

## Summary of Student Projects -- Summer 1999

The NSF REU Site program in the Department of Physics and Astronomy has strongly encouraged faculty in the Department to support additional undergraduates through NSF REU supplements and other grant support. With the REU Site Program attracting students both within and outside the University, some of the applicants to our program were also steered toward other research groups which could provide support from research grants. As stated above, a total of 30 undergraduates performed research in the Department of Physics and Astronomy in the summer of 1998, with 22 of these supported at least in part with funds from this REU Site award.

The summer projects of the 30 undergraduates are listed below (the 22 supported with REU funds are identified as "REU").

Drew Abrams (REU), currently a junior at the University of Rochester, worked **with Prof. David Douglass, studying the edge-tone oscillator and potential applications of that research to the Physics of Music laboratory course** in the department. Drew will present his results at the APS conference in Georgia in March and at the NCUR in Rochester in April, 1999.

Michael Carew (REU), currently a junior at the University of Rochester, **designed the mounting system for the radiator monitor system in the CDF detector at Fermilab, under the direction of Prof. Paul Tipton.** He also designed the user interface pages for the interlock-cooling system for the SVX detector and did an analysis project on the Z particle mass. He plans to attend graduate school in computer science.

Shawn Campbell (REU), currently a junior at the University of Rochester, worked **with Prof. Adrian Melissinos on the design optimization of a high-finesse fabry-perot laser cavity.**

(REU), currently a junior, worked **with Dr. Priscilla Auchincloss on physics education projects, including the development of summer physics laboratory/enrichment programs for high school girls.**

Davis Doherty (REU supplement to NSF research grant and University sponsored program), currently a junior at the University of Rochester, worked **with Professor Frank Wolfs on the construction/testing of the time-of-flight wall for the PHOBOS experiment at Brookhaven National Lab.**

Aaron Reichman (REU), currently a junior at the University of Rochester, **worked on data reduction of stellar object Arp 299, with Prof Judy Pipher's near-infrared astronomy group.** He will present his research at the NCUR in Rochester in April, 1999.

Michael Thomas, currently a sophomore at the University of Rochester, has been working **with Prof. Dan Watson on the characterizations of infrared detectors in the far-infrared astronomy group.** He plans to apply to graduate schools in astrophysics.

Jorge Viamontes (REU), currently a sophomore at the University of Rochester, **worked with Prof. Adrian Melissinos's group at Fermilab on thermal testing of the slab laser.** He will present his

research at the NCUR in Rochester in April, 1999. He plans to apply to graduate schools in physics.

1999 undergraduates doing research (still need 2 from Wolfs as of 7/21/99)

Drew Abrams (REU), currently a senior at the University of Rochester, worked with Prof. David Douglass, studying the edge-tone oscillator and potential applications of that research to the Physics of Music laboratory course in the department.

Peter Allen,(REU) a senior at the University of Rochester, worked on testing the properties of InSb detectors at visible wavelengths for possible use on the Next Generation Telescope under Prof. Bill Forrest and Prof. Judy Pipher in the Near Infrared lab. He plans on going to graduate school for astrophysics next year.

Hiwad Ayub, currently a senior Electrical & Computer Engineer at the University of Rochester, contributed to the research on the CDF detector at Fermilab, specifically working on the Silicon Vertex Detector (SVXii) power supply temperature interlock and control system under the direction of Professor Paul Tipton and Dr. Mark Kruse. He is preparing for graduate school in engineering or business in the future.

Russell Bent, (REU) currently a senior at the University of Rochester, took part in a project to develop a computer program that can simulate fluid dynamics which was under the direction of Prof. Adam Frank and grad student Guy Delamarter of the AstroTheory group. The program will be placed at the Strassenburgh Planetarium where it will simulate the jets of gas that flow off young and dying stars and will also be used as an undergraduate teaching tool. He will continue to work on the project during the academic year and will apply to graduate school.

Deborah Berlin,(REU) a senior at Northwestern University, has worked at Fermilab for two consecutive summers. During the first year she worked on the NuTeV experiment under the direction of Arie Bodek on instrumentation-related analysis which was presented at the Centennial meeting of the American Physical Society. In summer of '99, she worked at CDF under the direction of Paul Tipton and focused on hardware projects related to the Silicon Vertex Detector; in addition, she also worked on a top mass analysis project. She plans to teach high school physics, and possibly obtain further educational degrees in the future.

Andrew Blechman,(REU) currently a junior at the University of Rochester, worked on the D0 experiment at Fermilab under the supervision of Professor Thomas Ferbel. and concentrated on two projects: to make an accurate and direct measurement of the CKM matrix element,  $V_{tb}$ , without imposing 3 generations, unlike CDF's measurement and also work with the tau-ID group, he scanned the SUSY-parameter space looking for potentially difficult sectors which could dampen the D0 detector's ability to discover stau particles. He intends to continue this research during the academic year, and apply to graduate school in physics in the future.

Peter Brabant, (REU) currently a senior at the University of Kansas, took part in research on the CLEO detector at the Wilson Synchrotron at Cornell University. His research tested the theory of independent fragmentation through measurement of the correlated production of the  $\Lambda_c$  baryon, under the direction of Prof. David Besson and Prof. Ed Thorndike. He plans to complete this research over the next academic year and apply to graduate school for physics in the future.

Shawn Campbell, (REU) a senior majoring in Optics and Physics at the University of Rochester, assisted in the research and development of a 40,000 finesse fabry-perot cavity locked to a ten watt injection locked YAG ring laser for an experiment entailing the excitation of anti-hydrogen at Fermilab. He has been working under the direction of Prof. Melissinos for the past year and a half, and is applying to graduate schools to continue his education.

Michael Carew, (REU) a senior at the University of Rochester, took part in designing and maintaining CDF computer code to be used in the upcoming run at Fermilab. He worked on a status page in Java for the Level3 trigger, and a series of web pages to be used in accessing the Level 3 database under the direction of Prof. Kevin McFarland, and plans to apply for computer programming jobs early next year.

Matt Cervantes (REU) currently a senior at the University of Kansas, took part in research on the CLEO detector at the Wilson Synchrotron at Cornell University. He participated in data analysis of measurement of the semileptonic branching fraction of the  $\lambda_c$  baryon. He plans to apply to graduate school for physics.

Jeffrey Clark, (REU) currently a junior at University of Rochester, took part in research on the preliminary design of an optical fiber interferometer for the measurement of gravity, under the direction of Professor Steven Manly. He plans to continue this research during the academic year and apply to graduate school for physics in the future.

Alyse DeFranco, (REU) a junior at the University of Rochester, participated in research on the Phobos detector located at Brookhaven National Lab. She worked with Prof. Steven Manly and wrote programs in C++ to analyze simulated data from gold nuclei collisions expected to produce a quark-gluon plasma.

Chris DeRose, currently a junior at the University of Rochester, helped with the research and construction of the time of flight wall for the PHOBOS collaboration specifically testing delay cables, working on the electronics, and testing scintillator resolution. His work included two trips to Brookhaven National Laboratory with the TOF group, headed by Prof. Frank Wolfs. He intends to apply to graduate school in the future for optics or physics.

Davis Doherty, currently a senior at the University of Rochester, took part in the construction of the PHOBOS time-of-flight wall at the University of Rochester's Nuclear Structure Research Laboratory, under the direction of Prof. Frank Wolfs. He plans to apply to graduate school for mathematics in the fall.

Julia Eaton, (REU) a sophomore at the University of Rochester, was involved on two different projects at D0 detector at Fermilab. One of her projects has been to troubleshoot and fabricate o-rings used to create an air tight seal for components used for the D0 detector. In the other project, under the direction of Professors Thomas Ferbel (UR) and Harrison Prosper (FSU), she and another Rochester student have been analyzing a statistical technique developed by other scientists. She plans to continue her pursuit in physics as an undergraduate and will apply to study physics as a graduate student as well.

Brian Goss, currently a sophomore at the University of Rochester, took part in research on the Indium

Antinomide infrared camera array, specifically on the use of these cameras to double as optical cameras which would reduce the cost of the Next Generation Space Telescope, under the direction of Professors Judy Pipher and William Forrest. He plans to continue his undergraduate research and apply to graduate school for physics in the future.

Daniel Kerr (REU) currently a senior at the State University of New York at Albany, took part in research on the initial design of an optical fiber interferometer used for the measurement of gravity under the direction of Professor Steven Manly He will be applying to graduate school for physics.

Lisa Marshall, (REU) a junior at the University of Rochester, is doing research in the theoretical biophysics group under the direction of Prof. Robert Knox. She is studying the possibility of excited triplet states in chlorophyll a by using a calculated effective temperature as an indication of the extent of thermoequilibrium during fluorescence.

Chris Meehan, (REU) currently a senior at the University of Rhode Island, conducted research with Prof. Lynne Orr in the area of phenomenology, specifically in a Monte Carlo approximation of dijet production in proton-antiproton collisions. He plans to graduate with a Physics and Math degree and go on to graduate school in Physics.

M. Douglas McKinney, currently a sophomore at Ohio State University, works on the assembly and testing of scintillating megatiles at Fermilab, the key components of the hadronic calorimeter being produced for the Compact Muon Solenoid detector at CERN. He works under the auspices of Dr. de Barbaro and Prof. Bodek.

Joan Montesano, (REU) currently a sophomore at the University of Rochester, worked on the QCD analysis of inclusive mass and transverse momentum for n-jets systems with the DZero experiment at Fermilab. He was also working on testing a statistical method for setting upper cross sections when the number of events is small or zero under the direction of Prof. Thomas Ferbel. He plans to continue this research during the academic year and apply to graduate school for physics in future.

Muhua Diana Pang, currently a junior at University of Rochester, took part in the construction of the PHOBOS time-of-flight wall at NSRL, specifically testing scintillators and photomultiplier tubes, under the direction of Prof. Frank Wolfs. She plans to apply to graduate school for electrical engineering in the future.

Steven Person, (REU) currently a junior at University of Rochester, spent his summer working in theoretical biophysics with the Biological Physics Group at the University of Rochester. Under the guidance of Prof. Bob Knox he explored the effects of excited-state relaxation rates on the Kennard-Stepanov temperature.

Worawarong Rakreungdet, currently a senior at the University of Rochester, worked with the laser cooling and trapping group of Prof. Bigelow on the development of infrared diode lasers and saturation absorption spectroscopy.

Aaron Reichman, (REU) currently a senior at the University of Rochester, took part in research in the Near-Infrared Astrophysics Lab at UR under the supervision of Prof. Judith Pipher and Prof. William Forrest. He was involved in the design of a fanout board for NGST (Next Generation Space

Telescope). He also reduced data on the spiral Seyfert galaxy NGC 2992, looking at Pa-beta and FeII emission lines. Aaron will continue his research throughout the academic year and plans to pursue a career in science education.

Aaron Rosen, currently a sophomore physics major at the University of Chicago, works on the assembly and testing of scintillating megatiles at Fermilab, the key components of the hadronic calorimeter being produced for the Compact Muon Solenoid detector at CERN. He works under the auspices of Pawel de Barbaro.

Robert Rudin, (REU) currently a senior at the University of Rochester, was involved in research at Fermilab for the CDF project, working specifically on the Silicon Vertex Detector control and monitoring systems, under the direction of Prof. Paul Tipton and Mark Kruse.

Richard Sarkis, currently a senior at the University of Rochester, took part in research on the Phobos detector at the UofR's Nuclear Structure Research Lab and Brookhaven National Laboratory. He worked on the fiber optic/LED calibration systems used to calibrate the scintillator wall detectors before operation under the direction of Professor Frank Wolfs. He plans to apply to graduate school for physics.

Brock Tweedie (REU) currently a junior at the University of Rochester, majoring in math and physics, worked on data analysis software for Prof. Kevin McFarland's CDF group at Fermilab, especially concerning statistical methods for the measurement of W-boson handedness. He plans to continue during the '99-'00 academic year, and, in the long term, to attend graduate school for math and/or physics.

Albert Wang, (REU) currently a junior at University of Rochester, works with Prof. Wenhao Wu on measuring low frequency resistance fluctuations in inhomogeneous materials and organic light emitting diodes, tris-8-hydroxyquinoline aluminum (Alq3).

David Westbrook, (REU) currently a senior at Northwestern University, took part in research on the CDF detector at Fermilab, specifically working on the Silicon Vertex II Detector power supply control and monitoring and Run II Offline Software development, under the direction of Prof. Paul Tipton. He plans to apply to graduate school for physics in the future.

Jennifer Witkowsky, (REU) now a junior at the University of Rochester, took part in their REU program (research experience for undergraduates) this summer. She worked in the cooling and trapping group under Prof. Nicholas Bigelow. The goals included developing a future senior lab project on laser spectroscopy, as well as working on a new mount design to stabilize the laser enough to be used for research purposes. She will continue working with the group during the school year, and plans on applying to graduate school in the future.

Han Yoo, currently a sophomore at the University of Rochester, is involved in research with CDF at Fermilab on computer programs that retrieve pseudo-data from the CDF detector and select from the data ones that are interesting, under the supervision of Professor Kevin McFarland. He is looking forward to being involved at Fermilab continually throughout academic years and summer periods and plans to apply to a graduate school for physics.

