

## Elizabethtown College Solar Cabin Close to Being Finished



The Elizabethtown College Solar Cabin, which was designed and constructed by engineering students, is located between the Quads, Young Center, and the Track.

Did you know that Elizabethtown College has a Solar Cabin? It's true - engineering students designed and built a small 200 square foot cabin with twelve solar panels mounted on the roof (peak power totaling 2200 Watts). The cabin is completely stand-alone and was designed as both a student study cabin and as a platform to test and demonstrate alternative energy storage systems. The Solar Cabin is part of a broader project called the "Stand-alone Green-power for Village Settings Initiative" for which Elizabethtown College awarded a \$7,500 Strategic Grant to jumpstart the project. This \$7,500 internal grant, combined with \$7,000 in start-up funds from Professor McBride and generous corporate donations (including a Cypress Semiconductor Corp. and Sunpower Inc. donation of \$10,000 worth of high efficiency solar panels and a B&G Lumber donation of \$2500 in material discounts) has allowed us to build the small prototype solar cabin on campus between the Quads and the track. Thirty-one students, 22 1st years and 9 2nd years, along with Professors Fullerton and McBride

designed the solar cabin in the spring of 2006 and completed construction of the exterior of the cabin and the raised walkway. This Fall (2006), eight students worked to finish the interior of the cabin, the control system, and energy storage system as part of the elective course Engineering Research / Project. More details on the Solar Cabin and associated Initiative can be found on our website at <http://www.etown.edu/solarcabin>.

## Wunderbot IV Preparing For Competition in 2008

Are you ready for the fourth generation of Wunderbot? An undergraduate project of the Elizabethtown College Robotics and Machine Intelligence Laboratory, WunderBot (<http://www.etown.edu/wunderbot>) is now entering its fourth generation as a versatile autonomous robot platform. Coming off the 2006 competition, the team's present objectives include entering WunderBot IV in the 2008 Intelligent Ground Vehicle Competition (IGVC) and designing it to function as an autonomous tour guide of the Elizabethtown College Campus. One of the latest features, added by recent graduate Brian Moran (Dec. '06) and current student Chris Weaver ('08), is joystick control for easy maneuvering of the robot in and out of the lab.



The Wunderbot autonomous robot is now in its fourth generation.

Incoming president of the Robotics and Machine Intelligence Club, David Coleman '08 states, "In 2004 and 2006, Elizabethtown College students have competed in the nationwide competition and each time we have become better." (continued on page 3)

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## Biomechanics Research (by Garry Brock)

Department Chair and Associate Professor, Dr. DeGoede's research focus involves work in the Biomechanics Research Lab on the first floor of Esbenshade. This Fall and Spring semester, I am working on my senior project related to issues of balance and falls in pre- and post- menopausal women. The research that I am working on is a continuation of a study initiated as a senior project by Doug Wisner ('04). The project is based on an individual's reaction time to a balance disturbance. Subjects are placed on a platform that rests on a hinged fulcrum and, at a random time, the platform is released making the subjects feel as though they are falling. In this study, their reaction will be recorded using accelerometers and captured using three linked and calibrated video cameras. Subjects will consist of three groups; college-aged students, middle-aged women who have had menopause and middle-aged women who have not had menopause. The reaction times and the extent of the reaction will be compared. We hypothesize a difference in the times and hope to be able to make a determination on the effects that age and menopause have on the reaction of middle-aged women to a fall disturbance. The accelerometer-based measurement could be reproduced at low cost in a clinical setting as a potential diagnostic tool to determine those with an increased risk for fall-related injury.



**Garry Brock ('07) in the Biomechanics Lab testing a subject in a previous study of fall arrests.**

## E-Town Graduate Making a Difference at Two Technologies, Inc.

Snehash Shrestha, a 2005 graduate of Elizabethtown College and Computer Engineering major, is currently working at Two Technologies, Inc ("2T") near Philadelphia. He writes:

"First of all, I would like to congratulate the Wunderbot III team for the excellent performance at the IGVC 2006. Secondly, I want to thank all my professors at E-town for the wonderful experience I had. After graduating I got a job at Two Technologies, Inc. (<http://www.2t.com>) about 25 minutes north from the Philadelphia center city. We design and manufacture rugged handheld computer & terminal solutions for industrial and commercial applications. I am responsible for writing custom software for Microsoft Windows PC and CE platforms and custom firmware for 80 series microcontrollers. Like most small companies, at "2T" I have an opportunity to be part of the entire software development cycle from writing initial specifications and designing solutions to signing off on final tests and releases. I mostly use C, C++, C# and Assembly language." ~Snehash Shrestha

Next time you see one of those rugged handheld computers, you can remember that an E-town engineer is intimately involved in their software design and functionality.



**Snehash Shrestha ('05) sent us these photographs of Two Technology, Inc. products. He works as a computer engineer for the maker of rugged handheld computers.**





## Balancing Athletics and Engineering/Physics (by Jenn Hawkins)

Being an engineering or physics major is tough. Yet numerous students add to that the challenges and time demands of being on one of the College athletic teams. A few examples include Zach Galbraith ('08) and Michael Henry ('09) in soccer, Brandon Bear ('09) and Evan Metz ('09) in cross-country, Drew Graybeal ('08) and DJ Lehr ('08) in Track and Field, and me, Jenn Hawkins ('09) a newsletter editor and women's Lacrosse goalie. Involvement with engineering/physics and a sports team keeps one very active; it certainly forces a student to manage their time effectively. Like many students, Zach Galbraith enjoys the challenge. He states, "I enjoy difficult classes in the engineering curriculum. Having those classes helps me learn how to critically analyze questions and to improve my problem solving abilities. This helps me in all aspects of my life, including soccer". Another link between sports and being an engineering major is the focus on teamwork. As the saying goes, "There is no 'i' in team" and excelling in your role in a team is an important aspect of being a successful athlete and a successful engineer. In asking some of our student athletes how they deal with the pressure of being so busy, they turn it back on me and tell me that they love it and would tell me they would not want to have it any other way.



Zach Galbraith, '08, (center) clears the ball during the first round playoff game in the NCAA Division III soccer tournament.

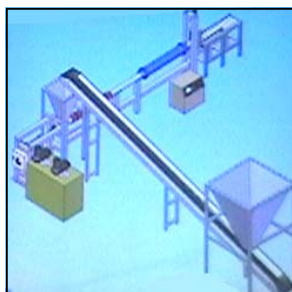
## Wunderbot IV Continued... (from page 1)

David continues "I am currently researching critical path planning techniques for use in robotic movement through a GPS course. My efforts will be focused on developing shortest path algorithms through the GPS waypoints while introducing obstacles in the path of the robot. Others, including James Painter '08, will be working on object detection to determine how the preplanned path might change due to a recently discovered object. The code will be written in LabView to use the other components on the robot to provide accurate feedback in a timely manner. You may contact me directly to coordinate any events concerning the robot at [colemam@etown.edu](mailto:colemam@etown.edu)"

## Senior Project to Full-time Position

Ben Carvell recently graduated from Elizabethtown College as an Engineering Physics major this December 2006. He completed his senior project this Fall based on a project he started during a summer internship at N.F. String and Son, Inc. in Harrisburg. His work for the company, including his impressive senior project, have led to the offer and his acceptance of a full-time position at the company starting in January 2007.

Ben's senior project involved the complete design—concept, specification, pricing, 3-d model, and electrical/control circuitry — of a machine to recycle waste corrugated cardboard cutouts by forming them into artificial fire logs. His machine design involves the automated mixing, heating, compression, cooling, and cutting of the cardboard (with wax). His 3-d model is shown above right. Ben looks forward to working at NF String to bring the machine to life, as he coordinates the building of the first system.



Ben Carvell's ('06) 3-d model of an artificial fire log machine for use with waste cardboard cutouts.



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*Editor: Kaitlin Hartzell, '07*

*Co-Editors: Jennifer Hawkins '09*

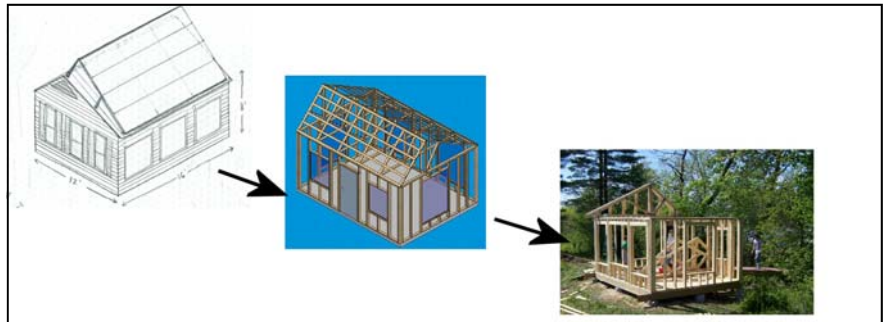
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*Advisor: Dr. Troy McBride*

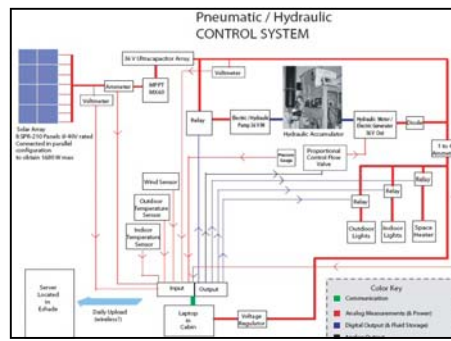
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# Sightings from the Department



The student designed and built Elizabethtown College Solar Cabin is nearly ready for its grand opening. The photos at left show students (TOP left to right) Kevin Green '09, Vince Sparacino '09, Neal Dawes '09, Stephany Schultz '09, Shaen Johnson '09, (Prof. McBride), Adam Botterbusch '08, (BOTTOM left to right) John Eveland '09, Patricio Terrazas '09, Botterbusch, Schultz, Johnson, Paul Stegner '08, Green, Justin Hynarowski '09, (McBride), Bhavin Patel '09, and David Coleman '08 constructing the cabin framework in Spring 2006. The middle photos show some of the student design work, while the lower right photo shows third-year students (bottom to top) Botterbusch, Stegner, Chris Yorgey '08, Coleman, and Pat Gianelli '08 working in Fall 2006 to mount the final row of solar panels. More information on the Solar Cabin project can be found at <http://www.etown.edu/solarcabin>



Physics and Engineering Department  
 Elizabethtown College  
 One Alpha Drive  
 Elizabethtown, PA 17022-2298

