



# TryEngineering Today!

The monthly newsletter of TryEngineering - find out more at [www.tryengineering.org](http://www.tryengineering.org)

Volume I, Issue III 2006 - November

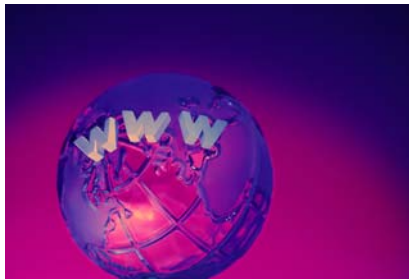
## Web Access in Developing Countries

The World Wide Web Consortium (W3C) is hosting a "Mobile Web in Developing Countries" Workshop in Bangalore, India, in early December. The workshop is part of W3C's Mobile Web Initiative, which aims to identify and resolve challenges and issues of accessing the Web when on the move. In order to deliver Web standards that enable access for all, W3C seeks to learn more about the specific needs, expectations, and challenges faced by people in developing countries.

According to the World Bank, more than two

billion people own a mobile phone. With one million new subscribers every day, almost four billion people will have a mobile phone by the end of 2010. Although access to phone service is fundamental, W3C considers access to Internet services such as email and the Web vital for education, commerce, and communication.

High speed mobile data networks and more affordable web-enabled phones are helping to make this access possible in the developing world.



For some, telephones may be the primary, or even sole, means to access the Web.

The World Wide Web Consortium (W3C) is an international consortium that works to develop Web standards. Over 400 organizations are members of the Consortium.

For more information, visit [www.w3.org](http://www.w3.org).

## Inside this issue:

Web Access in Developing Countries	1
Plastic Solar Cells Boost Performance	1
Lesson Plan: Electric Switches	2
Revolutionizing Prosthetics	2
Eye-controlled Computers	3
Design a Parachute	3
Seafloor Observatory Expands	4

## Plastic Solar Cells Boost Performance

"Plastic" solar cells show gains in performance. Nobel Prize winner Alan J. Heeger, and colleagues at the University of California, Santa Barbara, say new developments in "plastic" solar cells, particularly chemical modifications to titanium oxide layers, could provide efficiencies of up

to 15% in the future. He already has developed plastic solar cells with efficiencies between 5% to 6%, considered among the highest to date for this type of solar cell. The developments could pave the way for wider use of plastic solar cells, a type of conducting polymer, which are

increasingly seen as a low cost, efficient and long-lasting solar energy source

Heeger shared the 2000 Nobel Prize in Chemistry for his contributions toward the discovery of plastics that conduct electricity.

More details are at [www.ipos.ucsb.edu](http://www.ipos.ucsb.edu).





## Lesson Plan: Electric Switches

Each month, TryEngineering Today! profiles one of the many lesson plans available on TryEngineering.org.

The Electric Switches lesson demonstrates how electric circuits can be controlled with a simple switch. The lesson encourages students to design a simple switch into an electric circuit.

Students work in teams to create their design with wires, batteries, a bulb, and a simple switch. They also develop a schematic of their electrical diagram. Then student groups compare

results and discuss findings. Students also have an opportunity to identify switches found in common appliances.

The Electric Switches lesson can be adapted for ages 8 - 18, and is aligned with education standards to allow teachers and students to apply engineering principles in the classroom.

The lesson includes teacher and student handouts and worksheets, along with simple explanations of how switches work, and with examples of electrical diagrams.

Because the students work in teams to develop and plan their switches, they have an opportunity to explore the teamwork that is so important to the engineering process. By comparing their designs with those of other students, they can review pros and cons of different solutions.

The lesson is designed for classroom use only, with supervision by a teacher familiar with electrical and electronic concepts.

Find out more at [www.tryengineering.org/lesson.php](http://www.tryengineering.org/lesson.php).



## Revolutionizing Prosthetics

University of Utah researchers will receive up to \$10.3 million to help develop a new prosthetic arm that would work, feel and look like a real arm. The Utah work is a key part of a U.S. Department of Defense contract to develop the new device for soldiers and others whose arms are amputated.

"Imagine an artificial arm that moves naturally in response to your

thoughts, that allows you to feel both the outside world and your own movements, and that is as strong and graceful as an intact, biological limb," says bioengineer Greg Clark, the University of Utah's principal investigator on the project.

The researchers will focus on developing and testing a "peripheral nerve interface" – an implanted device that would relay nerve

impulses from nerves in the residual limb to a small computer worn on a belt and then to the bionic arm. That would allow a person to move the artificial limb like a real one.

Researchers at other institutions will develop the prosthetic arm itself and study other kinds of neural interfaces that could operate the bionic arm instead of nerves in the residual limb.



Bioengineer Greg Clark is leading a team of University of Utah researchers and subcontractors helping to develop a lifelike prosthetic arm for soldiers whose own arms were amputated. Credit: David J. Warren



## Eye-controlled Computers

A new system makes it possible to guide the computer mouse with your eyes. A software program interprets the user's pupil movements.

The "Eye-Controlled Interaction" system (EYCIN) developed by researchers at the Fraunhofer Institute for Industrial Engineering IAO in Stuttgart, Germany -- in cooperation with industrial partners -- tracks the human user's eye movement and transmits it to the mouse pointer on the monitor.

A camera observes the movement of the pupils from a distance of up to

one meter; a software program calculates and transfers the coordinates of the area viewed. It all happens so quickly that the mouse pointer moves smoothly.

The engineers have invested a tremendous amount of meticulous work in the new eye-controlled interaction system.

One of the problems they faced were the miniature jerk-like movements, or microsaccades, that the eye constantly makes.

If the pupil movements were transmitted to the monitor without first

being filtered, the pointer would dash around all over the monitor.

EYCIN will be used to facilitate the assembly or maintenance of industrial equipment by technicians: a worker can click his way through the maintenance menu with eye movements while holding the respective parts in his hands.

The system could also make it easier for paraplegics to work with a computer.

For more information, visit the Fraunhofer Institute for Industrial Engineering at [www.iao.fraunhofer.de](http://www.iao.fraunhofer.de).



## Design a Parachute

Most people are familiar with what a parachute is -- a soft fabric device used to slow the motion of an object through an atmosphere by creating drag. But, have you ever tried designing one of your own?

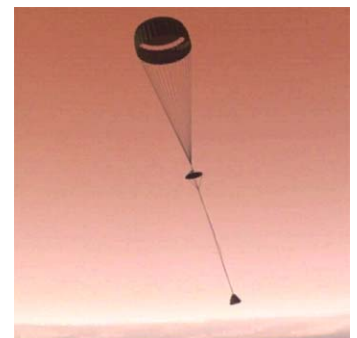
Many factors must be considered in the engineering of a parachute. How heavy is the object that must be

lowered safely? How fragile is it? Will temperature be a factor? What materials should be used?

TryEngineering.org provides a link to a NOVA interactive internet game that lets visitors try their hand at designing the ideal parachute for the Mars Exploration Rover Mission. The volume,

drag, strength, and stability of the design are tested online using a simulated wind tunnel. Site visitors can redesign their parachute until it operates as needed!

For the links to the Parachute Design game and other interactive engineering activities, click on "Play Games!" at [www.tryengineering.org](http://www.tryengineering.org).





## Seafloor Observatory Expands

The research capacity of the University of Victoria-led NEPTUNE Canada, the world's first regional cabled ocean observatory, received a significant boost in September with an additional \$20 million in funding. The additional funds will allow engineers and scientists to significantly expand the scope and scientific impact of the NEPTUNE Canada observatory -- part of the NEPTUNE (North-east Pacific Time-series Undersea Network Experiments) project, which will serve

as a platform for real-time oceanic monitoring and scientific experiments.

In 2007, French based-Alcatel will begin to lay an 800-km network of powered fibre optic cable across the seafloor in the deep ocean off the British Columbian coast. A series of laboratories, or "nodes," along the cable will allow land-based facilities to remotely control and monitor instruments, video cameras and underwater vehicles as they collect data from

the ocean surface to beneath the seafloor. The observatory will revolutionize ocean research by transmitting images and data instantly to shore where they will be relayed to researchers, educational institutions, and science centers via the Internet.

Alcatel ([www.alcatel.com](http://www.alcatel.com)) operates in more than 130 countries, and has played a key role in the engineering, development, and implementation of submarine cable networks.



## TryEngineering Today!

TryEngineering.org  
P.O. Box 1331  
Piscataway, NJ 08854-1331 USA

## TryEngineering.org

is a resource for students (ages 8-18), their parents, their teachers and their school counselors. It is a portal about engineering and engineering careers, developed to help young people understand better what engineering means, and how an engineering career can be made part of their future.

It is brought to you by:



With the participation of:

