

**PHYSICS DEPARTMENT  
COLLEGE BASED FEES  
REPORT  
March 2007  
2006-2007**

Message from Richard Saenz, Chair

The College Based Fee Committee, comprised of both students and faculty, endorsed the 2006-2007 proposal offered by the Physics Department Committee. The proposal included a summer student research program, student and faculty travel to physics meetings, senior project expenses, additional startup funding for junior faculty, equipment purchases and support for physics electives. The 2006 summer research program was very successful with 20 students taking part. I want to thank all the physics students for their support of the College Based Fee which makes it possible for the department to offer an enriched undergraduate experience to our students.

Courses: Electives for Majors

Budgeted	Expended
\$45,000.00	\$45,000.00

Student Travel

Budgeted	Expended
\$3000	\$858.92

Two students traveled with Dr. Mitchell to the Lick Observatory in Santa Cruz to conduct Astronomy research.

Student Project Expenses

Budgeted	Expended
\$2000	0

Student Summer Research Support

Budget	Expended
\$27,860	\$27,860

Ten different Physics faculty conducted research with twenty different Physics majors over the summer.

Dr. Thomas Bensky: We continued previous research using the high voltage breakdown spectrometer that we built.

Dr. Robert Echols: Our group investigated the operational properties of organic based photovoltaic devices on both theoretical and experimental levels. On a second project we investigated the possibility of the potential of organic solar cells to be as efficient as the inorganic solar cells, and at a fraction of the cost.

Dr. Robert Field: The students collected, developed and used heuristic mathematical models that describe the structure and evolution of the Sun and the Earth, both of which are internally heated by forms of nuclear energy.

Dr. Elizabeth Griffith: We attempted to identify factors that cause or influence ocean currents and then to quantify the resulting transient and steady state convection patterns using experimental techniques.

Dr. Roger Grismore: We measured the radioactivity of NASA objects such as meteorites, moon rocks, and objects from MIR.

Dr. Steven Harfenist: The group used an Atomic Force Microscope to measure the forces in a liquid drop as it is pulled apart.

Dr. David Mitchell: The students learned how to program and create a basic program to compile data on the distances between stars to find binary star systems, and to write a program that will analyze sunspots in order to determine how much the Sun will appear to move based on the positions of these spots.

Dr. Karl Saunders: We built dye-doped nematic liquid crystal cells to inspect the “Giant Response” due to the electric field of the laser light propagating through the cells rather than an applied electric field. In a second project the students developed a theoretical understanding of de Vries Liquid crystals undergoing phase transitions.

Dr. Peter Schwartz: Our group used short DNA strands as a smart VelcroR to controllably and reversibly bond polystyrene microspheres together.

Dr. Nilgun Sungar: We studied the synchronization properties of coupled neurons by using the Hodgkin-Huxley model of action potentials.

#### Faculty Travel

Budgeted	Expended
\$12,400	\$10,281

Seventeen different faculty members traveled or are committed to travel for professional development, to the following destinations: AAPT meetings in Maryland, Syracuse, and Utah; geology fieldwork in Nevada; sabbaticals in Berkeley and Ireland; American Geophysical Union meeting in San Francisco; International Symposium on Liquid Crystal Technology in Long Beach; SPIE meeting in San Jose; Materials Research Society meeting in San Francisco; conference on Critical Thinking in Las Vegas; meeting with research collaborator in Oregon; Activity Based Physics Workshop at the University of Oregon; Telescope Conference in Irvine; To present a poster at meeting of Division of Atomic, Molecular and Optical Physics of the American Physical Society in Calgary; To give an invited talk at Computational and Mathematical Methods in Science and

Engineering Conference in Chicago; Gordon Conference on Liquid Crystals in New Hampshire.

New Faculty Start Up

Budgeted	Expended
\$14,600	\$5171.30

Glass slides and a PID controller were purchased and were used by Dr. Saunders and his research students in their study of nematic liquid crystals; Dr. Bensky paid for his registration at an AIP meeting; Dr. Echols purchased released time during which he is conducting research with students; Dr. Garcia traveled to fieldwork sites, and purchased maps, reprints and subscriptions to professional geology journals; Dr. Sharpe attended the SPIE meeting in San Jose, and bought some small lab supplies.

Equipment/Labs

Budgeted	Expended
\$26,516	\$12,358

The Department purchased a wave meter, a CCD camera and filter and a prism holder to be used in upper division optics and astronomy classes and for research involving students with Drs. G. Gillen, K. Gillen, Keller and Mitchell.