

FRANK FAMILY SCIENCE CENTER

The Frank Family Science Center houses the four science departments at Guilford. In addition to providing modern laboratory facilities, the science center serves as a popular teaching facility for the entire academic community. It provides computerized multimedia classrooms, a computer visualization facility, a multi-function auditorium, an observatory, and formal and informal meeting facilities. The building was named The Frank Family Science Center to honor the late Stanley Frank – a local community leader and a trustee of the College from 1969-2006 – and his family.

The 54,000-square-foot facility was planned “from the inside out” to support Guilford’s unique vision of science education. Laboratory design consultants worked with each member of the science faculty to design laboratories that would enable hands-on learning with intense student-teacher interaction. These facilities were then combined with student work spaces, classrooms and easily accessible faculty offices to create learning communities for each discipline – biology and forensic biology, chemistry, geology and earth sciences, and physics and astronomy. The result is a building that facilitates interactions among the disciplines and so encourages the growth of interdisciplinary programs such as environmental science and health professions.

Biology

The Department of Biology has seven large, well-equipped laboratories on the first and lower floors of the Frank Family Science Center, a greenhouse, several instrument/prep rooms and faculty research space. Two additional laboratories are designed specifically for biology majors who are conducting individual research projects. All of the teaching laboratories in the Frank Center are fully wired and equipped with computer projection facilities, audio-visual equipment and multiple computer terminals for student use. The student research lab and the teaching laboratories are furnished with modern molecular biology equipment that gives students practical experience in research methods. The forensic biology laboratory is furnished with a gas chromatograph-mass spectrograph (GC-MS) and a wide variety of new instrumentation used both in teaching and research. In addition, modern crime scene software and a collection of Bone Clone replicas are available for student use. The physiology laboratory provides equipment and computer hardware and software for studies of animal and human functions.

The Bailes Greenhouse provides opportunities for student and faculty research and also serves as a depository of typical vascular plants for observation and study. A herbarium is available for botanical reference. An ornithological collection housed in the field biology laboratory dates back over a century to the work of Guilford alumnus T. Gilbert Pearson, one of the first presidents of the National Audubon Society. The department maintains a collection of specimens of vertebrates from North Carolina. The College woods and lake serve as a “living laboratory” with over 240 acres for research and study in forest ecology, ornithology, herpetology and limnology.

Chemistry

The Department of Chemistry occupies the third floor of the Frank Family Science Center. The laboratories and other department facilities were designed by the faculty to allow access to students in all chemistry courses, including the introductory courses, to state-of-the-art instructional and research facilities. The general chemistry lab is equipped with

downdraft hoods for each student, as well as data ports at each station. The organic chemistry lab provides individual access to research-grade fume hoods that allow modern experiments to be performed safely. Both labs are equipped with computer projection systems to facilitate demonstration of laboratory techniques and concepts. The advanced chemistry lab is a flexible space that can be used by junior and senior chemistry students to perform more advanced procedures in physical, analytical inorganic and materials chemistry. A research lab permits students to pursue thesis research under the direction of a faculty member.

Instrumentation available to students in these laboratories includes a 90 MHz NMR spectrometer, double beam UV-visible spectrophotometers, an FT-IR spectrophotometer, high-performance liquid chromatographs, a fluorimeter, calorimeters for solutions and polymer analysis, a potentiostat-galvanostat, and an ion chromatograph. Student offices give chemistry students spaces within the department to study, read journals or analyze data in a comfortable setting, near faculty offices.

Geology

Geology facilities support a complete field and laboratory program and complement Guilford’s student research program in geology. The Frank Family Science Center has eight state-of-the-art geology classrooms and laboratories, including ample and comfortable student research and study space, with excellent access to faculty.

The department owns an extensive map, rock, mineral and fossil collection. The department is equipped with rock and mineral analysis capabilities, including polarizing petrographic microscopes, photomicrographic facilities, dissecting microscopes, sample preparation facilities, gem analysis equipment and basic sedimentation equipment. Field studies are enhanced by a portable magnetometer, gravimeter and a 12-channel seismograph. The department has outstanding facilities for hydrologic studies, including eight monitoring wells that have been installed on campus, dataloggers, pumps, water level tapes and other standard equipment. A small lake on campus is available for study, and a permanent weir has been installed on the College creek for surface water studies.

The department also maintains a geochemistry lab and has field equipment for environmental investigations, including a portable spectrophotometer for contaminant analysis. These are complemented by Geographic Positioning System hardware and software, and excellent computer facilities (UNIX and PC), that include image-processing capabilities (computer, software and images), computer graphics and mapping capabilities, and a digitizing pad and color plotter.

Physics

The physics curriculum helps students to learn the science of physics and become physicists. To accomplish these goals, the Department of Physics emphasizes undergraduate research – especially projects initiated and designed by students – as a critical element in the physics learning process. Beginning in the first year, students are asked to initiate and design their own investigations. More than 3,000 square feet of laboratory space within the department supports undergraduate research. Many of the experiments that students conduct here are independent projects that are not associated with any particular course. Equipment for these experiments is constructed and modified in the modern shop facilities in the basement of the Frank Family Science Center.

The department offers two endowed physics awards, the Jeglinski Physics Award, in memory of Boleslaw Jeglinski and Michael Jeglinski, and the Helen and Winslow Womack Physics Research Award. These awards are

given annually to students to support their research and fund their travel to professional scientific meetings such as the National Conference on Undergraduate Research.

The department's introductory laboratories rely on a microcomputer-based data gathering and analysis system connected to the campus network. The advanced laboratories, created with support from the National Science Foundation, focus on experimental modern physics and include cryogenics, optics, atomic and nuclear physics, electronics centers and modern astronomical observing tools in the visible, infrared and 14 MHz radio frequencies. Students learn to control the sophisticated equipment in these centers using LabVIEW™ programs running on the department's many personal computers. For more complicated computational studies, students use Sun and Silicon Graphics Unix workstations from Guilford's Scientific, Computation and Visualization Facility.

In addition to the laboratory space, the department houses two rooms of student office space. Each physics major is given a desk and may use this space as a place to study or to store books. These rooms, provided by gifts from the physics alumni, are wired to the campus network and contain a personal computer and a Sun work station for student use.

Observatory

The Frank Family Science Center houses the J. Donald Cline Observatory and an astronomy lab, a photographic darkroom and an observatory support room. The principal instruments are a 16-inch Ritchey-Chretien optical telescope on a robotic mount and a seven-foot-diameter radio telescope on a fully motorized altazimuth mount. Instrumentation for the optical telescope includes CCD cameras, photometers and a spectrometer. This facility is used in the introductory astronomy and physics classes, for public viewing and for undergraduate student research. The College also shares a research-grade 32-inch telescope at the Three College Observatory that is located about 33 miles from campus.