



# 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, and Computing.**

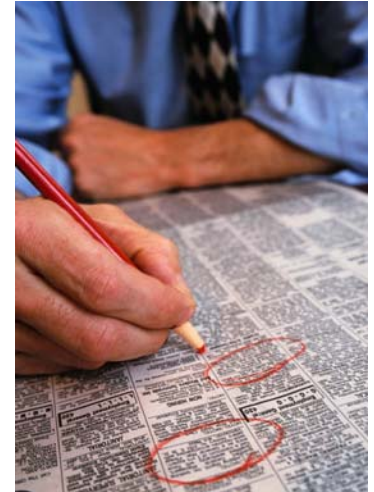
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## Engineering Heads Majors With Highest Average

In a job market that is seeing higher starting salary offers to new college graduates, engineering majors can expect to see the highest offers, on average, according to a report by the National Association of Colleges and Employers (NACE). Engineering majors garnered the four highest starting salary offers and five of the top-10 spots. In addition, seven of the top-10 majors with the highest starting salary offers saw increases in their offers over last year.

The following majors have the highest salaries paid to 2005-06 graduates (average salary offers are in parentheses):

1. Chemical engineering (\$55,900)
2. Computer engineering (\$54,877)
3. Electrical/electronics and communications engineering, (\$52,899)
4. Mechanical engineering (\$50,672)
5. Computer science (\$50,046)
6. Accounting (\$45,723)
7. Economics/finance, including banking (\$45,191)
8. Civil engineering (\$44,999)
9. Business administration/management (\$39,850)
10. Marketing/marketing management, including marketing research (\$36,260)



## College Admissions Trends

While the country's most selective colleges are admitting fewer candidates, a student's chance for admission to a four-year college is still overwhelmingly good, according to the National Association for College Admission Counseling's 2006 State of College Admission report. The report found that colleges and universities admit seven out of ten students who apply. Other trends noted in this year's report:

- A continued increase in applications to colleges and universities, fueled by increasing numbers of high school graduates
- A marked increase in Early Decision and Early Action applications after several years of decline
- Grades in rigorous courses, standardized admission test scores, and overall grade point averages continue to be the top factors considered by colleges in the admission decision.



Topics addressed in the report include high school graduation and college enrollment, applications to college, admission strategies, and financial aid.

The full report is available at [www.nacacnet.org](http://www.nacacnet.org).

## Career Cornerstone Offers PowerPoints

At the request of the many career counselors, educators, and other users of the Sloan Career Cornerstone Center, PowerPoint presentations have been developed to summarize every degree field profiled on the site.

The presentations may be downloaded and used by anyone wishing to share career planning advice with students, graduates, or others interested in exploring the varied career paths which lead from degrees in science, technology, engineering,

mathematics, and computing.

New PowerPoint presentations are also in the works to focus on issues such as diversity, the importance of accreditation, paths for women, precollege preparation, and coop and internship planning.

The new PowerPoints are available under each degree page, and also in the "Downloads and



Links" page at [www.careercornerstone.org](http://www.careercornerstone.org).

## Degree Profile: Chemical Engineering

Chemical engineers work in manufacturing, pharmaceuticals, healthcare, design and construction, pulp and paper, petrochemicals, food processing, specialty chemicals, polymers, biotechnology, and environmental health and safety industries, among others.

Within these industries, chemical engineers rely on their knowledge of mathematics and science, particularly chemistry, to overcome technical problems safely and economically. And, of

course, they draw upon and apply their engineering knowledge to solve any technical challenges they encounter. Don't make the mistake of thinking that chemical engineers only make things, though. Their expertise is also applied in the area of law, education, publishing, finance, and medicine, as well as many other fields that require technical training.

Specifically, chemical engineers improve food processing techniques, and methods of producing fertilizers, to increase the quantity and quality of available food. They also construct the synthetic fibers that make our clothes more comfortable and water resistant; they develop methods to mass-produce drugs, making them more affordable; and they create safer, more efficient methods of refining petroleum products, making energy and chemical sources more



productive and cost effective. They also develop solutions to environmental problems, such as pollution control and remediation. And yes, they process chemicals, which are used to make or improve just about everything you see around you.

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



## Student Challenge: Build a Steel Bridge

Almost 500 students from 45 U.S., Mexican and Canadian colleges and universities gathered in May to build strong, lightweight, scale-model bridges as the University of Utah hosted the 15th Annual National Student Steel Bridge Competition. More than 400 universities with civil engineering programs participated in regional competitions to qualify for the national contest.

"It's an opportunity for them to carry out a civil engineering task from inception to construction," says Pedro Romero, the competition's faculty advisor and an assistant professor of civil engineering at the University of Utah. "They learn teamwork, project scheduling, design, construction – all skills they

will need when they join the engineering profession." The national contest is sponsored by the American Society of Civil Engineers and the American Institute of Steel Construction.

Students were challenged to design and construct a scale-model steel bridge approximately 20 feet long and 4 feet wide following instructions that specify the bridge height, span length between supports, and the size of each piece used to make the bridge. During the competition, teams of five students were timed while they assembled their bridges. Once assembled, each bridge was loaded with steel weights totaling 2,500 pounds, and judges measured how much the bridge deformed. Bridges scored



more points the faster they were assembled, the lighter their weight, and the less they deformed under the 2,500-pound load. The bridge with the most points won!

For more information, visit [www.steelbridge2006.com](http://www.steelbridge2006.com).

## 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
- 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](http://www.careercornerstone.org)*

## A Bugs' Eye View

Using the eyes of insects such as dragonflies and houseflies as models, a team of bioengineers at University of California, Berkeley, has created a series of artificial compound eyes. These eyes can eventually be used as cameras or sensory detectors to capture visual or chemical information from a wider field of vision than previously possible, even with the best fish-eye lens, said Luke P. Lee, the team's principal investigator.

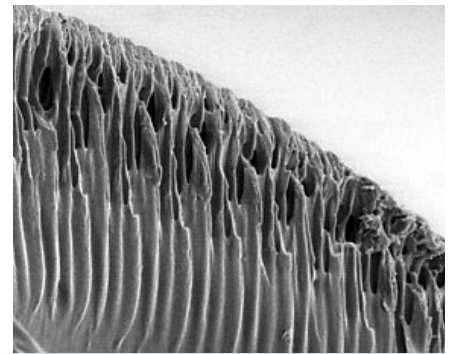
Potential applications include surveillance; high-speed motion detection; environmental sensing; medical procedures, such as endoscopies and image-guided surgeries, that require cameras; and a number of clinical treatments that can be controlled by implanted light delivery devices.

"I've always wanted to create an advanced, three-dimensional optical system," Lee said, "but conventional microfabrication technology is two-dimensional. So,

I started thinking about basing a fabrication system on the developmental stages of insect eyes that I'd learned about as a biophysicist and bioengineer."

What he and his team came up with is a low-cost, easy-to-replicate method of creating pinhead-sized polymer resin domes spiked with thousands of light-guiding channels, each topped with its own lens. Not only are these units packed together in the same hexagonal, honeycomb pattern as in an insect's compound eye, but each is also remarkably similar in size, design, shape, and function to an ommatidium, the individual sensory unit of a compound eye.

Just like pins in a pincushion - or a dragonfly's 30,000 ommatidia - the team's artificial ommatidia are each oriented at a slightly different angle. The lenses and waveguides of the artificial eyes focus and conduct light in the same way as an insect's eye.



The artificial compound eye (above) created by Luke P. Lee and his team is similar in size, shape and structure to an insect's compound eye (below), both seen in cross-section. (Photos by Luke Lee [top] and Birgit Greiner [bottom]; both courtesy Science magazine)



Find out careers in bioengineering at [www.careercornerstone.org](http://www.careercornerstone.org).

## For a Bigger Computer Hard-drive, Add H<sub>2</sub>O

Imagine having computer memory so dense that a cubic centimeter contains 12.8 million gigabytes (GB) of information. Imagine an iPod playing music for 100 millennia without repeating a single song or a USB thumb-drive with room for 32.6 million full-length DVD movies. Now imagine if this could be achieved by combining a computing principle that was popular in the 1960s, a glass of water and wire three-billionths of a meter wide. Science fiction? Not exactly.

Ferroelectric materials possess spontaneous and reversible electric dipole moments. Until recently, it was a technological challenge to stabilize ferroelectricity on the nano-scale. However Dr. Jonathan Spanier from Drexel University and his research colleagues and the University of Pennsylvania have proposed a new and slightly unusual mechanism stabilizing the ferroelectricity in nano-scaled materials: surrounding the charged material with fragments of water. If commercialized, ferroelectric memory of this sort could find its way into home computers, rendering traditional hard-drives obsolete. For more information, visit [www.ece.drexel.edu/mml](http://www.ece.drexel.edu/mml).

