



Career Cornerstone News

Volume IV, Issue VI

June, 2008



Career Cornerstone News is a Publication of the Sloan Career Cornerstone Center, the Premier Online Resource for Exploring Career Paths in Science, Technology, Engineering, Mathematics, Computing, and Healthcare.

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Flying Eye Hospital

ORBIS International, a nonprofit development organization dedicated to saving sight worldwide, is replacing its current DC-10 Flying Eye Hospital with a DC-10 Series 30 freighter. United Airlines, with the support of FedEx Corp., is donating the airplane to ORBIS. At the heart of ORBIS is the world's only Flying Eye Hospital -- an aircraft containing an innovative teaching facility and ophthalmic surgical center.

The ORBIS Flying Eye Hospital is flown across the globe by volunteer pilots from FedEx Express and United Airlines, and its international medical team conducts treatment and training programs.

Leading eye surgeons volunteer their time to perform surgery and teach aboard the aircraft. Since their first flight in 1982, ORBIS has carried out more than 900 sight-saving programs in 86 countries, and trained more than 195,000 ophthalmologists, nurses, biomedical engineers, and other healthcare workers.

A DC-10 Series 30 freighter that will be donated to ORBIS is about 10 years younger than ORBIS's current aircraft, and has a flying life of at least 20 years. The new ORBIS Flying Eye Hospital will be more efficient providing greater range, lower operating costs and better reliability. A team,



consisting of medical personnel, architects and engineers, has been assembled to determine the design and architectural modification necessary to convert the freighter into a state-of-the-art ophthalmic medical facility. The conversion of the plane is expected to take two years to complete.

Find out more at www.orbis.org. And, find out more about career paths in engineering and healthcare at www.careercornerstone.org.

NASA Student Research Program

The NASA Undergraduate Student Research Project, (www.epo.usra.edu/usrp), offers internship opportunities for undergraduate science and engineering students at all 10 NASA centers and additional partner facilities. These mentor-guided internships provide hands-on, real-life, career-related experiences that challenge, inspire, and provide practical application that complements and expands upon students' academic education. Three internship sessions are offered: a 15-week spring session, a 10-week summer session and

a 15-week autumn session. Eligible applicants must be classified as sophomores, juniors or seniors by the start of their internship. The students must be U.S. citizens with academic majors or course concentration in engineering, mathematics, computer science, or physical and life sciences. Most students work on practical problems that will see real applications in aerospace or on future NASA missions. Internships and Coops are excellent opportunities for



students to explore career paths, work with professionals in their fields, and network with other students with similar interests. Find out more at www.careercornerstone.org/coopsint.htm.

FDA Embarks on Major Hiring Initiative

Biologists, chemists, medical officers, mathematical statisticians and investigators are among the experts in demand as the U.S. Food and Drug Administration begins a multi-year hiring initiative. The U.S. Food and Drug Administration (FDA) is hiring hundreds of individuals with science and medical backgrounds to help meet the agency's responsibilities to assure the safety and/or efficacy of human and veterinary drugs, biological products, medical devices, food, cosmetics and products that emit radiation. Positions will be available throughout the agency, including in the Center for

Biologics Evaluation and Research, the Center for Drug Evaluation and Research, the Center for Devices and Radiological Health, the Center for Food Safety and Nutrition, and the Center for Veterinary Medicine. It takes a large pool of talented people for the FDA to protect and promote the public health," said John Dyer, FDA's Deputy Commissioner for Operations and Chief Operating Officer. "Each month there is a delay in bringing critical staff on board impairs the agency's ability to fulfill this mission."

In fiscal year 2008 alone, the FDA is looking to fill more than 600 new positions and to backfill over

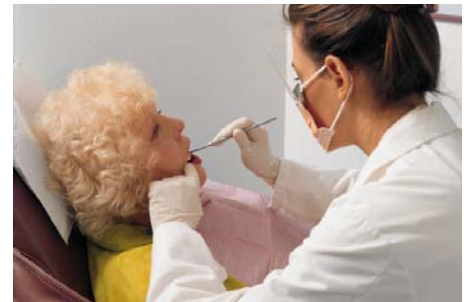


700 others to implement the FDA Amendments Act of 2007, the Food Protection Plan and the Import Safety Action Plan. That's nearly triple the number of people hired from 2005-2007. Details are at www.fda.gov/jobs/jobfairs08.html. More information about careers in these and other fields are at www.careercornerstone.org.

Degree Profile: Dental Hygienist

Dental hygienists remove soft and hard deposits from teeth, teach patients how to practice good oral hygiene, and provide other preventive dental care. They examine patients' teeth and gums, recording the presence of diseases or abnormalities. Dental hygienists use an assortment of different tools to complete their tasks. Hand and rotary instruments and ultrasonic devices are used to clean and polish teeth, including

removing calculus, stains, and plaque. Hygienists use digital and traditional x-ray machines to take and develop dental pictures. They may use models of teeth to explain oral hygiene, perform root planning as a periodontal therapy, or apply cavity-preventative agents such as fluorides and pit and fissure sealants. In some states, hygienists are licensed to administer local anesthetics using syringes. Some states also allow hygienists to place and carve filling materials, temporary fillings, and periodontal dressings; remove sutures; and smooth and polish metal restorations. Dental hygienists also help patients develop and maintain good oral health. Hygienists sometimes make a diagnosis and other times may prepare clinical and



laboratory diagnostic tests for the dentist to interpret. Hygienists sometimes work chair side with the dentist during treatment. Prospective dental hygienists must become licensed in the state in which they wish to practice. A degree from an accredited dental hygiene school is usually required along with licensure examinations. Most dental hygiene programs grant an associate degree.

Find out more about a career as a dental hygienist at www.careercornerstone.org.



High School Scientists Decode DNA Sequence

Opportunities for high school students to do research as part of a science class are -- sadly -- all too rare. Where such opportunities do exist, students often find themselves going through the motions of an experiment with a predetermined outcome.

Against this backdrop, imagine a project where students can work in a rapidly advancing field, doing original research, then publish their results and share them with the scientific community. About 300 New Jersey high school students had such an opportunity this year through the Waksman Institute at Rutgers University, which operates "HiGene: A Genome Sequencing Project for High Schools." With major funding from the National Science Foundation (NSF) through its Innovative Technology Experiences for Students and Teachers Program, students have been immersing themselves in a research project that draws on the fields of molecular biology and bioinformatics. Five of the students recently presented their findings to

an audience of scientists at the NSF. They described how they worked with bacteria that contained a fragment of a DNA copy of RNA from brine shrimp, purified the fragment, and performed a set of analyses to decode a DNA sequence that had never been seen before. They were able to compare their sequence to other DNA sequences and predict the functions of the genes. They then went on to publish their findings through the National Center for Biotechnology Information.

The Waksman Institute also hosts a Summer Institute where students can begin the DNA sequencing project; but unlike other summer science programs, the teachers of participating students must also attend. At the institute, both teachers and students gain



A high school student at work in the lab at part of an Innovative Technology Experiences for Students and Teachers (ITEST) project at Rutgers University.
Credit: Martin Nemeroff, Rutgers University

knowledge of molecular biology as well as bioinformatics -- a field that uses techniques such as applied mathematics and computer science to solve biological problems at the molecular level. Links to the Waksman summer institute and other summer opportunities for high school students are available on the Sloan Career Cornerstone Center website at www.careercornerstone.org/psumcamps.htm.

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Find out more at www.careercornerstone.org

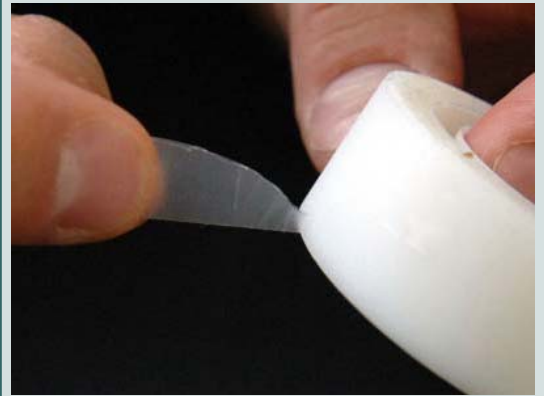
The Physics of Ripping

Frustrated by tape that won't peel off the roll in a straight line? Angry at wallpaper that refuses to tear neatly off the wall? A new study reveals why these efforts can be so aggravating. Wallpaper is not out to foil you--it's just obeying the laws of physics, according to a team of researchers from the Centre National de la Recherche Scientifique (CNRS) in Paris, the Universidad de Santiago, Chile, and MIT (www.mit.edu).

"You want to redecorate your bedroom, so you yank down the wallpaper. You wish that the flap would tear all the way down to the floor, but it comes together in a triangle and you have to start all over again," said Pedro Reis, one of the authors of the paper and an applied mathematics instructor at MIT. This pattern, where two cracks propagate toward each other and meet at a point, is

extremely robust. It applies not only to wallpaper but other adhesives such as tape, as well as nonadhesive plastic sheets such as the shrink-wrap that envelops compact discs. It even extends to fruit: The skin on a tomato or a grape typically forms a triangle when peeled off.

The team found that those ubiquitous triangular tears arise from interactions between three inherent properties of adhesive materials: elasticity (stiffness), adhesive energy (how strongly the adhesive sticks to a surface) and fracture energy (how tough it is to rip). The researchers developed a formulation that predicts the angle of the triangle formed, based on those three properties. They also figured out just how those triangular tears



Pedro Reis, an instructor in applied mathematics at MIT, and colleagues have reported the formulation and physics behind the pattern created by adhesive tearing. In this image, Reis demonstrates the way that adhesive tape tears in a triangular shape coming a point.
Photo / Donna Coveney

arise. As the strip is pulled, energy builds up in the fold that forms where the tape is peeling from the surface. The tape can release that energy in two ways: by unpeeling from its surface and by becoming narrower, both of which it does. Find out more about careers in physics at www.careercornerstone.org.

E-Prescribing Gains Momentum

Recently, five of the nation's leading physician groups announced the launch of a new program designed to help more physicians begin sending prescriptions to pharmacies electronically. Electronic prescribing, or "e-prescribing," replaces the need for handwritten, printed or faxed prescriptions and is seen as a more accurate and efficient means of prescribing medications. A new portal (www.GetRxConnected.com) has been developed where physicians can follow a step-by-step process designed to help them transition from paper-based prescribing to e-prescribing. In an effort to prevent medication errors, the Institute of Medicine has called for all prescriptions in the U.S. to be written and received electronically by 2010. [GetRxConnected.com](http://www.GetRxConnected.com) contains urgent information and guidance for an estimated 150,000 prescribers located throughout the U.S. that are currently using electronic medical record (EMR) and other clinical software to fax prescriptions to pharmacies. Computer-generated faxing of prescriptions not only prevents physicians from achieving the gains in practice efficiency and patient safety associated with e-prescribing, but starting on Jan. 1, 2009, all computer-generated prescriptions covered by the Medicare Part D program must be transmitted electronically and not via fax.

