



Career Cornerstone News

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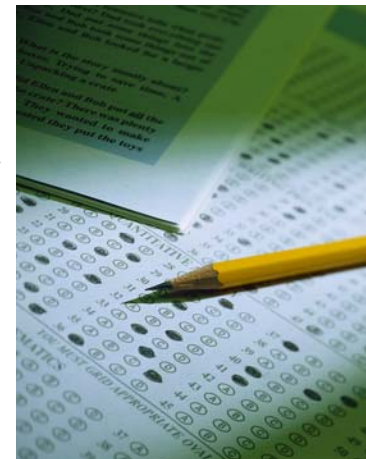
Students Succeed on AP Exams

More than 15 percent of the public high school class of 2007 achieved at least one AP Exam grade of 3 or higher -- the score that is predictive of college success, according to the College Board's recent "AP Report to the Nation." This achievement represents a significant and consistent improvement since the class of 2002 when less than 12 percent of public school graduates attained this goal.

Of the estimated 2.8 million students who graduated from U.S. public schools in 2007, almost 426,000 (15.2 percent) earned an AP Exam grade of at least a 3 on one or more AP Exams during their high school

tenure, the report documents. This is up from 14.7 percent in 2006 and 11.7 percent in 2002. Earning a 3 or higher on an AP Exam is one of "the very best predictors of college performance," with AP students earning higher college grades and graduating from college at higher rates than otherwise similar peers in control groups, according to recent reports from researchers at the University of California at Berkeley, the National Center for Educational Accountability, and the University of Texas at Austin.

The College Board's Advanced Placement Program enables students to pursue college-level studies while still in high



school. Thirty-seven courses in 22 subject areas are offered. Find out more about AP exams and other precollege ideas for those interested in science, technology, engineering, mathematics, computing, and healthcare at www.careercornerstone.org.

NOAA Satellites Help Rescue People

Armed with personal locator beacons to send a distress signal, 353 people were rescued in the United States and its surrounding waters in 2007 from potentially life-threatening emergencies. These signals were transmitted to rescue teams via a NOAA environmental satellite more commonly known for providing information to weather forecasters.

NOAA's polar-orbiting and geostationary satellites, along with Russia's Cospas spacecraft, are part of the high-tech, international Search and Rescue

Satellite-Aided Tracking System, called COSPAS-SARSAT. This system uses a network of satellites to quickly detect and locate distress signals from emergency beacons on board aircraft and boats and from handheld personal locator beacons (PLBs).

When a satellite pinpoints a distress location within the United States, or its surrounding waters, the information is relayed to SARSAT Mission Control at



NOAA's Satellite Operations Center in Suitland, MD, and then sent to a Rescue Coordination Center, operated either by the U.S. Air Force, for land rescues, or U.S. Coast Guard, for water rescues. More details are at www.sarsat.noaa.gov.

Microsoft Gives Students Access to Software

Microsoft Corporation Chairman Bill Gates recently unveiled a software giveaway that will ultimately provide millions of college and high school students around the world with access to the latest Microsoft developer and designer tools at no charge to unlock their creative potential and set them on the path to academic and career success.

The Microsoft DreamSpark student program makes available, at no charge, a broad range of development and design software for download. The program is now available to more than 35 million college students worldwide. Broad global coverage, as well as an

expansion of the program to high school students around the world, potentially reaching up to 1 billion students worldwide, will continue throughout the next year.

Microsoft DreamSpark is available to all students whose studies touch on technology, design, math, science and engineering. Students of today are more technical in their everyday lives than ever -- representing



both their personal interests and what is expected of them when they arrive in the workplace for the first time. The following software will be available to empower students to unlock their ingenuity by building critical skills: Microsoft developer tools, including Visual Studio; Microsoft designer tools, including Expression Studio; and Microsoft platform resources.

Find out more about Dreamspark at <http://channel8.msdn.com>.

Explore career paths in computer and software engineering at www.careercornerstone.org.

Degree Profile: Physical Therapist

Physical therapists provide services that help restore function, improve mobility, relieve pain, and prevent or limit permanent physical disabilities of patients suffering from injuries or disease. They restore, maintain, and promote overall fitness and health. Their patients include accident victims and individuals with disabling conditions such as low-back pain, arthritis, heart disease, fractures, head injuries, and cerebral palsy. Physical therapists examine



patients' medical histories and then test and measure the patients' strength, range of motion, balance and coordination, posture, muscle performance, respiration, and motor function. Next, they develop plans describing a treatment strategy and its anticipated outcome. Physical therapists also use electrical stimulation, hot packs or cold compresses, and ultrasound to relieve pain and reduce swelling. They may use traction or deep-tissue massage to relieve pain and improve circulation and flexibility. Therapists also teach patients to use assistive and adaptive devices, such as crutches, prostheses, and wheelchairs. They also may show patients how to do exercises at home to expedite their recovery.



Physical therapists need a master's degree from an accredited physical therapy program and a state license. Physical therapy assistants support the efforts of physical therapists and earn an associate degree from an accredited physical therapist assistant program. So there are several options if the field of physical therapy is of interest to you!

Find out more about careers in physical therapy at www.careercornerstone.org.

New Fabric May Power Your iPod

Nanotechnology researchers at the Georgia Institute of Technology are developing a shirt that harvests energy from the wearer's physical motion and converts it into electricity for powering small electronic devices worn by soldiers in the field, hikers, and other users.

The research, funded by the National Science Foundation (NSF), details how pairs of textile fibers covered with zinc oxide nanowires generate electricity in response to applied mechanical stress.

Known as "the piezoelectric effect," the resulting current flow from many fiber pairs woven into a shirt or jacket could allow the wearer's body movement to power a range of portable electronic devices. The fibers could also be woven into curtains, tents, or other structures to capture energy from wind motion, sound vibration, or other mechanical energy.

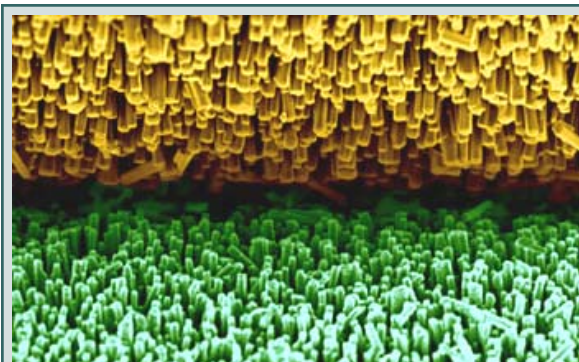
"The two fibers scrub together and the piezoelectric-semiconductor process converts the mechanical motion into electrical energy," says

Zhong Lin Wang, a Regents professor in the School of Materials Science and Engineering at the Georgia Institute of Technology. "Many of these devices could be put together to produce higher power output."

Wang and collaborators Xudong Wang and Yong Qin have made more than 200 of the fiber nanogenerators. Each is tested on an apparatus that uses a spring and wheel to move one fiber against the other. The fibers are rubbed together for up to 30 minutes to test their durability and power production.

The researchers have measured current of about four nanoamperes and output voltage of about four millivolts from a nanogenerator that included two fibers that were each one centimeter long.

With a much improved design,



A scanning electron microscopy image shows the piezoelectric zinc oxide nanowires. The two sets of nanowires meet teeth-to-teeth, allowing the gold-coated microfibers to scrub those not coated with gold to produce electricity via a coupled piezoelectric-semiconducting process. This is the fundamental concept of a "power shirt."

Credit: Image courtesy of Z.L. Wang and X.D. Wang, Georgia Institute of Technology

Wang estimates that a square meter of fabric made from the special fibers could theoretically generate as much as 80 milliwatts of power.

So far, there is only one wrinkle in the fabric, so to speak - washing it. Zinc oxide is sensitive to moisture, so in real shirts or jackets, the nanowires would have to be protected from the effects of the washing machine.

The Sloan Career Cornerstone Center Offers...

- Resources for Women
- Degree Summaries
- Careers Newsletter
- Pre-college Ideas
- Current Salary Data
- Employer Lists & Links
- University Lists & Links
- Association Support
- Career Path Options
- Science Centers
- Video Profiles
- Career Planning
- Job Hunting Tips
- Diversity Issues
- Summer Camps
- National Programs
- Podcasts, PDFs, and PowerPoints!



Find out more at www.careercornerstone.org

How Medical Physics Has Changed Healthcare

Many of the greatest inventions in modern medicine were developed by physicists who imported technologies such as X rays, nuclear magnetic resonance, ultrasound, particle accelerators and radioisotope tagging and detection techniques into the medical domain. There they became magnetic resonance imaging (MRI), computerized tomography (CT) scanning, nuclear medicine, positron emission tomography (PET) scanning, and various radiotherapy treatment methods. These contributions have revolutionized medical techniques for imaging the human body and treating disease.

Throughout 2008, the American Association of Physicists in Medicine (AAPM), is calling attention to the many ways in which medical physics has revolutionized medicine.

A few highlights include:

- **X rays:** Discovered in 1895, the application of these rays to medical imaging was recognized and embraced immediately.

- **Magnetic Resonance:** Just a few years after discovering the phenomenon of magnetic resonance, it took a few more decades before the discovery led to the development of MRI, which is routinely used today to image the human body.

- **Radioimmunoassays:** In 1977, the Nobel Prize in Physiology or Medicine was awarded Rosalyn Yalow for her development of radioimmunoassays, a sensitive diagnostic technique that can quantify tiny amounts of biological substances in the body using radioactively-labeled materials.



- **Computer-assisted Tomography:** In 1979, Allan M Cormack and Godfrey Newbold Hounsfield won the Nobel Prize in Physiology or Medicine for developing CT, which has revolutionized imaging because CT provides images with unprecedented clarity.

Find out more about careers in physics and medicine at www.careercornerstone.org.

Academic Degrees Demystified

For those considering a career in science, mathematics, engineering, technology, computing, or healthcare, it can sometimes be confusing to determine which degree will best prepare you for work in a particular field. For example, let's say you are interested in a career in electrical engineering. How do you decide if you want to earn a bachelor's degree in electrical engineering or a bachelor's or associate's degree in electrical engineering technology? And, you can also earn a master's degree in electrical engineering!

The differences between the variety of academic degrees can now be explored at the Sloan Career Cornerstone Center. A new site section demystifies the different degrees, and includes a look at the expectations and rewards of a range of degrees including Traditional Academic Degrees (Associate's, Bachelor's, Master's, and Research Doctorate Degrees), Professional Degrees, and special non-academic degree programs such as Postdoctoral Programs. Find out more at www.careercornerstone.org/degrees/acaddegrees.htm.

