



Career Cornerstone News

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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 Medicine.

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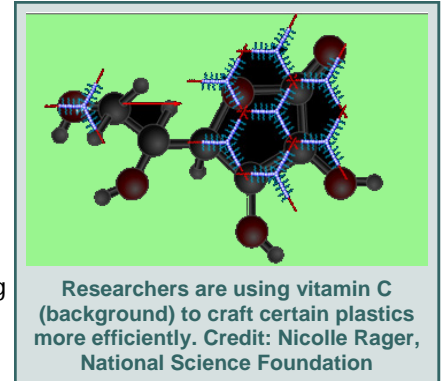
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Vitamin C is Good For Plastics Too

A new breakthrough that relies on common vitamin C is poised to dramatically improve how plastics are made by assembling molecular chains with less waste. Manufacturers tailor smaller molecules to meet specific needs by gluing them together into long, potentially complex polymers, or plastics. For some plastics, the small building-block molecules do not always stick together, so researchers have devised creative ways to coax certain chemicals into chains -- although with certain costs, such as added catalysts that become unwanted waste.

Researchers from Carnegie Mellon University in Pittsburgh, PA, have discovered that adding vitamin C, glucose, or other electron-absorbing agents to a powerful plastic manufacturing method can reduce the needed copper catalyst by 1000 times. Because the catalyst has to be removed from the end products, less of the metal means far less waste and drastically reduced costs.

The underlying production method is called "atom transfer radical polymerization" and allows manufacturers to join



Researchers are using vitamin C (background) to craft certain plastics more efficiently. Credit: Nicolle Rager, National Science Foundation

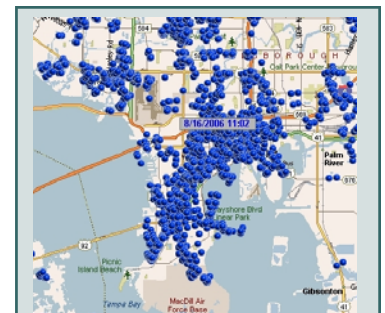
chemical building blocks that normally would repel each other. Mass manufacturing could become more affordable for a range of items such as advanced sensors, drug delivery systems, paint coatings, and video displays. Find out more at www.chem.cmu.edu/groups/maty/center.

Real-Time Traffic Routing

Engineers have developed a system for taking anonymous cell-phone location information and turning it into an illuminated traffic map that identifies congestion in real time. The system takes advantage of the steady stream of positioning cues -- untraced signals all cell phones produce, whether in use or not, as they seek towers with the strongest signals. It is the first traffic-solution technology that monitors patterns on rural roads

and city streets as easily as on highways.

Developed by IntelliOne (www.intellione.com), the TrafficAid system could not only help guide drivers around tie-ups, but also tell emergency responders where accidents are or how effectively an evacuation is unfolding by pinpointing clusters of cell phones. Creation and development of TrafficAid was supported in part by a grant from the National Science Foundation's



Blue dots represent all active mobile phones. Credit: IntelliOne Technologies

Small Business Innovation Research program, which directly supports businesses and their partners in academia.

Universities Compete in Solar Decathlon

The Solar Decathlon is a university competition in which engineering and architectural teams from participating schools design, construct, transport and erect completely sustainable solar homes and display them on the National Mall in Washington, D.C. Each entry is judged on ten criteria including style, innovation, and efficiency. Participating students strive to innovate, using high-tech materials and design elements in ingenious ways. Along the way, the students learn how to raise funds and communicate about team activities.

Sponsored by the U.S. Department of Energy, the Solar Decathlon is

also an event to which the public is invited to observe the powerful combination of solar energy, energy efficiency, and the best in home design.

The 20 teams selected for the competition will be awarded \$100,000 over two years to support the Solar Decathlon's research goal of reducing the cost of solar-powered homes and advancing solar technology.

Teams are judged in ten different categories, seven of which focus on energy efficiency; others include



Solar Home from 2005 Solar Decathlon.
Photo Credit: Stefano Paltera, Solar Decathlon

design and comfort of the house. The team with the most points -- the most energy-efficient and innovatively designed house -- wins. Find out more at www.eere.energy.gov/solar_decathlon.

Degree Profile: Engineering Technology

Engineering technologists use the principles and theories of science, engineering, and mathematics to solve technical problems in research and development, manufacturing, sales, construction, inspection, and maintenance.

Their work is more limited in scope and more practically oriented than that of scientists and engineers. Many engineering technologists assist engineers and scientists, especially in research and development. Others work in quality control -- inspecting products and processes, conducting tests, or collecting data.

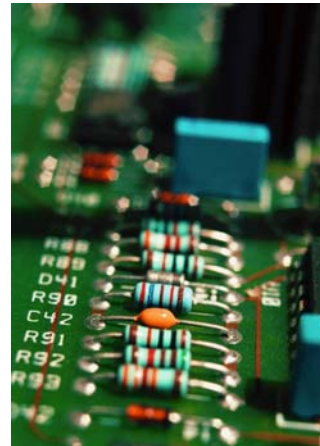


In manufacturing, they may assist in product design, development, or production.

Engineering technologists who work in research and development build or set up equipment, prepare and conduct experiments, collect data, calculate or record results, and help engineers or scientists in other ways, such as making prototype

versions of newly designed equipment. They also assist in design work, often using computer-aided design (CAD) equipment.

Most engineering technologists specialize in certain areas, learning



skills and working in the same disciplines as engineers.

Career options are broad for engineering technologists. After initial on the job experience, an engineering

technologist might choose to move away from more technical responsibilities and become more involved in management, sales, marketing, or other support areas.

Find out more about careers in engineering technology at www.careercornerstone.org/engtech/engtech.htm.

Public University Tuition Increases Slow

The College Board has announced that at four-year public colleges the increase in average tuition and fees slowed for the third year in a row, but prices are still up 35 percent from 5 years ago, after adjusting for inflation. The increase in average tuition and fees for two-year public colleges in 2006-07 was just slightly above the inflation rate. At all institutions, the net price -- the average price students pay after grants and tax benefits are considered -- is significantly lower than the published price. Total student aid increased by 3.7 percent to \$134.8 billion in 2005-06, but total federal grant aid failed to keep pace with inflation. Even without factoring in inflation, the average Pell Grant per recipient fell by \$120.

Published tuition and fee charges at four-year public colleges average \$5,836 in 2006-07. There was a \$344 increase over last year, which represents 6.3 percent, or 2.4

percent after adjusting for inflation. The average total tuition, fee, and room and board charges for in-state students at public institutions are \$12,796. After grant aid and tax benefits are considered, full-time students enrolled in public four-year colleges and universities pay on average about \$2,700 in net tuition and fees.

After declining or just keeping pace with inflation each year between 1996-97 and 2002-03, the average net price students pay at public four-year colleges has increased even more rapidly than published prices for the past four years because grant aid has not kept pace.

Published tuition and fee charges at four-year private colleges average \$22,218 in 2006-07. The \$1,238 increase over 2005-06 represents an increase of 5.9 percent, or 2 percent after adjusting for inflation. The average total tuition, fee, room, and board charges at private



four-year colleges and universities are \$30,367. Full-time students enrolled in private colleges and universities pay on average about \$13,200 in net tuition and fees after grant aid and tax benefits.

Find out more at www.collegeboard.com/prod_downloads/press/cost06/trends_college_pricing_06.pdf.

Organizations Contributing Content to the Sloan Career Cornerstone Center:

- American Chemical Society
- American Geological Institute
- American Institute of Chemical Engineers
- American Institute of Physics
- American Mathematical Society
- American Nuclear Society
- American Society of Civil Engineers
- American Statistical Association
- ASME
- IEEE
- JG Perpich, LLC
- Mathematical Association of America
- NASA
- Society for Industrial and Applied Mathematics
- The Minerals, Metals & Materials Society
- US Department of Labor, Bureau of Labor Statistics
- Whitaker Foundation



Find out more at www.careercornerstone.org

Internships = Higher Starting Salaries

Many new college graduates who have performed internships find that the experience pays off in terms of the starting salaries they are offered for full-time jobs, according to a report published by the National Association of Colleges and Employers (NACE).

Nearly half of the employers (46.2 percent) participating in NACE's recent Experiential Education survey said they offer higher starting salaries to new college hires who have internship experience. "Employers have told us consistently that they prize relevant work experience in job



candidates. This demonstrates that many organizations are willing to reward candidates who make the effort to gain that experience," says Marilyn Mackes, NACE executive director.

Among those offering higher starting salaries to candidates with internship experience, more than half reported that they have a set percentage that they add on top of their entry-level salaries. On average, they add 6.8 percent more to the position's entry-level salary.

Others reported that they add a set dollar amount to their entry-level salaries, or base the extra on the candidate's experience itself or on a combination of factors.

Internships and coops provide students with a great opportunity to gain real-world experience while still in school. In addition to giving students direct experience in the field they are considering,



interaction with others in the field can help provide perspective on career path options.

Many universities offer coop or internship programs. When selecting a university, find out what percentage of students participate in internships or coops. Ask how many companies participate, and see if you can talk with current undergraduates about their internship experiences.

More information about coops and internships is available at www.careercornerstone.org/coopsint.htm.

Mathematical Talent Search

The USA Mathematical Talent Search (USAMTS) is a mathematics competition open to all U.S. middle and high school students. Problems are published on the USAMTS (www.usamts.org) website four times a year. Problems range in difficulty from being within the reach of most high school students to challenging the best students in the nation. Students may use any materials -- books, calculators, and computers -- but all work must be their own. As opposed to most mathematics competitions, the USAMTS allows students a full month to work out their solutions. Carefully written justifications are required for each problem. This year's special topic is "expected value." The USAMTS is primarily funded by the National Security Agency (NSA), which has funded the program since 1992. Mathematicians at NSA also generously donate hundreds of hours to grade student submissions. Participation in the USAMTS is free.



Precollege programs and projects in science, technology, engineering, mathematics, medicine, or healthcare provide students with an opportunity to find out what it might be like to work in these fields. A broad list is at www.careercornerstone.org/pcproj.htm.