; nanoscience. Alper, Podila, Rao, Sanabria.

Condensed Matter Physics. Thermoelectric materials and applied physics; thermophysical properties of novel materials, including investigations of low-temperature heat capacity and thermal transport; investigations of thermal, magnetic, and electronic transport properties of exotic systems, low-dimensional conductors, strongly electron correlated materials, and phase transition materials; high-temperature thermophysical properties of novel materials; synthesis of thermoelectric nanomaterials and composite thermoelectrics. Daw, He, Podila, Puneet, Rao, Skove, Sosolik, Tritt.

Condensed Matter Physics. Atomic and molecular beam interactions at surfaces; formation and characterization of surface nanostructures with an energetic beam and scanning tunneling microscope. He, Marinescu, Podila, Puneet, Rao, Skove, Sosolik, Tewari, Tritt.

Nano Science and Technology. Synthesis of nanostructured materials using electric arc discharge, pulsed laser vaporization, neutron scattering, and CVD methods; optical characterization of novel materials by Raman scattering, infrared/visible, and fluorescence spectroscopy; mechanical properties of one-dimensional materials and chem-bio sensing using harmonic detection of resonance technique; superconducting nanotubes. Podila, Rao, Skove.