

## Research Laboratories

- Observatory (20-inch telescope, CCD camera, spectrograph, 7.5-foot radio telescope)
- Accelerator Lab (1.1 MV Pelletron particle accelerator, vacuum evaporator for preparing thin targets, radiation detectors)
- Lasers, Optics, and Microscopy Lab (Nd:YAG, Argon ion, dye, and diode lasers, optical and scanning electron microscopes, laser induced Raman spectrometer, and image enhanced CCD)
- Biophysics Light-Scattering Lab (argon ion laser, intensity fluctuation autocorrelator computer, computer-controlled rheometer)
- Three Astrophysics Computational Labs: Extragalactic, Nuclear, Radio (Linux, Mac, Sun workstations)
- Nuclear Physics Lab (Beowulf computer cluster, Mossbauer spectrometer, beta-ray spectrometer, cosmic-ray detectors)
- Laser Cooling Lab (frequency-stabilized and high-power diode lasers, fiberoptics, ultra-high vacuum system, single photon detection system)
- High-Speed Photography Lab for innovative teaching techniques
- Nano-Thermodynamics Lab (power compensated calorimeter, mid-infrared spectrometer, electron microscopes)



## Community

We strive to maintain an inviting department with a strong sense of community supported by:

- Faculty with generous office hours and an open-door policy
- A student lounge near faculty offices for group or independent study
- A weekly, lunch-time, colloquium series to help keep students and faculty in touch with exciting developments elsewhere
- A First-Year Seminar in Physics to help integrate new students into the department
- An active chapter of the Society of Physics Students (SPS) that sponsors field trips, social events, and outreach programs
- An active chapter of Sigma Pi Sigma, the physics honor society, that inducts new members each year
- Monthly pot-luck luncheons in the department
- Outreach programs run by students and faculty for K-12 teachers and students
- Monthly observatory open houses
- An active chapter of Sigma Xi, the scientific research society, that inducts student members each year



## Contact Us

We welcome visitors to our facilities. If you would like to visit, or if you seek additional information, please call (518) 388-6254, write to Professor Michael Vineyard, Chair, Department of Physics and Astronomy, Union College, Schenectady, N.Y. 12308, or send e-mail to [vineyarm@union.edu](mailto:vineyarm@union.edu).

Visit our web page at [www.physics.union.edu](http://www.physics.union.edu).

## Physics & Astronomy at Union College

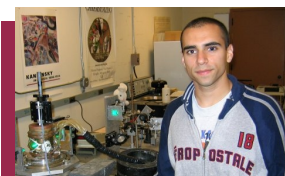
*The best of both worlds – small classes and personal attention of faculty in a small liberal arts college environment combined with instrumentation and research opportunities typically found only at larger universities.*



## Curriculum

In Physics and Astronomy at Union College:

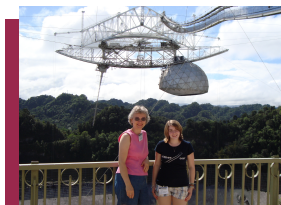
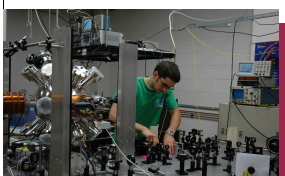
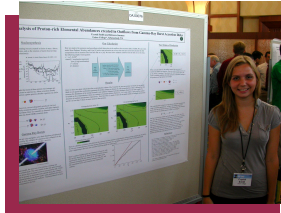
- Classes are small and personal
- All classes and labs are taught by regular faculty
- Instruction is characterized by individual attention
- The faculty are thoroughly dedicated to teaching, regard research as an essential part of their profession, and expect the students to join them in the joy of discovery
- Courses are innovative and employ active learning strategies
- The curriculum emphasizes hands-on experimentation
- The equipment holdings are comparable to those of a much larger institution
- All of the equipment is really used by students
- The curriculum is designed to develop a wide range of analytical and practical skills
- We offer core courses in undergraduate physics plus more specialized courses in areas such as astrophysics, biophysics, and nuclear physics
- Students may pursue a B.S. degree in physics, a B.A. degree in astronomy, and/or minors in physics, astronomy, and astrophysics
- Independent research with a faculty colleague is required for the major



## Student Research

The best education a young scientist can acquire occurs beyond the classroom, and the department provides a variety of extracurricular opportunities with this in mind. These include:

- Independent research with a faculty colleague during the school year
- Summer research program in the department (typically 15-20 students involved each year)
- Stipends for summer research from faculty grants, Union College, and the departmental undergraduate research fund
- Summer research opportunities at research institutions and at national and industrial laboratories
- Student presentations at regional, national, and international conferences
- Student co-authored publications in scientific journals
- The Sicily Science Research Term Abroad
- Membership in the NASA NY Space Grant, the Arecibo Legacy Fast ALFA, and the Small and Moderate Aperture Research Telescope System Consortia
- Collaborations with researchers at national labs (Jefferson Lab, Oak Ridge), research universities (NCSU, Cornell, RPI, Albany), and industrial labs (IBM)



## Teaching Faculty

### Samuel Amanuel

Assistant Professor of Physics  
Ph.D., Southern Illinois University  
Material science

### Rebecca Koopmann

Associate Professor of Physics  
Ph.D., Yale University  
Astronomy

### Scott LaBrake

Senior Lecturer of Physics and Accelerator Manager  
Ph.D., The University at Albany  
Accelerator and environmental physics

### Seyfollah Maleki

Professor of Physics  
Ph.D., RPI  
Laser optics and scientific analysis for art conservation

### Jonathan M. Marr

Visiting Associate Professor of Physics  
Ph.D., University of California at Berkeley  
Astronomy

### Jay E. Newman

Gordon Gould Professor of Physics  
Ph.D., New York University  
Biophysics

### Chad Orzel

Associate Professor of Physics  
Ph.D., University of Maryland  
Atomic physics

### Gary R. Reich

Professor of Physics  
Ph.D., Rutgers University  
Statistical mechanics and physics education research

### Rebecca Surman

Associate Professor of Physics  
Ph.D., University of North Carolina at Chapel Hill  
Nuclear astrophysics

### Michael F. Vineyard

Frank and Marie Louise Bailey Professor of Physics  
Ph.D., Florida State University  
Experimental nuclear and environmental physics

### Francis P. Wilkin

Lecturer of Physics and Observatory Manager  
Ph.D., University of California at Berkeley  
Astronomy