



TryEngineering Today!

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

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Building Engineered for Microscope

The Center for Functional Nanomaterials (CFN) at Brookhaven National Laboratory in Upton, NY, USA, provides state-of-the-art capabilities for the fabrication and study of nanoscale materials. The CFN is a 94,500 square foot facility that was built to house some of the world's most intricate scientific tools, including a Scanning Transmission Electron Microscope (STEM). The CFN is one of five nanoscale science research centers funded by the U.S. Department of Energy. To ensure optimal performance,

engineers designed special features into the building. For example, because the mere existence of body heat can affect the ambient conditions in the STEM lab, controls there are adjustable to 0.1 degrees Celsius for temperature and within 5 percent for humidity. The STEM is also sensitive to vibration and vehicles driving on nearby roadways can cause interference. To help absorb noise and vibration, 24-inch isolated concrete slabs have been constructed in some specialized labs and polypropylene fibers have



been added to certain slabs to dampen the noise. To avoid radio frequency and electronic magnet interferences, aluminum and steel shielding has been installed at the CFN. More details are at www.bnl.gov/cfn.

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Robotic Rats to Assist in Rescues

An interdisciplinary international project called BIOTACT (BIomimetic Technology for vibrissal ACtive Touch) is developing a new robot technology based on rat whiskers. The sensing abilities of rat whiskers are much more efficient than that of the average person's finger tips. The new initiative brings together

nine groups of researchers and engineers from Europe, the USA, and Israel. The 'whiskered' robotic rat is designed to quickly locate, identify and capture moving objects using technology similar to the rat's sensing system. Whiskers actively sweep back and forth repetitively, accumulating information about its

surrounding environment whether in the dark or bright sunshine. The sensing begins in the neurons at the whiskers' bases, which then fire signals off to the brain. The "whiskered" robot will be able to aid in rescue and search missions where conditions offer restricted visibility. Find out more at www.biotact.org.

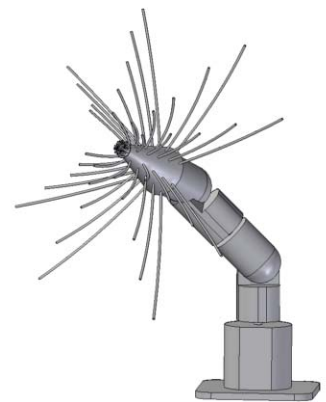


Image Credit: BIOTACT



Pulleys and Force

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

The "Pulleys and Force" lesson explores the concept of force and shows how pulleys are used in everyday life to make work easier.

Students learn about different uses for pulleys, the impact of multiple pulleys, and identify pulley use in school and their community. Students test the ability to move weights using one, two and three

pulleys in a series. They also work in teams to design a pulley system to require the least amount of force to move a weight.

Students learn that pulley systems are used in many machine designs and especially for moving and lifting very heavy equipment and goods. The elevator is an example of a pulley system designed to lift weights. Most elevators use counterweights which equal the weight of the elevator plus about 40% of the maximum weight it will carry.

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

The lesson is appropriate for students aged 8-11, and provides step-by-step instructions for both educators and teachers.

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



Plane Flies on Biofuel

Virgin Atlantic, one of the world's leading long-haul airlines, recently flew one of its Boeing 747 jumbo jets on biofuel from London Heathrow to Amsterdam -- becoming the first airline in the world to fly on renewable fuel. Together with partners Boeing, GE Aviation and Imperium Renewables, Virgin Atlantic is helping to pioneer renewable fuel sources for aviation. The biofuel was engineered from babassu oil and coconut oil — both are

environmentally and socially sustainable. They can both be found in everyday cosmetic products, such as lip balm and shaving cream, and do not compete with staple food sources. In addition, the babassu nuts and coconuts were harvested from existing, mature plantations. No modifications were made to either the aircraft or its engines to enable the flight to take place. In preparation for the flight, extensive laboratory and static-

engine testing was conducted on the ground to evaluate the energy and performance properties of the biofuel used in the flight. The Virgin Atlantic flight is the first step in a broader industry-wide initiative to commercialize alternative fuel sources for aviation and Virgin Atlantic will be sharing the results with those also seeking to cut their carbon emissions in the rest of the industry. More details are at www.virginatlantic.com.



Image Credit:
Virgin Atlantic Airways Ltd.



Lithium-ion Batteries for Cars

Daimler AG of Germany has achieved a crucial breakthrough in battery technology. The Stuttgart-based automaker is the first to have succeeded in adapting lithium-ion technology to the demanding requirements of auto applications. Until now, the technology has been used primarily in consumer electronics. The new battery will be used in the series-production S 400 BlueHYBRID beginning next year. This important technology was possible thanks to 25 patents held by Daimler.

The engineers' success is above all a result of the Daimler-developed

integration of the lithium-ion battery into the vehicle's climate control system. This ensures that the battery always works at optimal system temperatures of between 15 and 35°C, which in turn makes it possible for the battery to provide long service life and maximum performance.

The main advantages offered by the newly developed lithium-ion battery are its very compact dimensions and its far superior performance compared to conventional nickel-metal hydride batteries. The power density of the entire battery is 1,900 watts per liter (W/L).

What's more, the battery stands out by virtue of its high ampere-hour efficiency, long service life, and great reliability, even at very low temperatures. Its high level of safety is the equal of that provided by today's auto batteries.

Lithium-ion batteries are ideally suited for use in hybrid vehicles to help reducing fuel usage and thus also CO2 emissions. The Daimler engineers are also investigating to what degree this technology can be applied to other vehicle concepts, such as electric and fuel cell-powered cars. Find out more at www.daimler.com.



S 400 HYBRID
Image Credit: Daimler AG

Try Engineering with Power Up

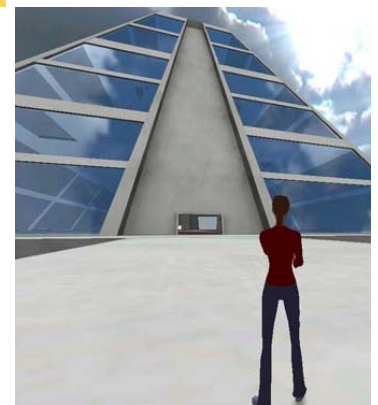
TryEngineering.org provides a link to PowerUp, a free, online, multiplayer game that allows students to experience the excitement and the diversity of modern engineering. While playing the game, students work together in teams to investigate the rich, 3D game environment and learn about the environmental disasters that threaten

the game world and its inhabitants.

Players interact with engineer characters to explore ways engineers design and build systems that harness renewable energy sources as alternatives to burning fossil fuels. Then, players take on the role of engineers, working together designing and building energy solutions to save the world.

A coordinating teacher's guide is available that provides background information and lesson plans that give students opportunities for more in-depth exploration of the engineering concepts addressed in gameplay.

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



Screen Image from Power Up.
Image Credit:
TryScience/New York Hall of Science



New Istanbul Satellite City

Istanbul is at such high risk for a devastating earthquake that engineers at Purdue University and the Republic of Turkey have come up with a bold new proposal: build a second city. It is likely an earthquake with a magnitude of 6.8 to 7.5 on the Richter scale would occur within the next three decades.

A second, satellite city would provide immediate refuge to inhabitants of the old city in the event of a catastrophic earthquake and soften

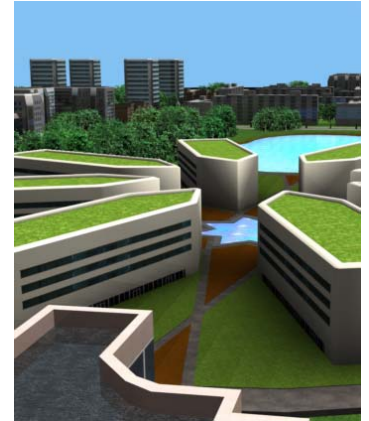
such an event's effects on the nation's economy.

With some cities around the world at risk from rising ocean waters caused by global climate change or from natural disasters, Mete Sozen, Purdue's Kettelhut Distinguished Professor of Civil Engineering, says building cities in new locations may become common in coming decades.

The new city would be earthquake resistant, with strong buildings and wide streets. The city

would be designed to take advantage of building techniques used to minimize earthquake damage and incorporate modern technologies such as electronic locks and security, video communication and environmentally friendly technologies. One of the most striking architectural features presented in the Purdue visualization is a cluster of earthquake-resistant buildings arranged in the shape of a star.

Find out more at <https://engineering.purdue.edu/CE/>.



A computerized visualization of a new satellite city of Istanbul features a cluster of buildings arranged to form a Selcuk star, a traditional Turkish symbol. Purdue researchers have worked with Turkish officials to plan a future city that would be earthquake resistant and offer refuge if a major earthquake hits Istanbul, which experts say is likely.
(Purdue image/Nicoletta Adamo-Villani)



TryEngineering Today!

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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:



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