

Darlene Roth, Grants Director

Completed in 2011, Albright's new Science Center includes three independent student and faculty research labs in Biology, Chemistry/Biochemistry, and Physics (separate from teaching labs). Providing independent research facilities, they eliminate disruptions in classrooms and teaching labs, encourage and accommodate increased student interest, and stimulate advanced research. The DOE grant of \$369,943 enabled Albright to equip these advanced labs for 21st century science research, with much instrumentation shared among departments. The specialty labs will enable Albright to expand its student-faculty research program to meet growing interest, help attract superior science students, maximize faculty expertise, and continue exceeding its already high rates of acceptance for students applying for postgraduate education or pharmaceutical research positions.

Biology instrumentation/equipment supports coursework and independent and collaborative research by students and faculty. The digital shaker, CO₂ and water bath incubators (for controlled cell growth), balance, and micropipettes support cellular biology research in the advanced cell biology course and student-faculty research into heavy metal induction of heat shock proteins in cultured mammalian cells and the development of PCR markers from different populations of the native tree, *Franklinia*. The gravity convection oven and lyophilizer support research into physical and chemical analysis of floodplain sediments used in assessment of riparian restoration efforts. The Bio-Rad thermocycler permits fast and accurate DNA amplification as part of research into genetic diversity in small mammal populations and how those populations are affected by land-use practices and environmental management. The Millipore water deionizing system and glassware washer provide general support of the independent research lab and ensure quality control of coursework and interdisciplinary research at the intersection of biology, chemistry, and toxicology. Grant purchases support faculty and students working in the areas of plant cellular biology, landscape ecology and wildlife management, wetland restoration, and ecotoxicology of aquatic invertebrates.

Chemistry/BioChemistry instrumentation supports a wide range of research and teaching needs. The Dell quad core Xeon processors and Gaussian 09 support computational research efforts of two of our faculty. The computational work of one of these groups is part of close collaboration with one organic chemist and provides support info for the synthetic work of this professor and his students. Computational chemistry studies were also introduced into the physical chemistry laboratory course for junior chemistry concentrators. The AKTA plus system and superdex columns, Thermoscientific Sorvall RC-6 plus superspeed centrifuge, Nanodrop spectrometer, Eppendorf microfuge, Homogenizer and Pipetman pipettors were incorporated into a research project involving purification and characterization of a construct of beta 2-

microglobulin by one of our biochemists. The vacuum system (glove box, stand, and pump) makes a significant contribution to the research of our inorganic chemist, the newest department member, working on research projects with four students. The glove box provides the means to carry out their synthetic work in an oxygenless atmosphere. Supporting basic research pursued by faculty and students, the remaining items (refrigerator/freezer units for flammable storage, freezer, refrigerated water bath, rotary evaporator system, vacuum oven, analytical and top-loading balances) were distributed between our biochemistry and chemistry research labs. The Nanodrop spectrometer, Sorvall centrifuge, and rotary evaporator system are used in several junior/senior lab courses in both biochemistry and chemistry. To date, 14 undergraduate research students have been involved in projects using the new instrumentation and equipment provided by this grant.

Physics equipment acquired is radically transforming Albright research and teaching capabilities. The two main purchases are an atomic force microscope (AFM) and a scanning tunneling microscope (STM). These two devices allow us to view surfaces at much higher resolution than ever before, even to the level of individual atoms. Already the AFM has been incorporated into courses for advanced physics and biology students, allowing them to view at high resolution material such as carbon nanotubes, cell structure, and proteins. These devices offer possibilities for interdisciplinary collaboration among students and faculty in various departments that have barely begun to be tapped. Additional equipment, such as software, optical tables, lasers, and other support equipment, is also strengthening our research and teaching capabilities in optics-related areas.