Career Cornerstone News

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New Scientific Visualizations

Science is full of famous visualizations that helped lead to new breakthroughs in how we understand complex concepts. In recent decades, researchers have used computers to build complex visualizations based on large data sets to gain a better perspective on their research. When a computer combines a map with the data from thousands of sensors measuring ocean currents and temperatures around the globe, for example, a collection of numbers can become a stunning visualization that helps us understand shifting climate patterns.

Programming a computer to produce these visualizations is not an easy task, however. And as the amount of data collected in our world grows, the challenge of organizing all that information into an accurate and cohesive picture becomes even more difficult. To simplify the process the University of Utah developed VisTrails, an NSF-supported suite of visualization tools that automatically manages the data, metadata and the data exploration process necessary to create visualizations. The result is a tool that lets
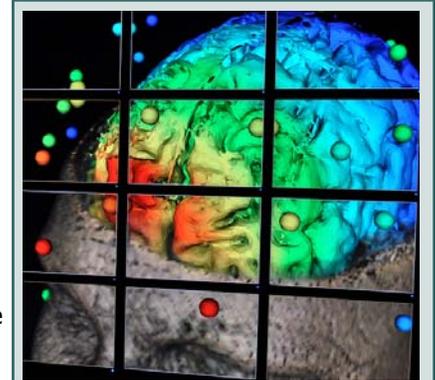
A visualization of the human brain using VisTrails.
Credit: Juliana Freire, University of Utah

researchers focus on the data sets and visualizations themselves, rather than the work needed to bring them together.
Find out more at www.vistrails.org.

The World's Water

"Is there such a thing as 'peak water'? There is a vast amount of water on the planet—but we are facing a crisis of running out of sustainably managed water," asks Dr. Peter Gleick, president of the Pacific Institute, who adds that "humans already appropriate over 50% of all renewable and accessible freshwater flows, and yet billions still lack the most basic water services." The most recent edition of "The World's Water," is a report release by the

Pacific Institute that examining global issues around use and misuse of our freshwater resources. The report includes a chart on "The Water Content of Things" - from potato chips to microchips. It is an eye-opener in terms of our own water footprints. The chart, with selected book chapters and data tables, is available online at www.worldwater.org. Key to the discussion of water today is the concept of "peak ecological water"— the critical point already reached in many areas,

where we overtax the planet's ability to absorb the consequences of our water use. A prime example is the water crisis in China, where water resources are over-allocated, inefficiently used, and grossly polluted by human and industrial wastes, with 300 million people lacking access to safe drinking water.

Salaries for College Interns Rise 5%

Employers expect to increase the pay they offer college students for internships, according to a new study conducted by the National Association of Colleges and Employers (NACE). Overall, employers taking part in the survey say they will offer bachelor's-degree-level interns an average hourly wage of $17.13—up 4.9 percent from the average they offered last year's interns. Interestingly, the increase in intern salaries is paired with a 21 percent decrease in the number of internship opportunities available.

"The increase in intern salaries may reflect a long-term strategy on the part of employers to

ensure their internship programs continue to attract top students," says Marilyn Mackes, NACE executive director.

Intern salaries are affected by the student's major and year of study as well as the location of the internship. Students in engineering and computer sciences earn the highest salaries on average.

The average hourly wage for engineering students is $18.26, while those studying computer sciences earn an average hourly wage of $17.20 as an intern. wage earned by 2007-08 interns.

Internships are just one way of gaining experience in a field.

Volunteering, or participating in university coop programs are other examples. Coops are frequently mandatory for engineering and some health programs and also provide excellent opportunities to work in a field while continuing studies. Find out more about internships and coops at www.careercornerstone.org/coopsint.htm.

Degree Profile: Medical Assistant

Medical assistants perform administrative and clinical tasks to keep the offices of physicians, podiatrists, chiropractors, and other health practitioners running smoothly. The duties of medical assistants vary from office to office, depending on the location and size of the practice and the practitioner's specialty. Ophthalmic medical assistants, optometric assistants, and podiatric medical assistants are examples of specialized medical assistants who have additional duties.

In small practices, medical assistants usually do many different kinds of tasks, handling both
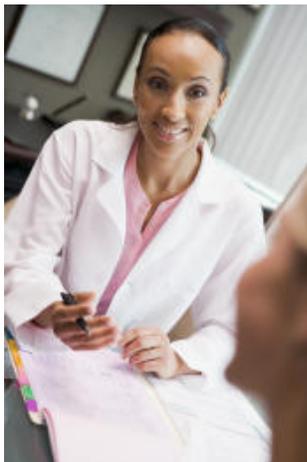
administrative and clinical duties and reporting directly to an office manager, physician, or other health practitioner. Those in large practices tend to specialize in a particular area, under the supervision of department administrators.

Some medical assistants are trained on the job, but many complete 1-year or 2-year programs. Postsecondary medical assisting programs usually last either 1 year and result in a certificate or diploma, or 2 years and result in an associate degree. Courses cover anatomy, physiology, and medical terminology, as well as typing, transcription,

recordkeeping, accounting, and insurance processing.

Employment of medical assistants is expected to grow 35 percent from 2006 to 2016, much faster than the average for all occupations. As the health care industry expands because of technological advances in medicine and the growth and aging of the population, there will be an increased need for all health care workers. Increasing use of medical assistants in the rapidly growing health care industry will further stimulate job growth.

More information about careers as a Medical Assistant and other Allied Health fields are at www.careercornerstone.org/alliedhealth/alliedhealth.htm.

Precollege Computer Gaming at Cornell U.

Computer games are fun and extremely cool. So, Cornell University computer science students are using games to attract public school students to computer science. Last fall, 25 nearby middle and high school students learned how to make their own games, picking up some new computer skills in the bargain, in a free after-school program on the Cornell campus.

Students met every Tuesday afternoon in a computer lab and often combined programming and pizza! A new session will be held in fall 2009, and there may be an advanced section for students from the first group.

The course was designed and taught by Cornell student members of the Game Design Initiative at Cornell (GDIAC). "We had several sixth-graders and up to a 12th-grader," said Chelsea Howe '09, who helped design the curriculum and became lead teacher. "The sixth-graders were some of our best programmers, and at the end had some of the best games." In

one of those games, called "Bob's Adventure," the protagonist is chased through Antarctica while fending off enemies by throwing fish at them.

In the after-school program, as in Cornell undergraduate courses in game design, games are developed by teams to pool skills in programming, music and art. Students in the program began with simple graphics programming, learned how to storyboard and moved on to working with a free program called Game Maker, chosen because it is "very visual and doesn't require programming experience," Howe said. At the end of the semester, students took home CDs with all the games created by the class.

The project is funded as an offshoot of a three-year National Science Foundation grant to Cornell computer science researchers to develop new databasing methods for -- among other applications -- computer games. Find out more about the Cornell Game Design

Initiative at www.cs.cornell.edu/ projects/game. The software used by the project, "Game Maker" is available in a limited form for free at www.yoyogames.com/ gamemaker/try.

Find out more about careers in computer science, computer engineering, and software engineering at www.careercornerstone.org.

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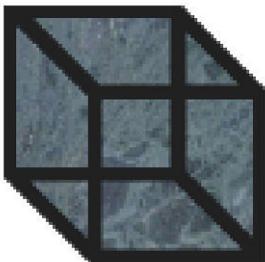
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New Rice Could Impact World Hunger

A new strain of flood-resistant rice currently being developed has the potential for making a huge impact on hunger for half of the world's population, which relies on rice as a food staple. With rising sea levels and more severe world weather patterns, flooding has become a major cause of crop failure for rice, which, although grown in flooded fields, can only stand complete submersion for an average of three days. In a very short matter of time, an entire crop could be completely destroyed.

To combat the threat that floods hold over crop viability, researchers have introduced a gene for flood resistance from a low-yield, noncommercial rice species into a popular and flavorful but flood-intolerant variety of rice, to create a plant that can withstand submergence for up to 17 days. Farmers who tested the new variety in flood-prone areas of India and Bangladesh were able to increase their crop yields threefold to fivefold, without sacrificing sought-after characteristics like taste.

The technique used -- precision breeding -- uses genomics and molecular biology to pinpoint desirable genetic traits before crossbreeding plants. In 1998 the National Plant Genome Initiative (NPGI) was established to study the genomes of plants to provide a foundation for rapid, fundamental, and novel insights into the means by which plants grow, reproduce, adapt to different and sometimes stressful environments, and help stabilize ecosystems.

Through NPGI-funded research and similar efforts, breakthroughs in precision breeding techniques like flood-resistant rice have been made possible.

the National Research Council released "Achievements of the National Plant Genome Initiative and New Horizons in Plant Biology," which examined the significant impact this initiative has made on plant sciences. The full report is available at http://dels.nas.edu/plant_genome/report.shtml

Find out more about careers in science and engineering at www.careercornerstone.org.

Worldwide Telescope on Your Computer!

To skim the surface of Mars, fly through the Andromeda galaxy, or peer down at a dark earth jeweled with the lights of its cities – all of that seems impossibly out of reach to the average person, not to mention scientists. But now it is possible, free, and easy with Microsoft's "WorldWide Telescope," a powerful piece of downloadable desktop software that allows people to quit simply staring at the night sky and instead zoom through it, visiting planets, constellations, even nearby galaxies. Since its release, nearly 2 million people around the world have downloaded the free desktop observatory. Worldwide Telescope also got a boost recently with the news that National Aeronautics and Space Administration (NASA) and Microsoft are developing technology that will make the most interesting NASA content — including high-resolution scientific images and data from Mars and the moon — explorable on WorldWide Telescope. Find out more at www.worldwidetelescope.org.