



TryEngineering Today!

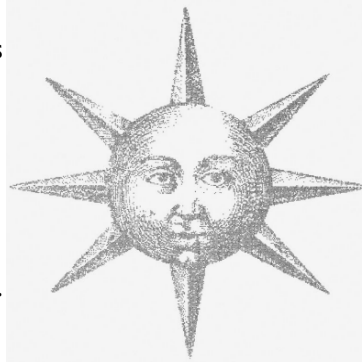
The monthly newsletter of TryEngineering - find out more at www.tryengineering.org

Volume II, Issue XII 2007 - December

Nanoscale Printing

Researchers from IBM's Zurich Research Lab and Switzerland's ETH Zurich Science and Technology University recently demonstrated a new, efficient and precise technique to "print" at the nanoscale. The method could advance the development of nanoscale biosensors and the fabrication of nanowires that might be the basis of tomorrow's computer chips. Until now, standard top-down micro-fabrication techniques produce such tiny particles by in effect carving them out of a bigger piece of material.

Printing, in contrast, adds ready-made nanoparticles onto a surface in a very efficient way and allows for different types of materials such as metals, polymers, oxides, and semiconductors to be combined in one process. The printed particles are as tiny as 60 nanometers -- roughly 100 times smaller than a human red blood cell -- with single-particle resolution to create nano-patterns. Translating the resolution of these particles into a printing term known as "dots per inch" or dpi, the nanoprinting method yields 100,000 dots per



This image created by IBM scientists shows a new nano 'printing' technique they believe will lead to breakthroughs in ultra-tiny chips, optics, and biosensors. (Image Credit: IBM)

inch, whereas common offset printing operates at 1,500 dpi.

Find out more at www.ibm.com or www.ethz.ch.

Inside this issue:

Nanoscale Printing	1
Panama Canal Expansion	1
Build Your Own Robot Arm	2
Burj Dubai Grows Even Taller	2
Origami Electronics?	3
Questioneering	3
Third Italian Earth Observation Satellite Planned	4

Panama Canal Expansion

The first-ever expansion of the nearly 100-year-old Panama Canal is underway. Engineers working on the expansion will build a new lane of traffic along the Panama Canal through the construction of a new set of locks, which will double capacity and allow more traffic and longer, wider ships.

The new Pacific Locks access channel will ultimately connect the Gaillard Cut to the new Pacific Locks. Expansion will double Canal capacity to more than 600 million Panama Canal tons, tighten the global supply chain, and help get goods to market faster.

The Panama Canal services more than 144

different transportation routes from every corner of the globe, connecting major trading arteries and providing safe, time-saving and secure passage for all vessels.

The expanded Canal will serve as a critical link to world commerce. Find out more at www.pan canal.com.



This explosion marked the recent groundbreaking for expansion of the Panama Canal.
Photo Credit: Panama Canal Authority



Build Your Own Robot Arm

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

The "Build Your Own Robot Arm" encourages students to develop a robot arm using common materials. Through the lesson, they explore design, construction, teamwork, and materials selection and use.

As part of the project, participating teams of three or four students are provided with a bag of materials which they use to design and build a

working robot arm. The robot arm must be at least 18 inches in length and be able to pick up an empty cup.

The teams must agree on a design for the robot arm and identify what materials will be used. They then draw a sketch of their design prior to construction. Once built, the resulting robot arms are tested and checked for range of motion and satisfaction of the given criteria.

The lesson is appropriate for students aged 8-18, and provides step-by-

step instructions for both educators and teachers.

This lesson is also appropriate for teachers who want to explore the engineering process in a fun and interactive way.

All lessons on TryEngineering.org provide detailed teacher and student handouts and worksheets, many which can serve as pre-activity homework assignments.

Explore this, and other lessons online at www.tryengineering.org/lesson.php.



Robot arm testing at a recent IEEE-sponsored Teacher In-Service Workshop in Malaysia.

Burj Dubai Grows Even Taller

The Burj Dubai is now officially the world's tallest free-standing structure.

The construction of the Burj Dubai has now surpassed the height of the CN Tower in Toronto, Canada, which was previously the world's tallest free-standing structure at 1,815 feet (553 meters). The height of the Burj Dubai, located in Dubai, United Arab Emirates, will continue to climb as construction continues

to the floors and beyond with its architectural spire. The construction is expected to top out in 2008. The final height is still a secret.

Upon completion in 2009, the Burj Dubai will be the tallest building in the world in all four categories recognized by the Council on Tall Buildings and Urban Habitat (CTBUH), which compiles and ranks the world's tallest buildings. CTBUH ranks buildings on the basis of spire

height, the highest occupied floor, roof height and pinnacle height. The Burj Dubai project was launched in 2004 as part of a \$20-billion, 200-hectare downtown development billed as the most prestigious square kilometre on earth. Designed by Skidmore, Owings and Merrill of Chicago, Illinois, USA, the tower is being built by Samsung Corp. of South Korea. More details are at www.burjdubai.com.



The Burj Dubai will contain the world's highest elevator installation.



Origami Electronics?

Engineers and researchers at Rensselaer Polytechnic Institute have developed a new energy storage device that easily could be mistaken for a simple sheet of black paper. The nanoengineered battery is lightweight, ultra thin, completely flexible, and geared toward meeting the trickiest design and energy requirements of tomorrow's gadgets, implantable medical equipment, and transportation vehicles. Along with its ability to function in temperatures up to 300 degrees Fahrenheit and down to 100 below zero, the device is completely integrated and can be

printed like paper. The device is also unique in that it can function as both a high-energy battery and a high-power supercapacitor, which are generally separate components in most electrical systems. Another key feature is the capability to use human blood or sweat to help power the battery. The semblance to paper is no accident: more than 90% of the device is made up of cellulose, the same plant cells used in newsprint, loose leaf, and nearly every other type of paper. The paper is infused this paper with aligned carbon nanotubes, which give the device its black color.

The nanotubes act as electrodes and allow the storage devices to conduct electricity. The device, engineered to function as both a lithium-ion battery and a supercapacitor, can provide the long, steady power output comparable to a conventional battery, as well as a supercapacitor's quick burst of high energy. The device can be rolled, twisted, folded, or cut into any number of shapes with no loss of mechanical integrity or efficiency. The paper batteries can also be stacked to boost the total power output. More details are at www.rpi.edu.



The new nanocomposite paper developed by engineers and researchers at Rensselaer Polytechnic Institute is infused with carbon nanotubes.
Credit: RPI; Victor Pushparaj

Questioneering

Sometimes the best way to understand what engineers do is to try your hand at it!

TryEngineering has developed a new online quiz game called Questioneering that challenges players to prove their engineering knowledge in a trivia game. The interactive game is lots of fun and fast paced!

There are three phases to the game:

Stage 1 - Answer each of 12 questions in 30 seconds, and earn bonus points for each second you answer early.

Stage 2 - Answer as many questions as you can in 60 seconds.

Stage 3 - Choose how many points to risk on one final question.

All questions are multiple choice. And, if you're on the clock it can pay to guess quickly and move on to the next question. With Questioneering, you can challenge friends, choose a team, or just go for the high score.

For the link to "Questioneering" and other engineering games, click on "Play Games!" at www.tryengineering.org.





Third Italian Earth Observation Satellite Planned

Thales Alenia Space Italia, the prime contractor of Agenzia Spaziale Italia, the Italian Space Agency is working with the Boeing Company to launch the third COSMO-SkyMed commercial satellite.

Thales Alenia Space Italia developed the COSMO-SkyMed program for the Italian Space Agency and the Italian Ministry of Defence. It is an end-to-end Earth observation dual-use (civil and military) system of four medium-sized satellites and supporting ground

stations for orbit control systems and data reception and processing. The system will take imagery of the Earth using an X-Band Synthetic Aperture Radar instrument capable of operating in all visibility conditions at the request of institutional and commercial users, including members of the civil, scientific, and defense communities.

A Delta II expendable launch vehicle will carry the COSMO-SkyMed spacecraft into orbit from Vandenberg Air

Force Base, California, U.S. in 2008. Martin joint venture.

Boeing has a long-standing relationship with Thales Alenia Space. For example, the company has provided Delta II tanks to Boeing since 2001 and built the Cupola and Harmony Node 2 elements (for the European Space Agency) of the International Space Station, for which Boeing is the prime contractor.

Find out more at www.asi.it or www.boeing.com.



COSMO-SkyMed is an end-to-end Earth Observation System dedicated to Earth remote sensing and data exploitation for civil and defense applications.

Graphic Credit: Agenzia Spaziale Italiana



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:

