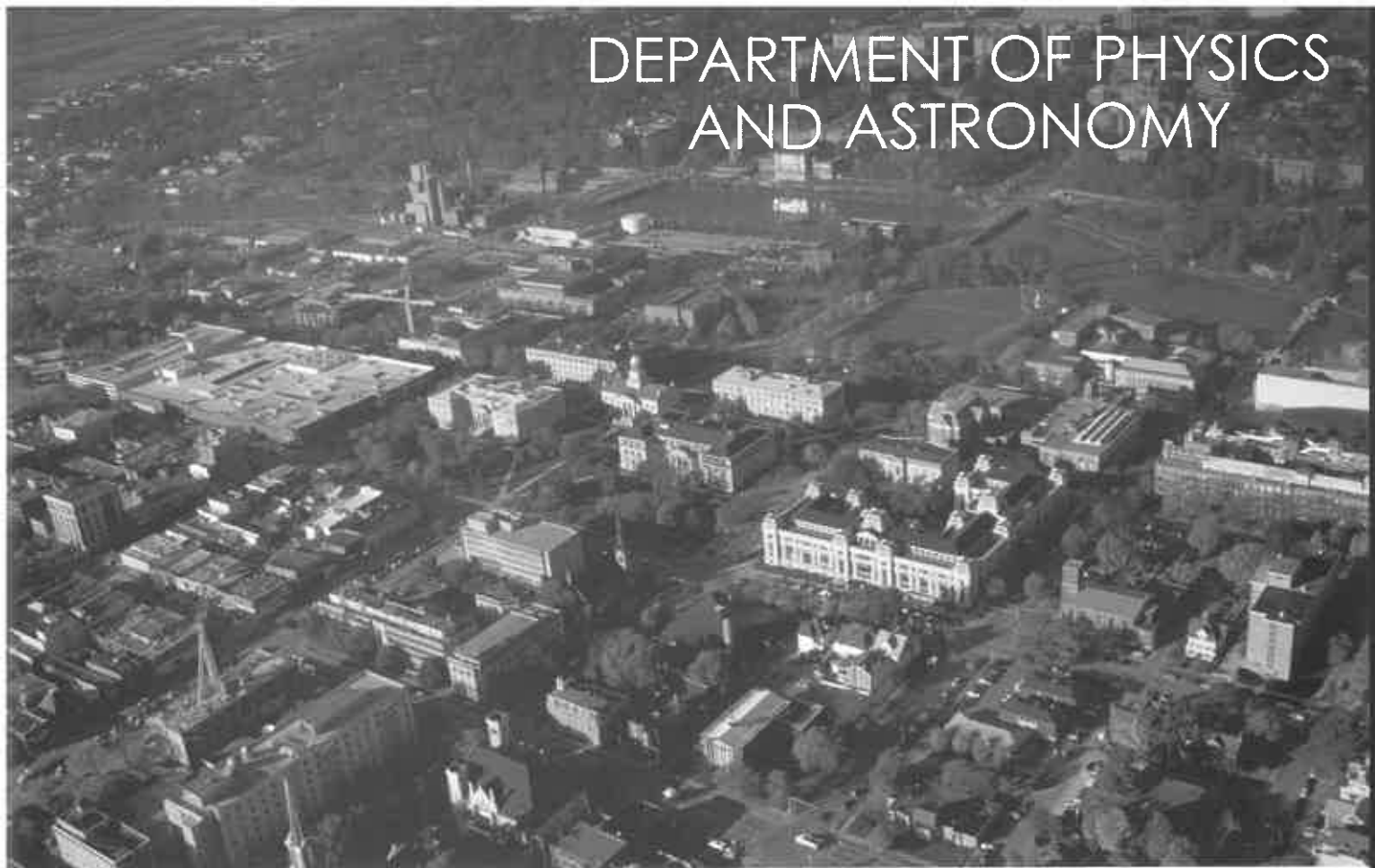




Graduate Study at **THE UNIVERSITY OF IOWA**



DEPARTMENT OF PHYSICS AND ASTRONOMY



The University of Iowa is a major research university, with 6,400 graduate students from more than 100 countries.

The Department of Physics and Astronomy has grown in size and prominence in the past 20 years. Our faculty members have received more awards than ever in our history. Our distinguished faculty includes two members of the National Academy of Sciences and 13 fellows of professional societies.

Our graduate students choose from a wide range of research areas, including interdisciplinary topics, and they enjoy a greatly expanded number of research labs.

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The University of Iowa

The University of Iowa is a major research university with 29,000 students. It is ranked 24th among 249 public universities that grant doctorates (*U.S. News & World Report*, 2002). Our faculty members travel the globe conducting and presenting their research. They receive about \$260 million of research funding annually.

Iowa City

Iowa City's population is educated, ranking third in the United States in the percentage of adults who have college degrees. It is a vibrant and cosmopolitan community of 60,000, located within easy travel distance to Chicago, Minneapolis, Kansas City, and St. Louis.

Department of Physics and Astronomy

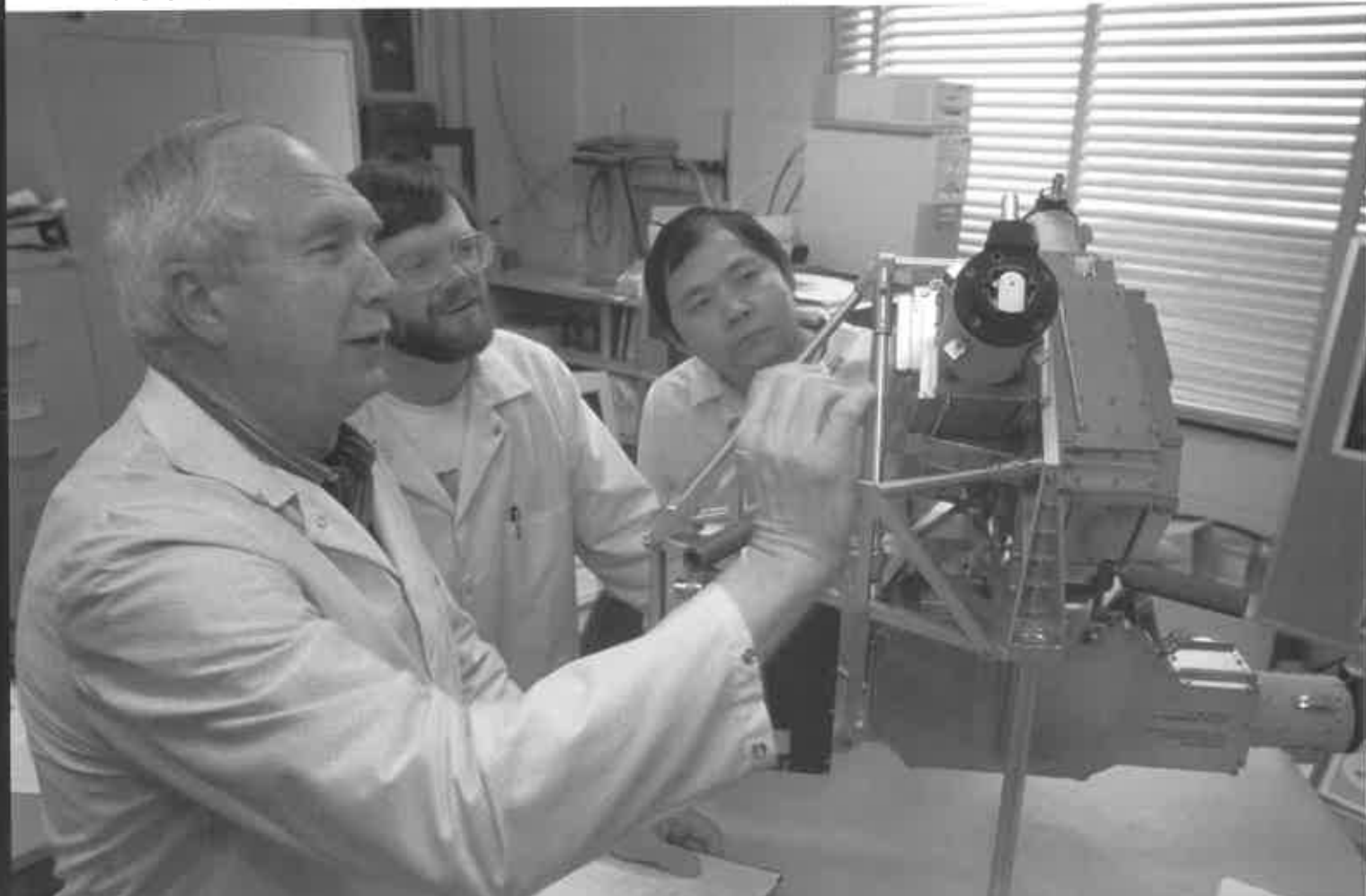
By joining our graduate programs in physics or astronomy, you will take a step toward fully realizing your potential as a scientific researcher and scholar. You will choose from a wide range of research areas.

You will be working with faculty members who have significant national and international reputations. To judge this for yourself, you can use the same criteria that professors everywhere use in evaluating themselves: awards won by faculty, research grants, invited talks at conferences and workshops, and papers published in the most prestigious journals. Each of these indicators is the result of peer review, on a national or international level, of the quality of a faculty member's work.

Our faculty members have won many major awards:

- Two members of the National Academy of Sciences
- One laureate of the Crafoord Prize—the Royal Swedish Academy of Sciences equivalent of the Nobel Prize in Astronomy
- One fellow of the American Association for the Advancement of Science (AAAS)
- Ten fellows of the American Physical Society
- Three fellows of the American Geophysical Union
- One Alfred P. Sloan fellow

Professor Donald Gurnett, member of the National Academy of Sciences, with an instrument built at Iowa for the spacecraft Cassini: "Our department has a very high-quality faculty that provides a broad range of research opportunities for graduate research."

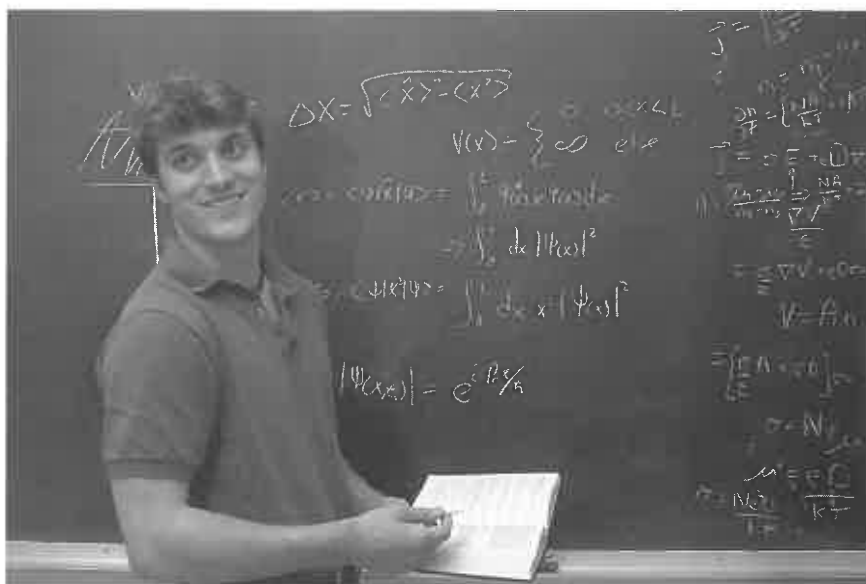


Our research grants make us the top physics department, measured in dollars received per faculty member, of all of the Big Ten universities—Illinois, Indiana, Michigan, Michigan State, Minnesota, Northwestern, Pennsylvania State, Purdue, Ohio State, and Wisconsin. Beyond indicating our faculty members' reputation among their scientific peers, research grants are also important because they pay for students' stipends, conference travel, and equipment.

Big Ten University	Grant Support per Faculty Member
Iowa	\$354,000
University A	\$263,000
University B	\$252,000
University C	\$235,000
University D	\$208,000
University E	\$185,000
University F	\$167,000
University G	\$148,000
University H	\$145,000
University I	\$124,000
University J	\$106,000

Our faculty members gave 52 invited talks at conferences and workshops during the most recent year. They publish their work in the leading journals, which you can identify in the publication lists on our faculty web pages (www.physics.uiowa.edu/faculty).

Degrees offered
• M.S. in Astronomy
• M.S. in Physics
• Ph.D. in Physics (for students in both physics and astronomy)



Graduate student Lou Datilio: "One of the things I like about the department is that the instructors are available for consulting to find out about their research areas. When you first come in as a graduate student, choosing a research area is a crucial decision. It was helpful to meet the faculty members when I was making this big first step."

Becoming a Successful Researcher

We offer the resources and opportunities that students need to become the best scientists they can be.

In choosing a research project, you will enjoy a wide range of research disciplines, including several interdisciplinary areas.

Our department is growing. In the past 20 years, we have increased our number of faculty members by 50 percent and the number of research labs on campus has more than doubled.

Our students use world-class research facilities. Our on-campus labs are among the most modern available. Many have been built in recent years by new faculty members.

Off-campus facilities used by students include:

- accelerators for particle physics research, including Fermi National Accelerator Laboratory, Stanford Linear Accelerator Center, and CERN, the European Organization for Nuclear Research;
- National Superconducting Cyclotron Laboratory, the leading rare isotope research facility in the United States;
- observatories, including Arecibo, Very Large Array (VLA), and Very Long Baseline Array (VLBA) Chandra X-ray Observatory.
- Large Plasma Device (UCLA), a unique tool for researching the fundamental properties of naturally occurring plasmas;
- Poker Flat Research Range (University of Alaska), which studies sounding rockets in the Arctic atmosphere and ionosphere; and spacecraft used by graduate students in space physics and astronomy include *Polar*, *Geotail*, and *Cluster* (all in Earth orbit), *Cassini* (in Saturn orbit), *Galileo* (in Jupiter orbit), and sounding rockets.



Most teaching assistants supervise an undergraduate lab. Here, a physics TA explains the e/m experiment to two undergraduates. These teaching labs are all equipped with modern instrumentation.

Our colloquia and seminars keep graduate students abreast of the latest research. Seminars are where students are trained to give talks and develop the communication skills they need to become successful scientists. In the 2001-2002 academic year, we had 154 talks in our colloquia and seminars. The speakers were:

- 53% from outside our department, including 41 other institutions, and
- 47% from our department, including our own graduate students.

Our seminars, specialized by research area, are:

- Astrophysics/space physics*
- Experimental and theoretical (high energy and nuclear)*
- Materials physics/solid state physics*
- Math physics*
- Operator theory*
- Plasma physics*

To become a successful researcher, you will want to talk with not only your adviser, but other scientists as well. We provide these opportunities. You will meet other scientists when you travel to research conferences, and you will also interact with our own staff of researchers with doctorates, including:

- 11 research scientists*
- 22 postdocs and research investigators*
- 4 visiting scholars*

Financial Support

Ninety-five percent of our new graduate students receive financial support, either from us or from their own governments.

Our Students, 2001-2002

68 graduate students

- 62% international
- 38% domestic
- 13% female
- 87% male

107 undergraduate students

- 25% female
- 75% male

Teaching Assistant (TA)

TA positions are awarded by the department. This is the most common support for first-year students who have not yet chosen a research adviser.

Research Assistant (RA)

RA positions are usually awarded by individual professors. Usually, the work you do as an RA is the same as the research you do for your thesis. Most commonly, students take an RA position after their first year, when they have learned about the opportunities for research with various faculty members. If you already know which faculty member has a research program that is best for you, you may contact that professor to inquire about RA support during your first year.

Scholarships

Some students who receive an RA or TA stipend also may receive a scholarship that pays all or part of their tuition.

Fellowships

Some students may receive a fellowship instead of a research or teaching assistantship. A fellowship pays both a stipend and tuition, without requiring the student to be an RA or TA. There are two kinds:

Presidential Graduate Fellowship—for students with outstanding Graduate

Record Examination scores and grade-point averages

Graduate Merit Fellowship—for under-represented students

Our graduate students are valuable to us, so we make every effort to pay them an attractive stipend. Most students have what is called a 50 percent appointment, with the following stipends:

Stipends for nine-month Academic Year, 2002-2003

TA \$16,500

RA \$17,500

Stipends for summer 2003

\$1,833-\$1,944 per month (up to three months, depending on the professor. For updated stipend information, contact us or visit our web site.)

Students with at least a 25 percent appointment:

- receive health insurance benefits in the form of the Graduate Student Health Insurance Allowance, and
- pay the resident tuition rate (www.uiowa.edu/registrar).

Resident Tuition for a Typical Student for Nine Months, 2002-2003

Semester hours		
9	First two years	\$4,887
6	After second year	\$3,341
2	After passing comp. exam	\$1,150

About TA Positions

- Most TAs have a half-time (50 percent) appointment.
- The most common assignment is for TAs to teach three sections of an elementary physics and astronomy laboratory, each with three hours of contact with students, or four sections each with two hours. These TAs work under the supervision of the laboratory coordinator and the professor in charge of the course.
- Other TAs serve as tutors, proctors, or graders.
- A half-time appointment requires up to 20 hours per week of service to the department. At the same time, you can take a full load of courses, up to 12 semester hours.

Some TAs also receive support as an RA. It is common for a student to be supported as a half-time TA during the academic year and as an RA for up to three months during the summer. Some students are supported during the academic year partly as a TA and partly as an RA. For example, a student supported with a one-quarter-time TA position and a one-quarter RA position would serve up to 10 hours per week as a TA and serve as an RA in the remaining time.



Graduate student Yohannes Abate, left, at a TA training meeting: "The cost of housing in Iowa City is reasonable. At first I lived in Hawkeye Court, and then I moved. I take the Cambus; it's free and it's fun because I see lots of international students."

A GRADUATE STUDENT'S LIFE

Housing

In Iowa City you will find many apartments at affordable rates. The University of Iowa also offers apartments; for example, many graduate students live in The University of Iowa's Hawkeye Court, where a one-bedroom apartment has a monthly rent of \$373, as of 2002.

Transportation

- Three bus systems serve Iowa City and Coralville, including the free Cambus. All bus lines pass through the downtown areas where our two buildings are located.
- To arrive in Iowa City by air, you will fly to the Eastern Iowa Airport, Cedar Rapids, located about 23 miles from campus. There are 42 scheduled flights each day, from Chicago, Minneapolis, St. Louis, and several other cities. A shuttle is available to bring you to campus.
- Iowa City is near Interstate 80 and easily reached by car and bus.

International Students

Iowa City is a friendly place to live. With graduate students from more than 100 countries living in Iowa City, you are sure to find friends from your own country. Many national groups have clubs and social events. Large cities, including Chicago, are near enough for you to travel by bus. The University of Iowa's International Center helps foreign students with visas and other services, such as a women's club for both students and spouses. Free classes in English as a second language are available to all adults. Children of school age will enjoy attending one of the best public school systems in the United States.

Women students enjoy events sponsored by Women in Science and Engineering (WISE).

Transition to Graduate School

- Our department helps you adjust to graduate school with a one-week orientation for all new students.
- We provide training to TAs. Each semester, we have a training meeting for all TAs, and TAs for laboratories also receive 30 minutes of training each week before beginning a new experiment.

Research

As you develop into a researcher, you and your adviser will publish papers in journals, and you will write your thesis. Most students also attend scientific conferences, where they give talks on their research and where they learn about job opportunities.

TYPICAL COURSE SEQUENCE

First-Year Courses (to Prepare for the Ph.D. Qualifying Exam)

Fall Semester

029:205 Classical Mechanics—
3 credit hours

029:213 Electrodynamics I—
3 credit hours

029:245 Quantum Mechanics I—
3 credit hours

Spring Semester

029:212 Statistical Mechanics—
3 credit hours

029:214 Electrodynamics II—
3 credit hours

029:246 Quantum Mechanics II—
3 credit hours

Alternatives

You may substitute a course in a research area for one of the courses above.

To improve your math skills, you may enroll in 029:171/172 Mathematical Methods of Physics during the fall and spring semesters of your first year.

Second Year

Qualifying Exam—August

Courses in research areas, such as:

- Mechanics of Continua
- Nonlinear Optics
- Laser Principles
- Quantum Electronics
- Semiconductor Physics
- Medical Physics
- Quantum Field Theory
- Quantum Gauge Theories
- Advanced Nuclear Physics
- Theoretical Solid State Physics
- General Relativity and Cosmology
- Particle Physics
- Solar-Terrestrial Physics
- Advanced Atomic and Molecular Physics
- Advanced Plasma Physics

Placement

Our students find excellent jobs after completing their degrees. They are prepared for this success by the experience they gain while performing their research and by the worldwide connections of our faculty members. We have a very successful record of placing students as scientists in all kinds of positions, in universities, national laboratories and observatories, and in industry. The department has a Career Development and Placement Office to help our graduate students find their jobs.



The Iowa Arts Festival attracts people to downtown Iowa City, just a few steps from where our department is located. Graduate student Lou Datilio: "When I go home to New Hampshire, I miss Iowa City. There are so many cultural activities, not just for the students but for the whole population. There are so many events and festivals, like the Jazz Festival."

RESEARCH AREAS

ASTRONOMY

Our astronomical research ranges from the innermost solar system to the most remote galaxies. We use radio telescopes to observe radio galaxies and quasars; we use both X-ray and radio telescopes to observe the galactic center; and we use spacecraft to observe the planets and solar system. Our theorists study stellar winds, the solar corona, accretion disks, astrophysical turbulence, and the interstellar medium. Students hone their speaking skills in our weekly space and astrophysics seminar.

We have recently added faculty members and broadened the range of research opportunities that we offer in astronomy. Our students use major observatories, and many of them spend a period of residence at national radio observatories. With our instruments on major spacecraft, we are one of the few departments in the United States that offer students significant opportunities for spacecraft exploration of the solar system. We are also one of the few departments with its own robotic observatory, which is located in Arizona. Our Ph.D.'s are successful in finding research careers at national observatories, laboratories, and universities. Our theorists include leaders of the newly formed Plasma Astrophysics topical group of the American Physical Society.

Our astronomy graduate students use Arecibo and other major telescopes as part of their thesis research.



Amitava Bhattacharjee

Theoretical plasma astrophysics

- Analytical studies and computer simulations
- Magnetohydrodynamic (MHD) turbulence in the interstellar medium and the solar wind, origin of magnetic fields in galactic plasmas

Benjamin Chandran

Astrophysics theory and simulation

- Theory topics: astrophysical turbulence, acceleration of energetic particles, origin of cosmic magnetic fields, accretion disks, magnetic reconnection, and heat transport in galaxy clusters
- Simulation topics: shock acceleration, accretion disks, magnetohydrodynamic (MHD) turbulence and dynamos

Louis Frank

Planetary exploration

- Analysis of Jupiter data from JPL's *Galileo* spacecraft

Kenneth Gayley

Theoretical astrophysics

- Theory topics: highly supersonic stellar winds accelerated by photon pressure; radiation transport in stellar atmospheres and disks; how massive stars lose mass prior to a supernova
- Simulation topics: colliding winds in hot-star binaries, radiation transport in outflows from stars

Donald Gurnett

Planetary exploration

- Experimental studies of planetary radio emissions and plasma waves
- Group is now constructing a low-frequency radar to search for subsurface water at Mars

Cornelia Lang

Observational radio and X-ray astronomy

- Observations are multi-wavelength, using both radio interferometry and X-ray imaging/spectroscopy
- Topics include the interstellar medium of the galactic center: magnetic and X-ray phenomena, stellar winds, and ionized and molecular gas

Robert Mutel

Observational radio astronomy

- Observations are very-long baseline interferometry (VLBI), using radio telescopes and spacecraft
- Jets in active galaxies, stellar radio emission, interstellar and interplanetary turbulence

Jack Scudder

Theoretical stellar astronomy

- Solar wind expansion

Steven Spangler

Observational radio astronomy

- Interplanetary medium, interstellar medium, radio galaxies, quasars

James Van Allen

Cosmic-ray observations

- Spacecraft measurements of cosmic-rays using data from *Pioneer 10*, about 80 AU (astronomical units) from the sun

ATOMIC AND MOLECULAR PHYSICS

Atomic and molecular physics is a field where the most exciting problems are often interdisciplinary with chemistry and atmospheric science. Our graduate students in physics and astronomy can choose an adviser either in our own department or in the Department of Chemistry.

Our interdisciplinary program includes four experimenters, with substantial labs and state-of-the-art instruments. Our senior faculty members have significant international reputations, with a record of invited talks at international conferences. Students can choose a purely atomic and molecular physics project or a plasma physics project using laser spectroscopy. Additionally, students may choose a project with our chemistry faculty, for example on mineral aerosols in the Earth's troposphere. Our physics faculty are known for the development of novel laser-based spectroscopic methods. We probe the transition state region of a chemical reaction, allowing unique insight into the dynamics of bond-breaking and bond-forming processes in chemical reactions. We also develop new laser-induced fluorescence instruments for measuring particle motion in magnetized plasmas. Our Ph.D. graduates have been placed as postdocs in the leading research groups in the world.

Graduate student Yugang Sheng at the left, shown with some of the members of the research group of Professor Paul Kleiber (right): "I'm a beginning graduate student in this research lab. I think the instruments are among the best of any university in the United States. The method I use is called photodissociation; I study the dynamics of atoms and molecules in chemical reactions. Living in Iowa City, I'm pleased that there are quite a lot of people from my country. It's a nice place for international students."



PHYSICS & ASTRONOMY

Paul Kleiber

Experimental atomic and molecular physics

- Molecular spectroscopy and chemical dynamics (bond activation and energy transfer processes)
- Development of laser-based spectroscopic methods

Frederick Skiff

Experimental atomic spectroscopy

- Primary research area is experimental plasma physics; student projects include atomic physics methods
- Spectroscopy of atomic ions, calculation of spectra, laser-optical pumping, tracer particle measurements

CHEMISTRY

Vicki Grassian

Experimental surface science

- Topics in environmental, atmospheric, and materials processes include: heterogeneous reactions of trace atmospheric gases, optical properties of atmospheric particulates, environmental catalysis, nanoparticles for use in environmental remediation

Jan Jensen

Computational and theoretical molecular biophysics

- Quantum mechanical modeling of protein biochemistry related to protein engineering and rational design of drugs

Mark Young

Experimental chemical physics

- Laser photochemical studies of electron and proton transfer in model complexes; atmospheric chemistry of particulate matter

CONDENSED MATTER PHYSICS

Condensed matter physics includes solid-state physics and the study of liquids and soft materials. As the largest field within physics, it includes a wide range of topics such as semiconductors, metals, magnets, superconductors, polymers, and biological systems. Our theorists and experimentalists explore quantum-mechanical phenomena including semiconductor spintronics and optoelectronics, superconductivity, magnetism, and strong light-matter coupling; and they explore soft-condensed-matter topics such as the melting phase transition and colloidal crystals. Students attend a weekly materials physics/solid state physics seminar.

Our department has recently expanded its size in the area of condensed matter. We now have more than 11 labs filled with state-of-the-art equipment, and we offer students a wide range of thesis projects. Our theoretical group frequently publishes joint papers with our experimentalists. We give numerous invited talks at national and international conferences. Specialized courses are offered biannually, including Semiconductor Physics, Solid State Physics, Quantum Electronics, Laser Principles, and Nonlinear Optics. Students give talks at national and international meetings. There is a particularly wide job market for students trained in this area, with excellent opportunities in industry, government labs, and academia. Our strong research collaboration with industrial partners aids students in finding jobs.

Professor Michael Flatté, left, with graduate student Benjamin Moehlmann. They are writing a computer code to model a semiconductor and discussing how to account for its crystalline symmetry.



Thomas Boggess

Experimental semiconductor physics

- Ultrafast nonlinear optical techniques used to study semiconductor nanostructures
- Experimental techniques allow measuring electron dynamics on a time scale of 0.1 picosecond

Michael Flatté

Theoretical superconductor and semiconductor physics

- Properties of impurities in high-temperature superconductors
- High-speed semiconductor magnetoelectronics

John Goree

Experimental soft condensed matter

- The melting phase transition, phonon spectra, nonlinear waves in lattices
- Interdisciplinary work with plasma physics; we use dusty plasmas, which form into crystals similar to colloidal crystals

John Prineas

Experimental semiconductor physics

- Topics include light-matter coupling in semiconductor nanostructures; and dynamics of excitons, i.e., bound states of a hole and an electron
- Molecular beam epitaxial growth of III-V compound semiconductor layered structures

John Schweitzer

Experimental and theoretical condensed matter physics

- Structural, electronic, and magnetic phase transition; materials synthesis and characterization of ternary transition-metal sulfides

Art Smirl

Experimental semiconductor and nanostructure physics

- Optical techniques used to study scattering and to control carrier transport with femtosecond temporal resolution and nanometer spatial resolution
- Research has potential applications in electronics, optoelectronics, terahertz wave generation, data storage, optical switching, and quantum computation

Markus Wohlgenannt

Experimental condensed matter physics

- Optical and transport (of electrical current) properties of organic semiconductors, interaction with light, electric and magnetic fields
- Superconductivity and spintronics

MATHEMATICAL PHYSICS

Mathematical physics is an interdisciplinary subject in which theoretical physics and mathematics intersect. The University of Iowa has held an ongoing mathematical physics seminar for the past 20 years, in which faculty from both mathematics and physics actively participate. Topics of interest include relativistic quantum mechanics, quantum field theory, representation theory of groups and quantum groups, theory of dynamical systems, quantum computing, phase transitions, quantum chaos, lattice gauge theory, and C-star algebras.

Our program in mathematical physics is one of the few in the United States that is fully interdisciplinary, combining both physicists and mathematicians in a working relationship. Every semester our seminar includes talks given by distinguished visitors, including Field medalists. We also organize workshops held on campus here at Iowa, attracting speakers from around the world; we've organized two such workshops in six years. Students may work on interdisciplinary research topics involving mathematics and theoretical physics. They can obtain a Ph.D. through the University's Applied Mathematical and Computational Sciences Program, in which a physicist and a mathematician jointly supervise the dissertation. Two students have recently completed such dissertations; one teaches in a mathematics department, the other is doing economic research for a private company.

Professor Paul Mubly of the Department of Mathematics speaking in the mathematical physics seminar. The department offers numerous interdisciplinary research opportunities for graduate students.



PHYSICS & ASTRONOMY

William Klink

Symmetry and group theory

- Primary research area is the application of group theory to relativistic quantum mechanics
- Topics include representation theory of groups, applied to relativistic nuclear theory and quantum field theory

Yannick Meurice

Mathematics of quantum field theory

- Topics related to statistical mechanics include phase transitions in Ising models and global properties of renormalization group flows
- Studies of large-order behavior of perturbative expansions; large-field contributions to path integral

Wayne Polyzou

Mathematics of quantum field theory

- Scattering theory, relativistic quantum mechanics, quantum field theory, dynamical systems

Vincent Rodgers

String theory and group theory

- Infinite dimensional Lie algebras as related to string theory; co-adjoint representations and field theories
- Computation includes use of symbolic manipulation software

MATHEMATICS

Tom Branson

Wavelets, quantum theory, symmetry

- Particles, fields, geometry, relativity, quantum computing algorithms, spectra

Palle Jorgensen

Wavelets, quantum theory, symmetry, algorithms

- Particles, fields, geometry, relativity, quantum computing algorithms, spectrum

Paul Muhly

Operator algebras and mathematical physics

- Mathematical underpinnings of quantum mechanics, particularly those of quantum field theory and quantum statistical mechanics

Tuong Ton-That

Group theory and harmonic analysis

- Group theory

MEDICAL IMAGING AND POSITRON EMISSION TOMOGRAPHY

We are active in two areas of experimental applied physics involving the imaging of radioactive tracers (radiotracers) that are introduced into the human body. Our areas are positron emission tomography (PET), where we produce short half-life radiotracers from a medical cyclotron and synthesize positron-emitting radiopharmaceuticals; and nuclear medicine, where we use gamma-emitting radiotracers for single-photon emission tomography (SPECT). A graduate course in medical physics is offered.

We are part of the largest teaching hospital in the United States. The University of Iowa Hospitals and Clinics offers extensive resources for student research. Students complete most of their courses with other physics students and then perform thesis research at the hospital on the other side of the campus. Students receive a Ph.D. in physics. Experimental thesis research includes developing new methods and technologies to enhance the use of radionuclide imaging for the measurement and evaluation of tissue function. Students participate in developing new radioactivity detection devices for clinical use, synthesizing novel radioactive tracers for imaging the human body, and improving medical image processing schemes for visualizing the extent of disease. Students receiving a Ph.D. in this area have excellent job prospects in medical imaging companies or academia.

Professor Richard Hichwa with the accelerator used to produce isotopes for the positron-electron tomography (PET) machine.



Richard Hichwa

Positron Emission Tomography (PET)

- Hardware development for nuclear detection systems, real-time control of a cyclotron, and high-power nuclear targets
- Image analysis schemes, and physiological modeling of normal and disease tissues

Mark Madsen

Radionuclide imaging physics

- Radiotracer kinetics (how radioactive tracers are transported in the body), image processing, and image reconstruction

NONLINEAR DYNAMICS

Nonlinear dynamics is the study of systems that are described by nonlinear equations of motion. Chaos is a topic of particular interest. This topic is important in almost every branch of science and engineering. Faculty members study chaos two ways: as a phenomenon of classical mechanics, and as quantum chaos, which is the study of the interface between the quantum and classical descriptions for classically chaotic systems. The department offers a second semester of classical mechanics devoted to nonlinear dynamics.

Our interdisciplinary research in nonlinear dynamics allows students to choose an experimental or theoretical project. Students can choose a theoretical project and apply the methods of chaos to field theory or to the many body problem. Additionally, students may choose an experimental project, studying the observable effects of chaos in plasmas, where the exchange of energy among waves and particles is chaotic. Our previous work on chaos has been published in leading journals such as *Physical Review Letters* and reported as invited talks at major conferences. One of our previous Ph.D. students received a major national prize for a thesis on nonlinear dynamics.



Graduate student Ilker Uzun (left), with Professor Frederick Skiff: "I'm going to work on an experiment with three-wave interactions in magnetized plasmas. It's a very interesting topic, and it's complicated. When I got here, this plasma machine was almost finished. I learned to build equipment by making the probe and some other parts. I think this is a great department. It's comfortable here. You're not in competition with the other graduate students; you're just improving yourself."

Yannick Meurice

Theory of dynamical systems

- Topics related to lattice field theory or renormalization group; chaos in classical lattice field theory
- Applications of the KAM theorem: action-angle variables, small denominators, resonance in systems of coupled oscillators, construction of scaling variables

Wayne Polyzou

Theoretical nonlinear dynamics

- Primary research area is nuclear and particle theory
- Quantum chaos, constrained Hamiltonian systems, scaling phenomena

Frederick Skiff

Experiments and simulations of chaos

- Primary research area is experimental plasma physics; many of these problems involve nonlinear dynamics
- Analysis of time series and the analysis of chaotic signals; experiments and simulations of interacting sound and radio frequency waves; spatio-temporal chaos

OPTICS

Optics is an applied physics area with applications in industry, scientific instrumentation, medicine, astronomy, and future technologies such as quantum computing. The University of Iowa is the home of the Optical Science and Technology Center (OSTC), an interdisciplinary center for optics researchers in physics, chemistry, engineering, and other fields. The Department of Physics and Astronomy has experimenters who develop and test new optical devices and materials, as well as experimenters in the fields of plasma, atomic, and molecular physics who develop scientific instruments based on lasers and optics. Our experimenters have 15 labs on campus, and we have a theorist. We offer graduate-level courses in modern optics.

We have greatly increased the number of optics faculty and state-of-the-art laboratories in our department. Students interested in optics enjoy a wide range of research possibilities, both within the OSTC and with other faculty in the department as well. With their strong financial support from numerous funding agencies, our faculty members offer students excellent research opportunities. Job placement opportunities are particularly strong for Ph.D. graduates with experience in any of the kinds of optics that our students use.

Ultrafast optics lab of Professor Thomas Boggess (right). Graduate student Kenan Gundogdu (second from left), talking about the results of a recent experiment, said: "I gave a talk at the APS March meeting in Indianapolis. The title was 'Spin relaxation in InAs/GaSb superlattices grown on [110] and [001] directions.'"



David Andersen

Theoretical and experimental nonlinear optics

- Parametric solitons, nonlinear optical crossbar switch, passive and adaptive nonlinear optical equalizer, 4-pi confocal nonlinear optical microscopy
- Applications include long-haul telecommunications systems, embedded wireless communications

Thomas Boggess

Experimental modern optics

- Building and using sources of ultrashort optical pulses

Michael Flatté

Theory of semiconductor lasers

- Laser materials are theoretically designed and then tested by experimenters at Iowa
- Research applications include medicine and environmental monitoring

John Goree

Experiments with optics and lasers

- Primary research areas are plasma and condensed matter; students design and use optical systems as part of their research
- Optical imaging, image analysis, laser scattering, laser stimulation of lattices, spectroscopic imaging, laser diagnostics of plasmas

Paul Kleiber

Experimental spectroscopy

- Primary research area is atomic and molecular physics; students use optics and lasers in their projects
- Development of laser-based spectroscopic methods

John Prineas

Experimental ultrafast optics

- Optical pulse shaping for pulse-propagation experiments in semiconductors
- Development of ultrafast spectroscopic techniques, studies of quantum nano-optics of semiconductors

Frederick Skiff

Experiments with lasers and spectroscopy

- Optical instrumentation is developed and used as part of an experimental plasma physics program
- Low-light-level laser scattering, cw laser systems for spectroscopy, nonlinear optics of plasma waves

Arthur Smirl

Experimental ultrafast nonlinear optics

- Topics include laser physics and propagation effects in semiconductors
- Optical measurement methods include characterizing the optical field on a femtosecond time scale, spectral interferometric techniques, ellipsometric measurements of polarization

Markus Wohlgenannt

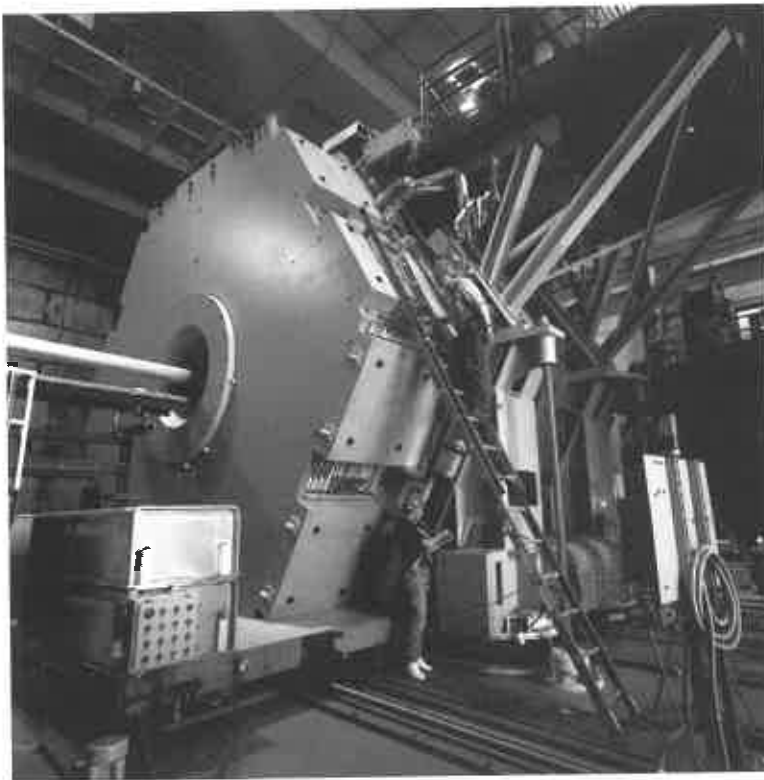
Experimental spectroscopy of organic semiconductors

- Topics include light absorption, reflection and emission, continuous wave photoinduced (nonlinear) absorption
- The influence of electric and magnetic fields on optical properties, spectroscopy of superconducting state in two-dimensional electron gas

PARTICLE PHYSICS AND NUCLEAR PHYSICS

Nuclear and particle physics is the study of particles and interactions at the level of nucleons and their quark structure and at the level of fundamental particles. Our program includes both experiment and theory. Graduate students perform experimental thesis projects at major accelerators or perform theory on campus. Our experimenters design and build detector components and perform data analysis as part of large experiments with multi-institution teams of experimenters. We have weekly seminars on campus, in which visitors, faculty, and students in nuclear and particle physics present their work.

We have four fellows of the American Physical Society and a representative of the U.S. High Energy Physics Advisory Panel. Group members publish in the leading journals and present their work at international conferences. Our experiments are performed at the world's leading accelerator facilities such as Stanford Linear Accelerator Center, Fermi National Laboratory, and the European Organization for Nuclear Research (CERN). Students conducting experiments often reside at these labs, and enjoy all the resources and learning opportunities of these major facilities, after completing their courses at Iowa. Theory students have opportunities to travel to summer schools on specialized topics. Students are encouraged to present their dissertation research at conferences.



Graduate students in experimental particle physics perform their thesis research using major facilities like the BABAR detector at the Stanford Linear Accelerator Center (SLAC). Our graduate students work in the room adjacent to this detector, cooperating with the leading experts in the field and helping to operate the experiment.

William Klink

Theoretical nuclear and particle physics

- Quarks models of nucleons and nuclei, relativistic quantum mechanics for few-nucleon and few-quark systems, electron-nucleus scattering
- Theory bridges the areas of particle physics and nuclear physics; is relevant to experiments at several national and international accelerators

Usha Mallik

Experimental particle physics

- CP-violation studies, to understand why matter is more common than antimatter

Yannick Meurice

Theoretical particle physics

- Renormalization group, lattice gauge, numerical simulations, Feynman diagrams, strong-coupling expansion, large-N approximations, supersymmetry, hierarchy problem

Charles Newsom

Experimental particle physics

- Baryon physics: charm and beauty

Edwin Norbeck

Experimental nuclear physics

- Collisions of Ni+Ni, Fe+Fe, lighter nucleons on gold, and Pb+Pb

Yasar Onel

Experimental particle physics

- Search for Higgs and supersymmetric (SUSY) particles
- Heavy ion collisions

Gerald Payne

Theoretical and computational nuclear physics

- The three-nucleon system as a tool to learn about the nuclear force
- Large-scale computer calculations to test models of few-nucleon systems

Wayne Polyzou

Theoretical nuclear and particle physics

- Quarks models of nucleons and nuclei, relativistic quantum mechanics for few-nucleon and few-quark systems, electron-nucleus scattering
- Theory bridges the areas of particle physics and nuclear physics; is relevant to experiments at several national and international accelerators

Mary Hall Reno

Theoretical particle physics

- Phenomenology: calculations support accelerator and cosmic-ray experiments
- Applying the standard model in neutrino physics theory; applying perturbative QCD corrections to particle interactions, evaluating nonstandard model signals in collider experiments

Vincent Rodgers

Theoretical particle physics

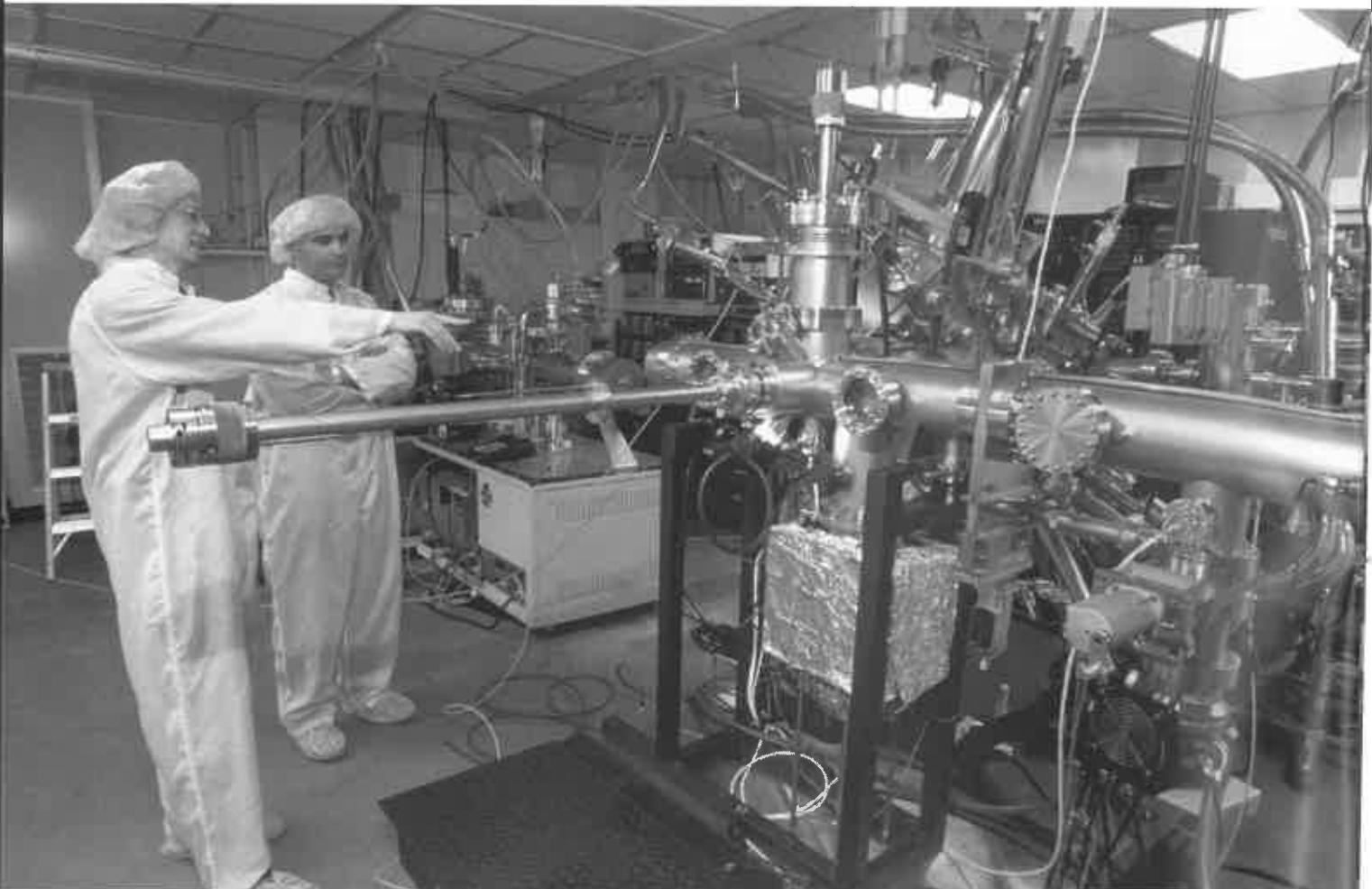
- Topics include string theory with applications in gravitation, cosmology, superstring theories as unified theory
- Numerical techniques developed for solutions in quantum chromodynamics (QCD)

PHOTONICS AND QUANTUM ELECTRONICS

Photonics and quantum electronics is about lasers and how laser light is used. Research in the department covers a diverse range of topics. In our labs we grow semiconductor and organic photonic materials, and we study them using spectroscopy, in many cases with ultrafast lasers. Topics include spin and exciton dynamics, nanoscale structures, optoelectronic devices, and nonlinear optical pulse propagation. Specialized courses are offered biannually, including Quantum Electronics, Laser Principles, Non-linear Optics, Semiconductor Physics, Solid State Physics, and Optics. Students attend a weekly seminar and travel to national and international meetings.

Our department has expanded in recent years with an emphasis on this rapidly growing field, with new faculty members and new labs. Our students use state-of-the-art equipment, and can choose from a wide range of experimental thesis projects. Our theory group works closely with our experimenters. We publish in the leading journals for physics and applied physics. More than 10 labs are dedicated to this research area in the beautiful Iowa Advanced Technology Laboratories (IATL) building, which was designed by world-renowned architect Frank Gehry. There is a particularly wide job market for students trained in this area, with opportunities in industry, government labs, and academia.

Professor John Prineas in the molecular beam epitaxy facility, a laboratory built recently at a multimillion-dollar cost: "By growing in a vacuum lower than deep interstellar space, highly pure layered structures can be grown with atomic precision, allowing the ultimate control of material properties. Students with graduate training in this area find themselves in demand in industry, government labs, and academia after graduation."



David Andersen

Theoretical and experimental nonlinear optics

- Parametric solitons, nonlinear optical crossbar switch, passive and adaptive nonlinear optical equalizer, 4- π confocal nonlinear optical microscopy
- Applications include long-haul telecommunications systems, embedded wireless communications

Thomas Boggess

Experimental optoelectronic device physics

- Optical techniques used to measure semiconductor properties relevant to lasers, detectors, and photovoltaic devices

Michael Flatté

Theory of semiconductors

- Theory of manipulation of electron spin in semiconductors with strong laser fields
- Applications of research include quantum computing

John Prineas

Experimental photonics

- Optical solitons in semiconductor quantum wells and superlattices; antimonide materials growth for near- and mid-infrared optoelectronic devices; and spintronics
- Interdisciplinary effort in developing optoelectronic sensors for medical applications

Arthur Smirl

Experimental quantum optics

- Nonlinear optical techniques with femtosecond time resolution used to measure quantum mechanical phenomena and coherence in semiconductors
- Optical methods used to control the direction and spin of carrier populations and currents and to investigate the transport of carriers through quantum wells and potential barriers

Markus Wohlgenannt

Experimental spectroscopy of organic semiconductors

- Light absorption, reflection and emission, continuous wave photo-induced (nonlinear) absorption
- Organic dyes in unusual optical cavities, such as photonic crystals (crystal lattice constant is equal to light wavelength) and Bragg-reflectors, “random lasing”

PLASMA PHYSICS

Plasma physics is the study of ionized gases. Plasmas are the most common state of known matter in the universe. Our experimenters have seven labs on campus, and their instruments are on spacecraft, rockets, and the International Space Station. Our research includes experiment, theory, and simulation; spanning areas including basic science, astronomy, geophysics, and processing plasmas as used in semiconductor manufacturing. Graduate students participate in a weekly plasma physics seminar.

We have the largest number of plasma physics faculty members among all physics departments in the United States. Our faculty members have strong international reputations, giving frequent invited talks at international conferences and winning grants from a wide range of funding agencies. Our faculty includes five elected fellows of the APS and one member of the National Academy of Sciences. Our labs, and our instruments in space, are unique and world class. We offer a wide choice of research problems, which are diversified among the healthiest and most rapidly-growing topics in plasma physics. Students publish highly cited papers in the leading journals, and they give talks at major conferences. Plasma physics offers strong job placement opportunities, and our Ph.D. graduates have excellent success in finding the jobs that they most want.

Graduate student Jason Hiner, with a plasma chamber used to prepare for sounding rocket flights through the auroral plasma: "I wanted to explore research to see if I would like it (as a career). When I decided to go back, I looked for areas of physics that I might be interested in and I saw space and plasma physics. I thought: Space equals Dr. Van Allen equals The University of Iowa! The faculty was very helpful, flexible, and approachable in classes and out. I had opportunities to do presentations, as much really as I wanted to take on. There are seminars available each week, colloquia available each week."



Amitava Bhattacharjee

Theory and simulation for plasma physics

- Research has applications to laboratory, space, and astrophysical plasmas
- How magnetic field lines break and reconnect; instabilities, turbulence, dusty plasmas, free-electron lasers

Benjamin Chandran

Plasma astrophysics theory and simulation

- Theory topics include magnetohydrodynamic (MHD) turbulence, interaction between turbulence and particles, magnetic reconnection, shock acceleration
- Simulation methods include particle-in-cell (PIC) simulation, fluid (MHD) simulation, numerical solution of statistical turbulence theories (DIA, EDQNM)

Nicola D'Angelo

Experimental plasma physics

- Basic plasma physics problems, including laboratory simulations of space plasma phenomena, dusty plasmas

Louis Frank

Experimental space plasma physics

- Spacecraft: NASA's *Polar*, investigating the Earth's auroras and upper atmosphere; Japan's *Geotail*, investigating plasma dynamics of Earth's distant environment; JPL's *Galileo*, observing Jupiter

John Goree

Experimental plasma physics

- Dusty plasmas, strongly coupled plasmas, plasma processing, optical diagnostics of plasmas, waves in plasmas
- Physics problems are interdisciplinary: condensed matter and plasma physics; experiments involve direct comparisons to theory

Donald Gurnett

Experimental space plasma physics

- Experimental studies of planetary radio emissions and plasma waves
- Spacecraft data: *Voyagers 1* and *2* (now approaching interstellar space); *Galileo* (in orbit around Jupiter); *Cassini* (on its way to Saturn); and *Cluster* (consisting of four spacecraft in Earth orbit)

Craig Kletzing

Experimental plasma physics

- Plasma processes that occur in the aurora
- Experimental verification of Alfvén wave theory in the laboratory

Karl Lonngren

Experimental and theoretical plasma physics

- Solitons and sheaths in plasmas
- Solitons in Schottky-barrier-diode transmission lines

Robert Merlino

Experimental plasma physics

- Basic plasma physics problems, including laboratory simulations of space plasma phenomena, dusty plasmas

Jack Scudder

Experimental and theoretical plasma physics

- Experimental search for collisionless magnetic reconnection mechanisms
- Theoretical study of the role of supra-thermal tails in heat transport

Frederick Skiff

Experimental and theoretical plasma physics

- Experimental topics include experiments for plasma waves and instabilities, laser-induced fluorescence diagnostics of plasmas; student projects are usually mostly experimental, with some theory
- Theoretical topics include plasma kinetic theory, momentum flow in ionized gases

Steven Spangler

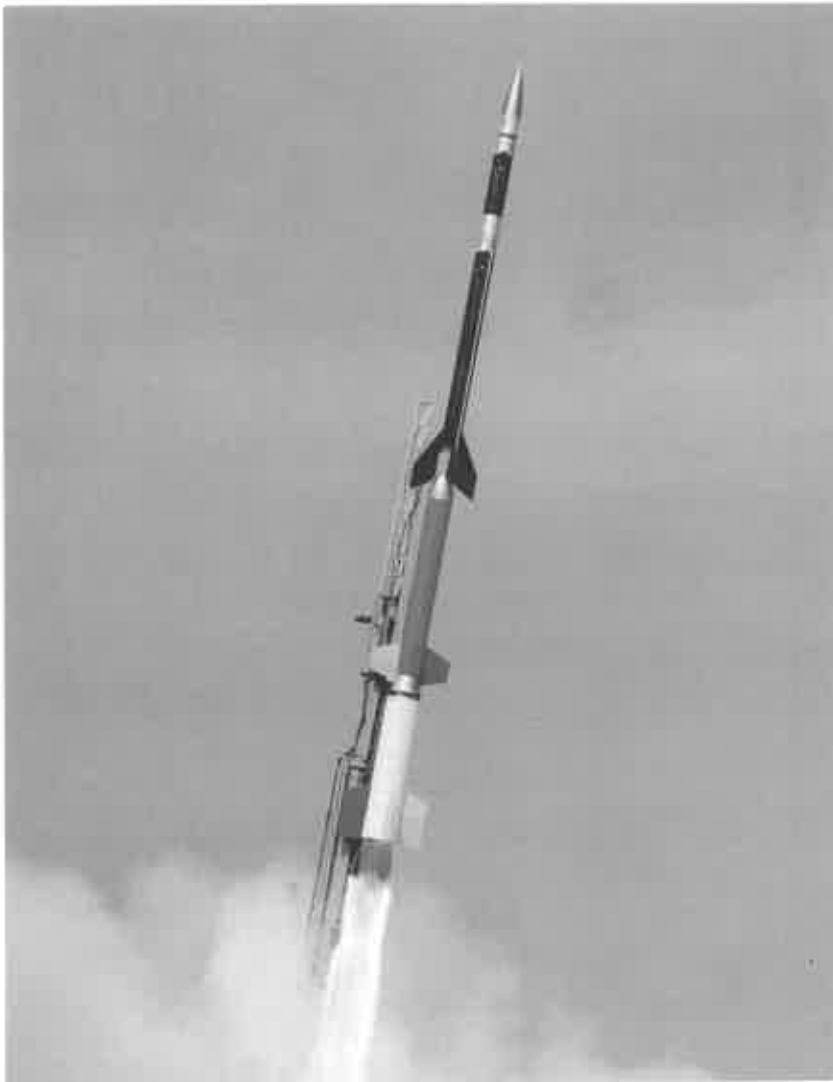
Theoretical plasma physics

- Theory and data analysis, with applications to astrophysical plasmas
- Turbulence in plasmas, nonlinear plasma waves, and interaction of charged particles with waves and turbulence

SPACE PHYSICS

Space physics is the study of everything that is above Earth's atmosphere but inside the solar system. It includes the Earth's ionosphere (the ionized gas just above the atmosphere), the magnetosphere, and magnetotail (beyond the ionosphere), the sun's corona and solar wind, the planets, interplanetary space, and cosmic rays. Our research program includes all these subjects. Student research projects include analyzing spacecraft data, performing theory, or simulating space physics conditions using laboratory experiments. Students also participate in a weekly astronomy/space physics seminar.

Space physics research at Iowa attained international prominence in 1958 when James A. Van Allen discovered energetic particles trapped in Earth's geomagnetic field, forming the Van Allen Radiation Belts. He subsequently received the Crafoord Prize, which is given by the Royal Swedish Academy of Sciences as an equivalent of a Nobel Prize. With the strong international reputation of our space physics faculty, including two members of the National Academy of Sciences, and our commitment to graduate research, Iowa has become a preeminent leader among universities in space physics. Our faculty includes experimenters who have built instruments for spacecraft including *Pioneer*, *Voyager*, *Cassini*, *Galileo*, *Polar*, *Cluster*, and many other major space exploration missions.



Black Brant sounding rocket launch. Graduate students build instruments and take them to Alaska, where they install them in rockets that fly through the Earth's aurora. Our department is one of the few in the United States where graduate students receive hands-on experience with hardware for space physics experiments.

Amitava Bhattacharjee

Theoretical space plasma physics

- Research has applications in laboratory, space, and astrophysical plasmas
- Explaining the explosive disruptions in the Earth's magnetotail that are called substorms, and why the sun's corona is so much hotter than its surface

Benjamin Chandran

Theoretical space plasma physics

- Theory topics include acceleration of energetic particles, how solar flares work, how magnetic fields are generated, accretion disks, magnetic reconnection
- Simulation topics include shock acceleration, accretion disks, magnetohydrodynamic (MHD) turbulence, and dynamos

Nicola D'Angelo

Experimental plasma physics

- Basic plasma physics problems, including laboratory simulations of space plasma phenomena, dusty plasmas

Louis Frank

Experimental space physics

- Spacecraft: NASA's *Polar*, investigating the Earth's auroras and upper atmosphere; Japan's *Geotail*, investigating plasma dynamics of Earth's distant environment; JPL's *Galileo*, observing Jupiter

Kenneth Gayley

Theoretical space physics

- Analytic calculations in ideal magnetohydrodynamics (MHD) of Alfvén-wave growth in accelerated plasmas; detection volumes for optical tracking experiments

Donald Gurnett

Experimental space physics

- Experimental studies of planetary radio emissions and plasma waves
- Analysis of plasma data from *Voyagers 1* and *2* now approaching interstellar space; *Galileo* in orbit around Jupiter; *Cassini* on its way to Saturn; and *Cluster*, which consists of four spacecraft in Earth orbit

Craig Kletzing

Experimental space plasma physics

- Auroral and magnetospheric physics
- Space missions include *Cluster* (a joint NASA-ESA four-spacecraft mission to study the Earth's magnetosphere); NASA's *Polar* satellite; the Rocket Auroral Correlator Experiment (a NASA sounding rocket)

Robert Merlino

Experimental plasma physics

- Basic plasma physics problems, including laboratory simulations of space plasma phenomena, dusty plasmas

Robert Mutel

Observational space physics

- Spacecraft observations made using *Cluster*, which is a group of four spacecraft operated by the European Space Agency
- Planetary radio emissions (Auroral Kilometric Radiation) are studied using *Cluster*, operated in VLBI mode (Very Long Baseline Interferometry)

Jack Scudder

Experiment and observation of space plasmas

- Analysis of data from NASA's *Polar* spacecraft, in Earth orbit
- Search for geophysically important plasma processes in near-Earth plasmas

Steven Spangler

Observational and theoretical space physics

- Solar wind and the transition from the solar corona to the solar wind

James Van Allen

Experimental space physics

- Spacecraft measurements of cosmic rays using data from *Pioneer 10*, which reached 80 AU from the sun in 2002



David R. Andersen
Ph.D., Purdue, 1986
(joint appointment)



Amitava Bhattacharjee
Ph.D., Princeton, 1981



Thomas F. Boggess
Ph.D., North Texas State,
1982, chair



Benjamin D.G. Chandran
Ph.D., Princeton, 1997



Nicola D'Angelo
Ph.D., Rome, 1953



Michael E. Flatté
Ph.D., California,
Santa Barbara, 1992



Louis A. Frank
Ph.D., Iowa, 1964



Kenneth G. Gayley
Ph.D., California,
San Diego, 1990



John A. Goree
Ph.D., Princeton, 1985



Donald A. Gurnett
Ph.D., Iowa, 1965



Richard Hichwa
Ph.D., Wisconsin-Madison,
1981 (joint appointment)



Paul D. Kleiber
Ph.D., Colorado, 1981



Craig A. Kletzing
Ph.D., California, San Diego,
1989, associate chair for physics



William H. Klink
Ph.D., Johns Hopkins,
1964



Cornelia C. Lang
Ph.D., California,
Los Angeles, 2000



Karl E. Lonngren
Ph.D., Wisconsin, 1964
(joint appointment)



Mark T. Madsen
Ph.D., Wisconsin, 1979
(joint appointment)



Usha Mallik
Ph.D., CUNY, 1978



Robert L. Merlino
Ph.D., Maryland, 1980



Yannick Meurice
Ph.D., UCL
Louvain-la-Neuve, 1985



Robert L. Mutel
Ph.D., Colorado, 1975



Charles R. Newsom
Ph.D., Texas, 1980



Yasar Onel
Ph.D., London, 1975



Gerald L. Payne
Ph.D., California,
San Diego, 1967



Wayne N. Polyzou
Ph.D., Maryland, 1979



John P. Prineas
Ph.D., Arizona, 2000



Mary Hall Reno
Ph.D., Stanford, 1985,
undergraduate coordinator



Vincent G.J. Rodgers
Ph.D., Syracuse, 1985



John W. Schweitzer
Ph.D., Cincinnati, 1966



Jack D. Scudder
Ph.D., Maryland, 1975



Frederick N. Skiff
Ph.D., Princeton, 1985



Arthur L. Smirl
Ph.D., Arizona, 1975



Steven R. Spangler
Ph.D., Iowa, 1975,
astronomy coordinator



Markus Wohlgenannt
Ph.D., Utah, 2000



HOW TO APPLY

1. Get an application form one of these three ways:

- from the department: by e-mail, mail, or phone;
- from the Office of Admissions:
admissions-gradform@uiowa.edu; or
- from the Internet:
www.uiowa.edu/admissions/applications/graduate_college.html

2. Submit the application form. Either arrange to have sent, or gather and send with your application, the following:

	to the Office of Admissions	to the department
• GRE general test score	Official copy	Copy
• GRE advanced subject test score		Official copy
• Transcripts from all institutions attended after high school	Official copy	Official copy
• 3 letters of recommendation		Original letters
• Application for Graduate Awards		Application
• TOEFL test score (international students only)	Official copy	Copy

3. Include the application fee with the form:

- If you apply by mail, enclose payment with application; or
- If you apply by Internet, pay the fee at that time with a credit card.

4. Optionally, you may contact one or more of our faculty members to tell them of your application and your interest in their research.

Two opportunities to apply each year:

- Fall Admission—application deadline, February 1
- Spring Admission—application deadline, October 1

VISIT US

We invite you to visit us in Iowa City. To arrange a tour, please contact us.

You will find more information at:

Department of Physics and Astronomy

The University of Iowa
203 Van Allen Hall
Iowa City, IA 52242-1479

Telephone:

Debbie Foreman
319-335-1687
toll free 1-800-553-IOWA
Ask for the Department
of Physics and Astronomy.

Fax:

1-319-335-1753

E-mail:

admissions@newton.physics.
uiowa.edu

The University of Iowa prohibits discrimination in employment and in its educational programs and activities on the basis of race, national origin, color, creed, religion, sex, age, disability, veteran status, sexual orientation, gender identity, or associational preference. The University also affirms its commitment to providing equal opportunities and equal access to University facilities. For additional information on nondiscrimination policies, contact the Coordinator of Title IX, Section 504, and the ADA in the Office of Affirmative Action, (319) 335-0705 (voice) and (319) 335-0697 (text), 202 Jessup Hall, The University of Iowa, Iowa City, Iowa 52242-1316. 34596/12:02

UNIVERSITY CALENDAR

First Semester

	2002	2003
Classes begin	August 26	August 25
University holiday	September 2	September 1
Thanksgiving recess begins	November 26	November 25
University holidays	November 28-29	November 27-28
Classes resume	December 2	December 1
Classes end	December 13	December 12
Examination week	December 16-20	December 15-19
Commencement	December 20	December 19
University holidays	December 24-25	December 25-26

Winter Session

	2002-03	2003-04
Classes begin	December 26	December 29
Classes end	January 17	January 16

Second Semester

	2003	2004
University holiday	January 1	January 1
University holiday— Martin Luther King Convocation	January 20	January 19
Classes begin	January 21	January 20
Spring vacation begins	March 14-23	March 12-21
Classes resume	March 24	March 22
Classes end	May 9	May 7
Examination week	May 12-16	May 10-14
Commencement	May 16	May 14

Summer Session

	2003	2004
Three-week session	May 19-June 6	May 17-June 4
University holiday	May 26	May 31
Eight-week session	June 9-August 1	June 7-July 30
Six-week session	June 23-August 1	June 21-July 30
University holiday	July 4	July 5
Commencement	August 1	July 30

UNIVERSITY FACTS

Enrollment: Approximately 29,000, including 6,000 in the Graduate College.

Colleges: Business, Dentistry, Education, Engineering, Law, Liberal Arts, Medicine, Nursing, Pharmacy, Public Health, and the Graduate College.

Degree Programs: Approximately 100 graduate degree programs; almost 60 leading to the doctorate.

Research Funding: About \$260 million annually.

Faculty: Approximately 1,700 full-time faculty members.

History: Founded in 1847 as Iowa's first public institution of higher learning, Iowa was the first public university in the United States to admit women and men on an equal basis.

Location: Iowa City is within 300 miles of Chicago, St. Louis, Minneapolis, Omaha, and Kansas City. Served by national and regional airlines, the Eastern Iowa Airport in Cedar Rapids is a 20-minute drive from campus.

FOR MORE INFORMATION

For information about the University, or to apply, write to the chair of the department of interest or to:

Office of Graduate Admissions
The University of Iowa
107 Calvin Hall
Iowa City, Iowa 52242-1396

Phone: 1-800-553-IOWA

E-mail: admissions@uiowa.edu
gradcoll@uiowa.edu

Web: <http://www.uiowa.edu/admissions/>
<http://www.uiowa.edu/~gradcoll/>

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