Sloan Career Cornerstone Center
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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 Healthcare.

Inside this issue:

Ocean Observatories Initiative	*1*
Researching Algae-based Fuels	*1*
Undergrad Research Experience and Mentoring	*2*
Degree Profile: Computer Science	*2*
Report Calls for 'New Biology' Initiative	*3*
Encouraging K-12 Engineering Ed Expansion	*4*
Students Design Car for the Blind	*4*

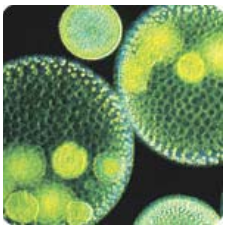
Ocean Observatories Initiative

The Ocean Observatories Initiative (OOI) is a new and transformative infrastructure project that will provide an expandable and adaptable network for observing complex ocean processes such as climate variability, ocean circulation, and ocean acidification across a range of spatial scales at several coastal, open-ocean, and seafloor locations. Continuous data flow from hundreds of sensors will be integrated by a sophisticated computing network and will be openly available to scientists, policy makers, students, and the public. The OOI is expected to transform ocean science research and education by providing unprecedented power and bandwidth for an interactive connection to the ocean through diverse sets of sensors, and near real-time access to data.

As OOI construction begins, a series of science community workshops will introduce ocean scientists and educators to the full scope of the OOI construction design, its core capabilities, the completion schedule, timing of data stream availability and data access, procedures for adding sensors and conducting experiments, and use of the OOI as a framework for advancing ocean research and education.

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

Researching Algae-based Fuels



Can algae someday make the fuel that fills the tanks of our cars and trucks? It's a question that could make a difference to our energy future and our environment. Scientists already know that certain algae produce oils that can be converted into diesel and other fuels. What we don't know is whether we can make affordable, large-scale quantities of algae fuel. That's why ExxonMobil has teamed up with Synthetic Genomics Inc., in a long-term project to research and develop next-generation biofuels from photosynthetic algae. The goal is to produce a commercially scalable, renewable fuel that is compatible with today's gasoline and diesel. Why algae? Biofuels made from algae could be transported and used like today's conventional fuels, therefore avoiding the expense of creating a new infrastructure. Algae-based biofuels also have potential environmental advantages. Algae absorb carbon dioxide -- the main greenhouse gas -- and convert it to useful products, like oils and oxygen. As a result, algae fuels could reduce greenhouse gas emissions. Also, while today' biofuels made from plants like corn and sugar cane are an expanding energy source, they impact global food supplies by requiring fertile land and fresh water. Algae production has no such requirement and could yield more than three times more biofuel per acre compared to other biofuel sources.

Undergrad Research Experience & Mentoring

Semiconductor Research Corporation and Intel Foundation are partnering on an innovative program that provides science and engineering undergraduates with valuable, hands-on research experience and mentoring. The Undergraduate Research Opportunities (URO) program, designed to stimulate and assist the next generation of technology leaders, supports hundreds of students each year at 14 university campuses nationwide. The SRC and Intel Foundation are seeking additional partners to expand the program over the coming year.

The URO program supports qualified undergraduates interested in physical science and engineering disciplines in advanced research projects, workshops and other resources that encourage and enable them to continue their education beyond a four-year degree. The program has awarded research fellowships to more than 1,000 students. More than 95 percent of participants stayed in science or engineering, nearly 60 percent of graduates from the program continued to graduate school in science or engineering and 62 percent of program participants were women and/or under-represented minorities. For more information about student support programs, visit www.careercornerstone.org/forstudents.htm.

Degree Profile: Computer Science

The rapid and widespread use of computers and information technology has generated a need for highly trained workers proficient in various job functions. These computer specialists include computer scientists, database administrators, and network systems and data communication analysts. Job tasks and occupational titles used to describe these workers evolve rapidly and continually, reflecting new areas of specialization or changes in technology, as well as the preferences and practices of employers.

Computer scientists work as theorists, researchers, or inventors. Their jobs are distinguished by the higher level of theoretical expertise and innovation they apply to complex problems and the creation or application of new technology. The areas of computer science research range from complex theory to hardware design to programming-language design. Some researchers work on multidisciplinary projects, such as developing and advancing uses of virtual reality, extending human-computer interaction, or designing robots. They may work on design teams with electrical engineers and other specialists.

Computer scientists and database administrators hold about 542,000 jobs in the U.S. Median annual earnings of computer and information scientists were $93,950 in the most recent data. And, according to a recent salary survey, computer science graduates were offered an average salary offer of $61,407. Entry level positions in the field typically require a four year bachelor-of-science degree.

According to the U.S. Department of Labor Statistics, computer scientists and database administrators are projected to be one of the fastest growing occupations over the next decade.

More information about a careers in computer science is at www.careercornerstone.org.

Report Calls for 'New Biology' Initiative

According to a recent report from the National Research Council, the emergence of "New Biology" -- where scientists and engineers from many disciplines collaborate on ways to take advantage of dramatic recent advances in biology, such as the ability to sequence entire genomes -- offers an opportunity to solve some of society's most pressing problems. The report recommends a National New Biology Initiative to accelerate such research and apply it to our greatest challenges.

The committee used the term "new biology" to describe an approach to research where physicists, chemists, computer scientists, engineers, mathematicians, and other scientists are integrated into the field of biology to create the type of research community that can tackle society's big problems. "'The new biologist' is not a scientist who knows a little bit about all disciplines, but a scientist with deep knowledge in one discipline and a 'working fluency' in several," the report says.

The report describes four broad challenges where the new initiative could accelerate the emergence of an integrated approach to biology and bear its "first fruits." For starters, it could meet food security challenges by developing the capacity to quickly adapt plants to any growing conditions. The initiative also could be used to address environmental issues by making it possible to monitor ecosystems and diagnose and repair ecosystem damage. On the energy front, the new biology initiative could speed the development of alternatives to fossil fuels by optimizing systems for turning plant cellulose into biofuel. A fourth goal should be to advance so-called personalized medicine by making it possible to monitor and treat a person's health in a manner that is tailored to that individual, the goal being to provide individually predictive surveillance and care.

The report says that by targeting society's major challenges, the initiative would provide an

opportunity to attract students who want to solve real-world problems to scientific fields. The initiative will need to devote resources to interdisciplinary education to support the training of new biologists, the report adds. The report, "A New Biology for the 21st Century: Ensuring the United States Leads the Coming Biology Revolution, " is online at www.nap.edu/catalog.php?record_id=12764.

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

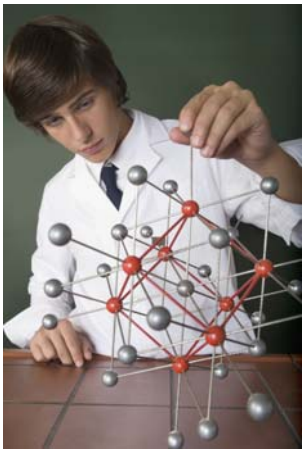
Sponsor the Sloan Career Cornerstone Center

The Sloan Career Cornerstone Center has a limited number of endowment and sponsorship opportunities for organizations, foundations, or corporations who wish to support those considering career paths in science, technology, engineering, mathematics, or healthcare.

More details on sponsorship: www.careercornerstone.org/sponsorship

Encouraging K-12 Engineering Ed Expansion

The introduction of K-12 engineering education has the potential to improve student learning and achievement in science and mathematics, increase awareness about what engineers do and of engineering as a potential career, and boost students' technological literacy, according to a recent report from the National Academy of Engineering and the National Research Council. The report examines the status and nature of efforts to teach engineering in U.S. schools. "The problem solving, systems thinking, and teamwork aspects of engineering can benefit all students, whether or not they ever pursue an engineering career," said Linda Katehi, chancellor of the University of California, Davis, and chair of the committee that wrote the report. "A K-12 education that does not include at least some exposure to engineering is a lost opportunity for students and for the nation."



Engineering education at the K-12 level should emphasize engineering design and a creative problem-solving process, the committee said. It should include relevant concepts in mathematics, science, and technology, as well as support the development of skills many believe essential for the 21st century, including systems thinking, collaboration, and communication. While science, technology, engineering, and mathematics instruction is collectively referred to as "STEM education," the report finds that the engineering component is often absent in policy discussions and in the classroom. In fact, engineering might be called the missing letter in STEM, the report says.

The Sloan Career Cornerstone Center offers many resources for precollege students wishing to explore STEM degrees and careers. These can be used by students, teachers, counselors, or home school facilitators. Find out more at www.careercornerstone.org/ /precolprep.htm.

Students Design Car for the Blind

A student team in the Virginia Tech College of Engineering is providing the blind with an opportunity many never thought possible: the opportunity to drive. A retrofitted four-wheel dirt buggy developed by the Blind Driver Challenge team from Virginia Tech uses laser range finders, an instant voice command interface and a host of other innovative, cutting-edge technology to guide blind drivers as they steer, brake, and accelerate. Although in the early testing stage, the National Federation of the Blind -- which spurred the project -- considers the vehicle a major breakthrough for independent living of the visually impaired. Sitting inside the vehicle, a blind driver can turn the steering wheel, stop and accelerate by following data from a computing unit that uses sensory information from the laser range finder serving as the 'eyes' of the driver, in addition to a combination of voice commands and a vibrating vest as guides. Explore career paths in engineering and healthcare at www.careercornerstone.org.

Mark Riccobono, executive director of the National Federation of the Blind's Jernigan Institute, drives the Virginia Tech Blind Driver Challenge vehicle through an obstacle course of traffic cones on a campus parking lot. In the passenger seat is Greg Jannaman, who led the student team.

Image Credit: Virginia Tech