

## **Undergraduate Research in Physics and Astronomy at the University of Rochester -- Summer 2001**

Seth Baum, class of '03 at the University of Rochester, worked on pulse propagation in two-level atoms, particularly the effect of varying detuning, with Prof. J. H. Eberly in the Rochester Theory Center. He plans to either go to graduate school for optics or work in the optics industry.

Jessica Benjou class of '03 at the University of Rochester was involved with the physics enrichment program (PREP) for 26 high school girls under the direction of Dr. Priscilla Auchincloss. This focused on basic physics principles and laboratory experiments.

Dan Berdine, class of '03 at the University of Rochester, worked with computer simulations of laser pulse propagation through media of two level atoms. He investigated effects and the accuracy of the simulations, working with Prof. J. H. Eberly. He plans to go on to graduate school.

Bertrand Biritz, class of 2003 at Georgia Institute of Technology, did research and development of a magnet assembly to be placed around the Hybrid-Photodetector Device (HPD) in the Compact Muon Solenoid (CMS) test beam experiment. This was done under the supervision of Prof. Arie Bodek. He plans to apply for graduate school in physics.

Cliff Cheung, class of '04 at Yale University worked with Steve Manly on a mathematical discriminator of the kaon to pion ratio in gold ion collision data from the Relativistic Heavy Ion Collider at BNL. He plans on applying to graduate school in physics a couple years from now.

Brian Clader, class of '02 at SUNY Geneseo, worked with Prof. David Douglass on analysis of satellite data pertaining to global warming and El Nino events. The analysis was used to create a model for predicting sea surface temperature. In fall 02, he entered the graduate program in Physics at the University of Rochester.

Nathan Clark, class of '04 at the University of Rochester, worked on the creation and optimization of thin film coating designs for InSb detectors for possible use in NASA's Next Generation Space Telescope with Prof. Bill Forrest and Prof. Judy Pipher in the Near Infrared lab.

Andrew Collette, class of '04 at the University of Rochester, worked with Professor Paul Tipton on the Collider Detector at Fermilab to develop a software package to monitor and report on the detector's power consumption.

Joe Gester, class of '04 at the University of Rochester, worked on testing the properties of Si:Sb and Si:As BIB infrared detectors for NASA's Space Infrared Telescope Facility with Prof. Dan Watson in the Far-Infrared Astrophysics Laboratory.

Anne Goodsell, class of '02 at Bryn Mawr College, collaborated with graduate student Pedro Quinto Su on the construction of a Cesium atom trap. Their research was supervised by Dr. Nicholas Bigelow. Anne entered the Ph.D. program in Physics at Harvard in Fall 02.

Nicole Green, class of 2003 at Alabama Agricultural and Mechanical University took part in research of some of the properties of photonic crystal fibers (PCF) which has possible applications in optical communications and biomedical optics. She participated in measuring the change of dispersion in bending PCF under Prof. Bob Knox in Physics and Prof. Wayne Knox at the Institute of Optics. She plans on going to graduate school for optics and apply to the Institute of Optics at the University of Rochester.

Alaina Henry, class of '03 at the University of Rochester, worked with Professor Judy Pipher, in the Near Infrared Astronomy lab, analyzing tests of image latency for the Infrared Array Camera (IRAC) in NASA's Space Infrared Telescope Facility (SIRTF). She plans to go to graduate school for astrophysics.

Jonathan Insler, class of '03 at Cornell University, worked on comparing data gathered by the central calorimeter of the CDF detector with a Monte Carlo simulation of the detector at the CDF collaboration at Fermilab with Prof. Kevin McFarland. He plans to apply to graduate school for physics in high energy, cosmology, or quantum field theory.

Andrew Kowalik, class of '03 at the University of Rochester, worked on isolating  $W$  to  $\mu$   $\nu$  decays from  $p - p$  bar collision data at Fermilab. He plans to attend graduate school for physics.

Zhuohan Liang, class of '04 at the University of Rochester, worked on building a database for the targets of IRS (Infrared Spectrograph of the Space Infrared Telescope Facility) with Prof. Dan Watson and Prof. Bill Forrest.

Daniel Licht, class of '03 at the University of Rochester, created, acquired a wide variety of data for, and obtained preliminary results from the InfraRed Spectrometer [IRS] Database for use in the selection of nearby Young Stellar Objects to be submitted as targets for observation with the NASA's Space Infrared Telescope Facility [SIRTF], as well as supporting and providing targets for the ground based observations which will precede final SIRTF target selection. He worked under Prof. Dan Watson in the Far-Infrared Lab, and for the IRS\_Disks group. He plans on going to graduate school for astrophysics.

Katie Lotterhos, class of '02 at the University of Binghamton, studied the incorporation of inhomogeneous broadening into the theory of excited-state anisotropy with Professor Robert Knox. She will probably take a position with the Alaska Fish and Wildlife Department and plans to go to graduate school in biomedical engineering in Fall 03.

Rebecca Madson, class of '03 at the University of Rochester, worked on the analysis of tests on the Infrared Array Camera (IRAC) that is part of the Space Infrared Telescope Facility (SIRTF) with Prof. Judy Pipher and Prof. Bill Forrest in the Astrophysics Near-Infrared Laboratory.

Alphonso Magri, class of '02 at SUNY Geneseo, worked with Prof. David Douglass on data analysis of marine and ice core samples, to find a pattern in the earth's warming and cooling cycles. He entered the graduate program school at Syracuse in Fall 02.

Allison Powers, class of '04 at the University of Rochester, worked in the visualization lab of Professor Adam Frank with programs which simulate the bipolar outflows of young stellar objects

using hydrodynamic and soon to be magnetohydrodynamic code. These simulations were used to analyze the morphology of the jets which will hopefully lead to a better understanding of how and why this phenomenon occurs. She is still involved with this research project.

Elizabeth Reisinger class of '02 at the University of Rochester was involved in physics education research under the direction of Dr. Priscilla Auchincloss. This focused on basic physics principles and laboratory experiments. She won the University of Rochester Suzan B Anthony Prize. She joined the Teach for America Program in Fall 02.

Kieseane Riddick, class of '03 at the University of Rochester, worked on the development and testing of optical tweezers for the potential usage of manipulating microscopic objects with Prof. Nick Bigelow in the quantum optics laboratory. He plans on applying to graduate school in physics.

Julia Sando, class of '04 at the University of Rochester, took part in researching quantum optics, specifically the effects of lasers on one and two level atoms with Raphael Panfili and Professor J.H. Eberly. She plans on applying to graduate school for math.

Laura Schmidt, class of '03 at the University of Rochester, studied climatology and constructed a global climate model under the guidance of Prof. Robert S.Knox and Prof. H. Lawrence Helfer. She is currently expanding the model for further investigation of the non-radiative energy transfers between the earth's surface and atmosphere. Laura plans on pursuing a graduate degree in chemical engineering or physics.

Bryan Spring, class of '02 at Iowa State University, studied theoretical biophysics under Prof. Robert S. Knox. Worked on dipole strength of chlorophyll-b and and Forster excitation transfer between chlorophylls b and a. Completed technical report to be published coauthored with Prof. Knox. His entered graduate school to study molecular biophysics the University of Illinois Champagne-Urbana in Fall 02.

Elizabeth Strychalski, class of '02 at the University of Rochester, built optical tweezers with a HeNe laser to trap and manipulate polystyrene microspheres with Prof. Nick Bigelow. She graduated with a B.S. in physics and a B.A. in religious studies. She is planning to apply to graduate school for Fall 03.

Michael Thomas, class of '03 at the University of Rochester, worked on testing the properties of Si:Sb and Si:As BIB infra-red detectors for NASA's Space Infrared Telescope Facility with Prof. Dan Watson in the Far-Infrared Astrophysics Laboratory. He plans to join a civil engineering firm in Fall 03.

Scott Verbridge, class of '01 at the University of Rochester, worked with Prof. Eric Blackman applying mean field MHD techniques to the problem of vorticity growth in sheared accretion disks, as it applies to planet formation. He entered Cornell graduate school for theoretical physics in Fall 01.

## **SUMMER RESEARCH IN PHYSICS AND ASTRONOMY**

### **Student Presentations**

**August 7, 2001 in B&L 106**

10:15 Session I Chair: Arie Bodek

Cliff Cheung; advisor, S. Manly  
**The Kaon to Pion Discriminator**

Allison Powers and Joe Terry; advisor, A. Frank  
**Computational Astrophysics and Jets that Appear  
During Certain Stages in Stellar Evolution**

Dave Clader; advisor, D. Douglass  
**The Sun's Influence on the Earth**

Zhuohan Liang and Dan Licht; advisor, D. Watson  
**Young Stellar Objects and the Space Infrared Telescope Facility (SIRTF)**

Alaina Henry; advisor, J. L. Pipher  
**Tests of Image Latency and First Frame Effect in Two Channels  
of the Infrared Array Camera (IRAC) for the Space Infrared Telescope Facility (SIRTF)**

11:25 Break

11:30 Session II Chair: P. S. Auchincloss

Dan Berdine; advisor, J. Eberly  
**Optical Pulses and a Two-level Medium**

Julia Sando; advisor, J. Eberly  
**Elements of FORTRAN Computing**

Bryan Spring; advisor, R. S. Knox  
**Energy Transfer in the Chlorophylls**

Tom Allen; advisor, C. McMurtry  
**Testing of Bare Multiplexers for the Next Generation Space Telescope (NGST)**

Al Magri; advisor, D. Douglass  
**Predicting the Next Ice Age**

Nathan Clark and Pratap Ranade; advisor, W. J. Forrest  
**Anti-reflective Coating Design for NGST**

12:30 Lunch in B&L 208 for program participants and faculty

1:15 pm Session III Chair, R. S. Knox

Nicole Green; advisor, W. H. Knox  
**Measuring The Dispersion In Photonic Crystal Fibres**

Laura Schmidt; advisors, H. L. Helfer and R. S. Knox  
**Elementary Climate Modeling**

Katie Lotterhos; advisor, R. S. Knox

**The Incorporation of Inhomogeneous Broadening on  
the Theory of Excited-State Anisotropy**

Kieseane Riddick and Elizabeth Strychalski; advisor, N. Bigelow

**Optical Tweezers**

Anne Goodsell; advisor, N. Bigelow

**Components of Atom Cooling: Laser and Vacuum Systems**

To view photos of a few students participating in the electronics mini course and in their labs, please click [here](#).