



SWEET BRIAR ENGINEERING

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www.engineering.sbc.edu

International Engineering Design Project: Sweet Briar's Water Supply Work in Guatemala

An important component of the Sweet Briar engineering program is an international design experience. As companies increasingly do business around the world, this experience will provide our students with key problem-solving opportunities outside the United States.

The first implementation of this design experience culminated in May 2007 at the Institute Mixed with an Orientation in Agriculture (IMOA), a Mayan boarding school in Xix, Guatemala. Sweet Briar engineering students, faculty and staff traveled there to provide a clean water source to the school. They constructed a 3,500-gallon cement water storage tank and a 3- by 3-foot by 4-foot-tall spring box with a hand/electrically powered pump.

The project involved four months of classroom and laboratory preparation in Technology and Society: A Global Perspective, an interdisciplinary course taught by former associate professor of engineering Jim Durand during the spring 2007 semester. Students studied multidisciplinary aspects of constructing an intervention water development project in a developing country.

The course covered cultural issues related to the Mayan Indian community in Xix, water crises in the developing world, technical aspects of water development projects, sociological problems of technical intervention projects and sustainability. Students also addressed the day-to-day concerns of living in Guatemala.

To prepare for the project, students completed a conceptual design of the spring box and water tank and partially constructed ¼-scale models

in the lab. They selected a site on Sweet Briar's campus, where they built full-scale prototypes of the 3,500-gallon storage tank and spring box, and installed and tested the pump prototype. They also raised \$12,000 dollars to pay for building materials and travel expenses to Guatemala.



Sarah Smiley, Class of 2009, works on site in Guatemala.

The National Science Foundation partially funded the project and engineering course through the Science Talent Expansion Program (STEP). Sweet Briar engineering faculty and students look forward to continuing other international design projects in upcoming years.

SBC Engineering—Involved in the Community

Virginia FIRST LEGO League

The engineering program helped organize the Virginia FIRST LEGO League (FLL) at SBC in the fall of 2006. FLL is an international program for children ages 9-14 that combines a hands-on, interactive robotics program with a sports-like atmosphere. Teams consist of up to 10 players with the focus on such things as team building, problem solving, creativity and analytical thinking.

Sweet Briar College Science Scene

Our engineering students participated in the Sweet Briar College Science Scene, where area middle and high school girls gathered to solve mysteries through science. The engineering program opened up the Materials Science Lab for these girls. The girls visited our engineering lab and used the concrete tester to determine if faulty concrete was used in the construction of a fictitious building. The girls learned about science and engineering and many commented that it was a fantastic experience.

Brownie Science Try-It Day

Sweet Briar engineering students volunteered at the eighth annual Brownie Science Try-it Day hosted by the College during the spring of 2007. The event brought first- through third-graders from area Brownie troops to campus to participate in activities that can be applied toward the Girl Scout math and science badge requirements.

Conveying the Excitement of Engineering

Sweet Briar faculty visits area high schools with hands-on science kits

In an effort to expose high school students to the fields of engineering and physics and to inform them of the exciting opportunities in Sweet Briar College's new engineering program, we have begun visiting area high schools with hands-on science kits.

Dorsa Sanadgol, assistant professor of engineering, and Hank Yochum, director of engineering, designed a hands-on speaker kit that each student can build in class and take home with them. The kit components are simple: a plastic cup, magnet wire, a magnet, a speaker jack and a rubber band. The speaker can play music from an iPod or CD player. Students learn the physics behind how a speaker works with this basic design.

Students tested their handmade speakers and were not shy about speaking out and trying alternative designs — different types of cups, wires

and magnets can change the quality of the sound generated by the speaker. For example, some students replaced the ordinary plastic cup with a cone-shaped speaker made out of a piece of paper. One used the plastic box from his speaker kit, and another cut off the bottom of her plastic cup and covered it with Scotch tape.



Many students thought the “Make Your Own Speaker” kit was one of the coolest labs they had done all year.

“Many high schools have recognized the importance of trying to include engineering in the high school curriculum,” Yochum said. “We want to be a part of exposing and exciting these bright young students to a career in engineering as they consider their higher education options.”

Sweet Briar engineering representatives have visited E.C. Glass, Amherst and Altavista high schools and plan many more visits to schools locally and throughout the commonwealth.

Sweet Briar Engineering Students Gain Industrial Experience

Christina Johnson, Class of 2008, worked at AREVA NP, an international nuclear power company in Lynchburg, Va., as a systems engineering intern in the summer of 2006. Johnson assisted with alterations to the design of a pressurized water reactor for AREVA's U.S. EPR plant.

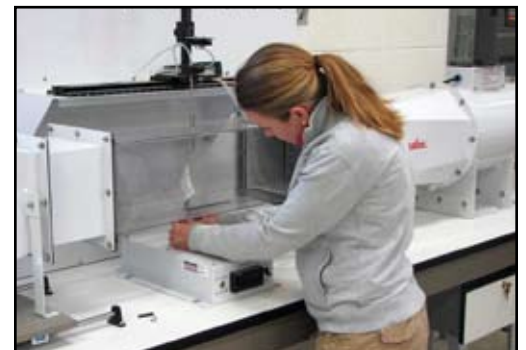
The first EPR plant is being built in Olkiluoto, Finland. The alterations improved the existing design, as well as compliance with U.S. Nuclear Regulatory Commission standards. Johnson's work included development of documents that designate and describe the responsibilities and functions of many systems, and the interaction between these systems, within a nuclear power plant.

“My experience at AREVA NP was more than I had ever hoped for,” Johnson said. “As a summer intern, I was constantly working with real engineers on projects that were an important part of the engineering industry.

“Getting a taste of industry as an intern, before seeking professional employment as an engineer, has been invaluable for me. AREVA NP provided a friendly and professional environment for interns to both learn about the nuclear power

industry and to contribute to the industry. In short, I would highly recommend an engineering internship at AREVA NP to any interested student.”

The internship experience is a valuable part of a student's engineering education and all Sweet Briar students must complete at least one such position. Other Sweet Briar engineering students have interned at NASA's Wallops Flight Facility, ASSETT, Inc., the Virginia Department of Transportation and Persar Inc.



Christina Johnson working on the wind tunnel in SBC's engineering lab.



2006-07 Sweet Briar Engineering Program Highlights

Students participate in third annual Cardboard Boat Regatta and Design Contest

During the September 2006 Homecoming Weekend, five teams from the Introduction to Engineering class, one team from environmental studies and a team from Monelison Middle School raced on Sweet Briar's Lower Lake in boats made from no more than 20 pounds of cardboard and 50 feet of duct tape. Nearly 1,000 Sweet Briar students, alumnae and guests came to cheer for the engineering students. This annual event takes place every fall during Sweet Briar's Homecoming.

Students visit DaimlerChrysler research facilities/SAE conference

A group of Sweet Briar engineering students went to Detroit for a special tour of the DaimlerChrysler Scientific Research Laboratories at its Auburn Hills Technical Center in March 2007. T.C. Scott, associate professor of engineering and active consultant for the DaimlerChrysler research group, arranged for this remarkable trip. Scott's Chrysler colleagues provided a personalized tour of the full-size wind tunnel, engine and power train test facilities, climate-controlled full-vehicle test cells, and the major computer analysis groups. "This is really awesome," was a common expression by the touring students.

After the tour, the students spent some time at the annual Society of Automotive Engineers (SAE) conference in Detroit, where hundreds of technical sessions are conducted and automotive companies and suppliers demonstrate their products. This event also was a chance to drop resumes for potential summer internships and learn more about careers in the automotive business. This will be an annual event for SBC engineering students.

Speaker series on society, technology and engineering

Tim Miles from AREVA NP visited Sweet Briar's engineering program and gave a presentation on nuclear power plants in March 2007. Miles is a mechanical engineer who works in the AREVA NP nuclear fuel group and is involved in the company's college recruiting program. He discussed how the United States, along with the rest of world, is on the verge of making many decisions concerning the future of global energy production. AREVA, headquartered in Lynchburg, Va., provides nuclear reactors, fuel and engineering services to electrical utilities worldwide.

Message from the Director

The faculty, staff and students in the engineering program at Sweet Briar have had a busy and productive year. From designing and building a water supply tank in the highlands of Guatemala to visiting area high schools with hands-on science and engineering kits, we continue to make our innovative program a challenging academic experience for our students while giving back to our community.

The class arriving for the fall of 2007 marks the third group of students entering the program. Students may earn the Bachelor of Science in engineering or Bachelor of Arts in engineering management.

The engineering track is based on a multidisciplinary approach to engineering with an emphasis in mechanical engineering along with a significant design component embedded throughout the curriculum. We believe that this multidisciplinary approach to engineering best prepares our graduates for a technical environment in which the lines between disciplines are no longer clear. Today's engineers must work effectively in multidisciplinary teams and must approach engineering problems at the system-level. We ensure that our graduates are prepared for this environment by removing discipline-specific boundaries from the curriculum and by teaching a holistic, systems-level approach to engineering design. In addition to many courses in physics, chemistry and mathematics, the engineering track includes such courses as electrical circuits, materials science, thermal and chemical processes, systems and controls and the senior design capstone. Most courses have a significant lab component.

The engineering management track combines engineering and science coursework with a variety of courses from Sweet Briar's business management program. Both degree programs prepare Sweet Briar women to become technically strong leaders in business and engineering.

We continue to be active in the Central Virginia community and look forward to collaborations with area industry and schools.

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Washing Down Pancakes With Fresh Water

Mayan children at the Institute Mixed with an Orientation in Agriculture in Xix, Guatemala, chow down on chocolate chip pancakes compliments of an SBC-led engineering team. The team traveled to the remote school to complete a water-improvement project. Check out Bonnie Kestner's story at <http://www.sbc.edu/news/?id=2205> to learn more about what the team was up to.



Thanks to Our Friends of Engineering

Lockheed Martin, Progeny Systems and BWXT support women in engineering

Lockheed Martin, headquartered in Bethesda, Md., donated various electronics and a laminar flow apparatus to the College's engineering department. The equipment has already been used in the sophomore-level thermal and fluid processes laboratory. Progeny Systems, headquartered in Manassas, Va., donated Rotometer flow meters and a thermocouple welder. BWX Technologies Inc., headquartered in Lynchburg, Va., provided the program with financial support for a technician.



Left to right: Laura Tanner, Margaret Melchor, Maxine Emerich, Aimee Savage, Rachel Moretta, Jim Durand, Amy Dyer, Christina Johnson, Josefina Escobar, Erica Franklin and Hollis Bauer of Lockheed Martin.

Engineering program awarded funds from National Science Foundation

Sweet Briar engineering has been awarded several grants through highly competitive National Science Foundation funding programs. Part of the initial seed money for the program was provided through the Engineering Education and Centers division via planning and implementation grants totaling over \$500,000. Through the Science Talent Expansion Program, the college was awarded more than \$400,000 to support engineering recruitment efforts, scholarships and our international design project. As part of the Cyber-Infrastructure program, the engineering program is part of a nine-college collaboration to implement recently developed computer-based dissection modules in the engineering curriculum.



Engineering program thanks Sweet Briar alumnae for generous gifts

The SBC engineering program thanks Mrs. Margaret Jones Wyllie, Sweet Briar Class of '45, and Mrs. Anne Allen Symonds, Sweet Briar Class of '62, for each making generous gifts to the program. These funds have helped with start-up costs, upgrades to facilities and important equipment purchases in the engineering machine shop and the materials characterization laboratory.

Sweet Briar College is committed to supporting women in engineering through the Women in Engineering Program Advocates Network (WEPAN) and Society of Women Engineers (SWE). The College supports innovation and growth in technology through Virginia's Region 2000.

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