

**PHYSICS DEPARTMENT
COLLEGE BASED FEES
REPORT
January 2006
2005-2006**

Message from Richard Saenz, Chair

The College Based Fee Committee, comprised of both students and faculty, endorsed the 2005-2006 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 and extra sections of required courses. The 2005 summer research program was very successful with twenty 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
\$2,500.00	\$961.00

Three students traveled to a Nanotechnology conference at UCSB. One student accompanied Dr. Mitchell to the Lick Observatory near San Jose. One student attended a conference at the University of N. Iowa, on teaching Physics.

Student Project Expenses

Budgeted	Expended
\$3,000.00	0

Student Summer Research Support

Budget	Expended
\$32,000.00	\$28,741.00

The projects were as follows;

Dr. Bensky: Matt Fritch built a high voltage circuit that can ionize gas near two conductors connected to the circuit. He used a light spectrometer to analyze the light coming out of the ionization process. Mary Lee Weeks worked on spectroscopy of Rb atoms using a diode laser. She was able to resolve the fine structure of gaseous Rb.

Dr. Echols: Richard Colon built and tested polymer based solar cells with the goal of improving power conversion efficiency. Paul Sutter performed computer simulations of

wind oscillations in the equatorial stratosphere with possible influences from the solar sunspot cycle.

Dr. Field: Tyler Collins successfully got Dr. Joyce Guzik's LANL solar evolution code working on a PC, created user friendly versions that run under Windows or Linus, did a little documentation, and ran a few cases. Monica Lopez worked on solar opacity and main sequence solar evolution with emphasis on core contraction and analyzed Dr. Guzik's LANL code outputs. Dan Hernandez investigated processes related to the formation of the Sun. A summary of some of his and Monica's work in solar formation and evolution will be posted on Dr. Field's website. Geoff Masten evaluated educational materials which will help Dr. Field develop a Physics 470 advanced topics course called Solar and Global Evolution in which students will investigate the structure and evolution of the Sun, solid Earth oceans, atmosphere, and biosphere.

Dr. Mitchell: Kim Johnson worked on a program to identify binary star systems from a large infrared survey database using only stellar separation distances.

Dr. Moelter: Darren Fraser and Tyler Otto worked on the fabrication and resistivity measurements of high Tc superconductors.

Dr. Saunders: Ricky Gibson built liquid crystal cells and explored their electro-optic properties. In particular, he observed the Fredericksz transition.

Dr. Schwartz: Amber Bowen, Greg Tucker, and Bradley Anthony worked on the "DNA" project, whereby they used DNA as a selective nanoscopic Velcro to controllably attach microsphere to each other. They were developing a new way to stabilize the spheres so that they slide more easily past each other. Gregory Tucker also worked on the soft lithography project where they patterned molecules onto a gold surface with an Atomic Force Microscope (AFM). Grant Gallagher has been studying the Milk Fat Globule Membrane (MFGM) by assembling it on a flat surface and examining it under an Atomic Force Microscope (AFM).

Dr. Sungar: Shaun Perisho studied the synchronization in neural networks resulting from different coupling schemes for neurons modeled by the Hindmarsh-Rose model. This model uses three coupled differential equations to model the firing of individual neurons. His work involved writing Matlab programs to compute the output of coupled neurons and to study the synchronization that results for each coupling scheme such as unidirectional, bidirectional and heterogeneous coupling.

Faculty Travel

Budgeted	Expended
\$12,000.00	\$5193.00

Dr. Benzahra met with research collaborators in Minneapolis, MN. **Dr. Foster** presented a poster and attended a meeting of the AGU in San Francisco. **Dr. Garcia** conducted geological research in San Ardo, CA. **Drs. Hoellwarth, Knight and Moelter**

attended a meeting of the AAPT in Salt Lake City, UT where Dr. Moelter presented a paper. **Dr. Hoffman** presented research findings at the AGU meeting in San Francisco. **Dr. Mitchell** conducted astronomical research at the Lick Observatory near San Jose, CA. **Dr. Poling** traveled to the Golden Bear, Maritime Academy ship for Spring quarter. **Dr. Schwartz** attended a Nanotechnology conference at UCSB along with 4 students. Some of the above activities were actually conducted last academic year, but the charges appeared this year.

New Faculty Start Up

Budgeted	Expended
\$32,000.00	\$1,2146.00

Dr. Garcia renewed his subscription to the Geological Society of America, he traveled to his research site in San Ardo, he purchased boots for fieldwork, and he purchased access to a service for Optically Stimulated Luminescence (OSL) dating of rocks.

Dr. Moelter purchased magnets and superconductors for his summer research students.

Drs. Schwartz and Sharpe used their funds to buy released time from teaching to conduct research which involves students. Dr. Schwartz is using his time to prepare a manuscript about real time molecular ordering, to work on modifications to the AFM, and to work with the DNA group to improve the lubrication between microspheres to improve the “annealing” process whereby clusters of DNA-linked microspheres form ordered lattices. Dr. Sharpe is conducting research on pattern formation in a nonlinear optical system.

Equipment/Labs

Budgeted	Expended
\$16,000.00	\$945 credit

A vendor returned a credit of \$945 for an error from last fiscal year.