



# Career Cornerstone News

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## NASA to Launch Five Missions in 2014

For the first time in more than a decade, five NASA Earth science missions will be launched into space in the same year, opening new and improved remote eyes to monitor our changing planet.

The five launches, including two to the International Space Station (ISS), are part of an active year for NASA Earth science researchers, who also will conduct airborne campaigns to the poles and hurricanes, develop advanced sensor technologies, and use satellite data and analytical tools to improve natural hazard and climate change.

NASA satellites, aircraft, and research help

scientists and others find answers to critical challenges facing our planet, including climate change, sea level rise, decreasing availability of fresh water, and extreme weather events.

Two Earth science missions will be sent to the International Space Station this year to measure ocean winds, clouds, and aerosols, marking NASA's first use of the orbiting laboratory as a 24/7 Earth-observing

platform. The new instruments are the first of a series that will observe Earth routinely from the orbiting laboratory.

Find out more about careers in many science areas at [www.careercornerstone.org](http://www.careercornerstone.org).



*The first new NASA Earth science mission of 2014 is the Global Precipitation Measurement (GPM) Core Observatory. Image Credit: NASA*

## Science and Engineering of the Olympic Winter Games 2014

The National Science Foundation has partnered with NBC Learn (the educational arm of NBC News) to release the "Science and Engineering of the 2014 Olympic Winter Games"-- the latest installment in the Emmy Award-winning "Science of Sports" series. This enlightening 10-part video collection, narrated by NBC Sports' Liam McHugh, delves into the physics, engineering, chemistry, design, and mathematics behind the world's foremost sporting event.

The segments feature a variety of sports stories, as told by some of the world's top athletes and record holders, along with perspectives and innovative research from leading NSF-supported engineers and scientists.



The series' diverse topics reveal how key engineering and science concepts and cutting-edge technology play an integral part in each athlete's respective sport and help maximize their performance at the 2014 Sochi Games. See [www.nsf.gov/news/special\\_reports/winterolympic](http://www.nsf.gov/news/special_reports/winterolympic) for more details.

## Team Identifies 13,000 Fish in 1 Glass of Water

A mere glass full of water from Monterey Bay Aquarium's 1.2 million-gallon Open Sea tank, among the 10 largest aquariums in the world, is all scientists really needed to identify the Pacific Bluefin tuna, dolphinfish and most of the other 13,000 fish swimming there. Researchers also for the first time used DNA from water samples to discern which of the species were most plentiful in the tank. Being able to determine the relative abundance of fish species in a body of water is the next step in possibly using modern DNA identification techniques to census fish in the open ocean, according to Ryan Kelly, University of Washington assistant professor of marine and environmental

affairs. Currently most scientists net, see or in other ways count fish to determine what species are present and in what proportions in marine environments.

The sea tank at Monterey Bay Aquarium was suggested because the inhabitants are known and could be compared to what the new technique revealed was present, giving the authors a way to judge the technique's accuracy. The researchers analyzed about two pint glasses worth of water in the course of their project and Ryan



said the DNA data of what's in the tank likely could have been revealed by an even smaller sample. The technique turned out to be so finely tuned that it also picked up DNA from fish that had been processed, transported and added to the tank as food.

Explore science career options at [www.careercornerstone.org](http://www.careercornerstone.org).

## Degree Profile: Geoscientist

Geoscientists study the composition, structure, and other physical aspects of the Earth, and the Earth's geologic past and present by using sophisticated instruments to analyze the composition of earth, rock, and water. Many geoscientists help to search for natural resources such as groundwater, minerals, metals, and petroleum. Others work closely with environmental and other scientists to preserve and clean up the environment.

Geoscientists use a wide variety of tools, both simple and complex. During a typical day in the field, they may use a hammer and chisel to collect rock samples and then use sophisticated ground-penetrating radar equipment to search for oil or minerals.

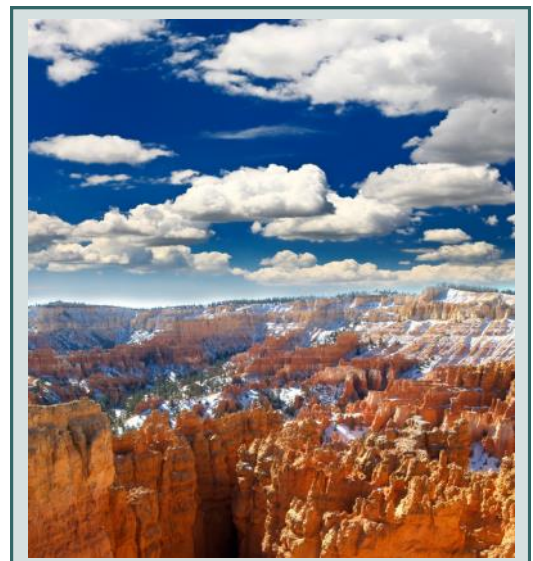
In laboratories, they may use x-ray and electron microscopes to determine the chemical and physical composition of rock

samples. They may also use remote sensing equipment to collect data and advanced geographic information systems (GIS) and modeling software to analyze data.

Most geoscientists split their time between working in the field, in laboratories, and in offices. For example, oceanographers may spend months at sea on a research ship, and researchers studying advanced topics may need to collaborate with top scientists around the world.

A bachelor's degree is adequate for a few entry-level positions, but most geoscientists and hydrologists need a master's degree, which is the preferred educational requirement for most research positions. The median annual wage for geoscientists was \$90,890 in May 2012.

Employment of geoscientists is



projected to grow 16 percent from 2012 to 2022, faster than the average for all occupations. The need for energy, environmental protection, and responsible land and resource management is projected to spur demand for geoscientists in the future.

Find out more about careers in the geosciences at [www.careercornerstone.org](http://www.careercornerstone.org).



## Students Experience Antarctic Science

Three high-school students and a teacher from Wisconsin will participate in a joint pilot program of the U.S. and Chilean Antarctic programs that will send them to a Chilean research station in February for hands-on experience with Antarctic environments and ecosystems research. The U.S. students and teacher, from the Monona Grove, Wisc., school district, will join their Chilean peers--winners of Chile's Antarctic School Fair--in the first Joint Antarctic School Expedition (JASE). The joint program is designed to strengthen the collaborative relationship between national Antarctic programs in the United States and the Republic of Chile. The National Science Foundation (NSF) and the Arctic Research Consortium of the United States (ARCUS) jointly selected the students from a pool of competitive applicants. They also selected a polar-experienced teacher to take part in the Antarctic School Expedition (Expedición Antártica Escolar 2014) to King George Island, Antarctica.

The U.S. and Chilean students and teachers will spend about a week at Profesor Julio Escudero Station

learning about Antarctic scientific research and exchanging cultural information. The joint program will offer the U.S. and Chilean students the opportunity to work with Antarctic scientists

and learn about subjects ranging from glaciology to ecology. The students also will give presentations about their own research, practice their language skills and visit research stations run by other countries on King George Island. The U.S. participants will share their Antarctic expedition experiences as well as their research with their classmates in Wisconsin and other schoolchildren nationwide. Plans are also being made for the group to speak with U.S. Embassy staff and students at an international school in Santiago, Chile as they

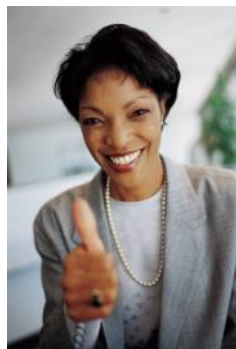


*Chilean students participate in the 2013 National Antarctic Institute's Antarctic School expedition on King George Island. Credit: Elias Barticevic, Chilean National Antarctic Institute*

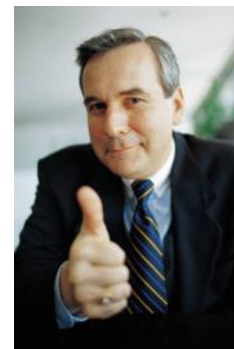
make their way home to the USA. The JASE program follows on the success of NSF's Joint Science Education Project (JSEP) held in Greenland during the boreal summer. Each year, JSEP brings together high school students and teachers from Denmark, Greenland and the United States for a three-week, science-education and cultural-exchange program.

Find out about other precollege programs and projects at [www.careercornerstone.org/pcprogproj.htm](http://www.careercornerstone.org/pcprogproj.htm).

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## Genomic Data for Alzheimer's Disease Available

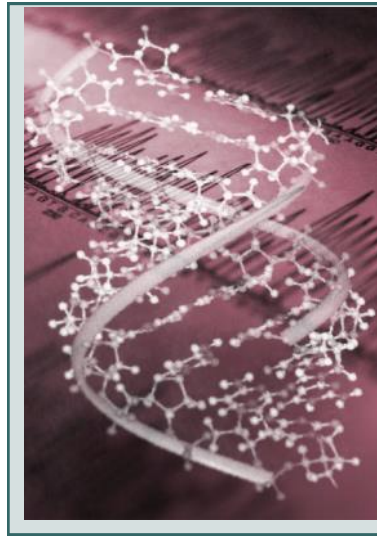
Researchers can now freely access the first batch of genome sequence data from the Alzheimer's Disease Sequencing Project (ADSP), the National Institutes of Health (NIH) recently announced. The ADSP is one of the first projects undertaken under an intensified national program of research to prevent or effectively treat Alzheimer's disease. The first data release includes whole genome sequence (WGS) data from 410 individuals in 89 families. WGS determines the order of all 3 billion letters in an individual's genome. The sequence data is available at dbGaP ([www.ncbi.nlm.nih.gov/gap](http://www.ncbi.nlm.nih.gov/gap)).

"Providing raw DNA sequence data to a wide range of researchers proves a powerful crowd-sourced way to find genomic changes that put us at increased risk for this devastating disease," said NIH Director Francis S. Collins. "The

ADSP is designed to identify genetic risks for late-onset of Alzheimer's disease, but it could also discover versions of genes that protect us. These insights could lead to a new era in prevention and treatment. "

As many as 5 million Americans 65 and older are estimated to have Alzheimer's disease, and that number is expected to grow significantly with the aging of the baby boom generation.

Genome sequencing – determining the order of chemical letters in a cell's DNA – is considered a key strategy to identifying new clues to



the fundamental cause of Alzheimer's disease and the development of new diagnostics and treatments. The clues come from differences in the order of DNA letters in Alzheimer's patients compared to control groups.

Find out how you can contribute to the cure for Alzheimers! Healthcare will

generate 3.2 million

new wage and salary jobs between 2008 and 2018, more than any other industry, largely in response to rapid growth in the elderly population. Explore career paths, degree options, salary forecasts for healthcare careers at [www.careercornerstone.org](http://www.careercornerstone.org).

## Engineering Dominates List of Top-Paid Majors

Seven of the 10 top-paid majors for Class of 2013 bachelor's degree graduates are engineering majors, according to a new report by the National Association of Colleges and Employers (NACE). "This isn't surprising since there is a great deal of competition among employers for engineering majors," says Marilyn Mackes, NACE executive director. NACE's January 2014 Salary Survey—the final report on starting salaries for the college Class of 2013—found that petroleum engineering once again is by far the highest-paid major for the Class of 2013. The January report shows that the average starting salary for petroleum engineering is nearly \$27,000 more than the average starting salary for computer engineering, which is the second highest-paid major for Class of 2013 graduates. Other engineering majors among the top 10 are chemical engineering, aerospace/aeronautical/astronautical engineering, mechanical engineering, electrical/electronics and communications engineering, and engineering technology. Meanwhile, computer science, management information systems/business, and logistics/materials management are the non-engineering majors whose average starting salaries were among the highest for Class of 2013 bachelor's degree graduates. Find out more about salary levels for hundreds of career paths at [www.careercornerstone.org](http://www.careercornerstone.org).

*Top-Paid Majors for Class of 2013 Bachelor's Degree Graduates*

Major	Average Starting Salary
Petroleum Engineering	\$97,000
Computer Engineering	\$70,900
Chemical Engineering	\$67,500
Computer Science	\$64,700
Aerospace/Aeronautical/Astronautical Engineering	\$64,500
Mechanical Engineering	\$64,500
Electrical/Electronics and Communications Engineering	\$63,000
Engineering Technology	\$61,500
Management Information Systems/Business	\$60,700
Logistics/Materials Management	\$59,800

Source: January 2014 *Salary Survey*, National Association of Colleges and Employers. All data are for bachelor's degree graduates.