



Pre-Engineering Newsletter

March/April 2010

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Previous Pre-Engineering Newsletters can be accessed at <http://www.kent-school.edu/academics/preEngineering.cfm>



Higher Education

Stanford Seeks To Create "New Type Of Engineer."

The [San Francisco Chronicle](#) (3/22, Wildermuth) reports, "Stanford is training a new type of engineer for a fast-changing world and James Plummer wants to get the word out that students needn't be a total techie to apply." Plummer, dean of Stanford's School of Engineering, said, "We're looking for kids who think of the world in terms of finding solutions to big problems, like global warming, international development, the environment." While it "has advantages when recruiting the kind of students Stanford wants," the strategy "has also brought the engineering school some grief, both from the professional group that accredits it [ABET] and from the employers who hire the graduates." The Chronicle describes the effort's potential benefits and shortcomings. "An important part of Plummer's job involves selling his program to students who may never have realized they wanted to be engineers."

Engineering and Public Policy

New Coalition Launches Campaign to Increase Federal Funding for STEM Education.

[Roll Call](#) (3/15, Murray) reports that the new Science, Technology, Engineering and Mathematics Education Coalition "launched a

Kent School Robotics: Year Two

Under the persistent guidance and direction of Mr. Austin, the robotics team at Kent, in its second year, has increased in competence and membership and has quadrupled the number of machines and tools used.

Regional FIRST Robotics Competition 2010: Team 2785

"The FIRST Robotics Competition (FRC) is an exciting program that assimilates teams, sponsors, colleges and technical professionals with high school students to develop their solution to a prescribed engineering challenge in a competitive game environment. This year the game was essentially a soccer game called "Breakaway" played in a 27-foot by 54-foot carpeted area, partitioned into three sections, bounded by two alliance walls and a guardrail system. The teams built robots capable of scoring, going through tunnels to access the other sections of the field, or navigating over intimidating field bumps that are 1 1/2 inches high and 12 inches wide at the top. The teams compete repeatedly in alliances of three randomly assigned teams".

Kent school and 48 other teams of high school students went head to head at the Long Island Regional FIRST Robotics Competition held at Hofstra University. Among Kent School's supporters were parents and alumni (Mr. Charles S. Morehouse '75 and two members of last year's Robotics Team: Pakorn Srimongkol (Mint)'09 and Andrew Chan '09)

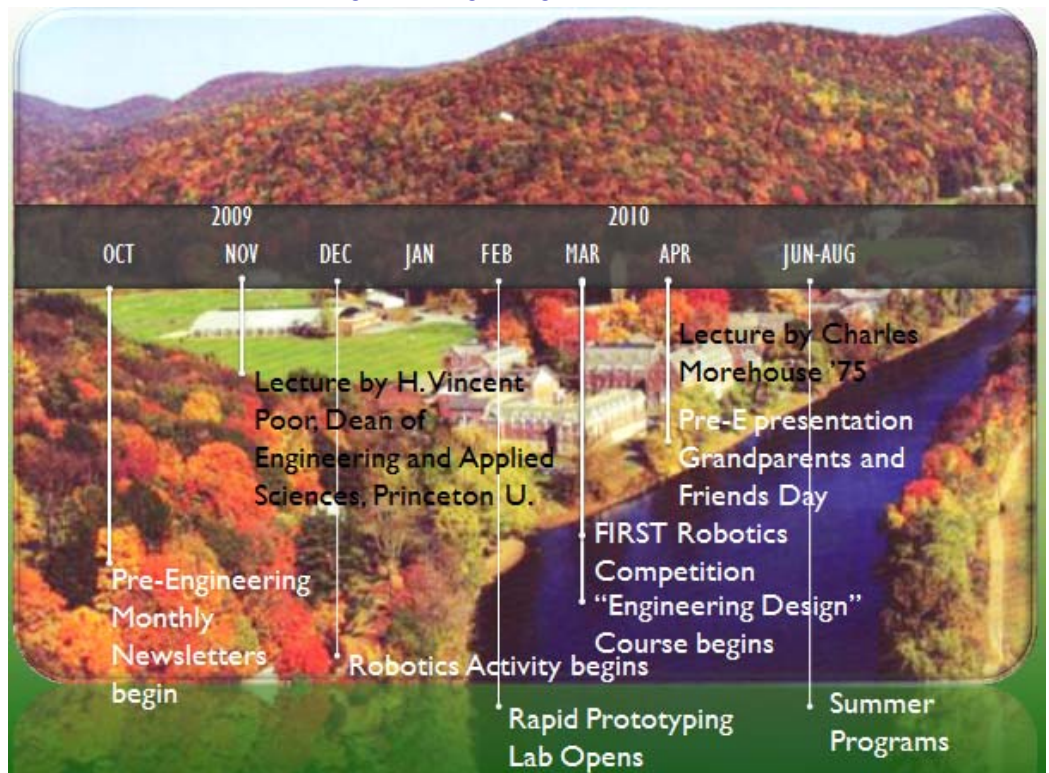
After six weeks spent on design and fabrication to build a compliant robot, and, just before the practice rounds and 11 competition matches scheduled throughout March 25-27th, the teams had to fully understand the rules of the game, set up a pit, go through registration, keep abreast of updated information and deadlines, be evaluated for safety and pass a robust robot inspection that included FMS communication, pneumatic, electrical, and mechanical systems. Kent School robot #2785, seen in the picture in scoring position, scored many points and met unexpected challenges against fierce and aggressive robots.



Second Pre-Engineering Lecture of the year

We are honored that Mr. Charles S. Morehouse '75 will be giving a lecture on April 6th from 2:35-3:30 PM (right after H block classes) in the Science Auditorium. Mr. Morehouse has been involved with FIRST for 13 years, both as a local sponsor, technical mentor, and member of the NJ regional committee. Mr. Morehouse is the owner of Morehouse Engineering. He was the 2008 Engineer of the Year for the Professional Engineers Society of Mercer County.

Kent Pre-Engineering Program 09-10 at a Glance



Engineers should lead the way in reforming K-12 education*

With last September's National Academy of Engineering-National Research Council report on K-12 engineering education and the White House emphasis on science, technology, engineering, and math (STEM), we as a profession are well positioned to make an impact on education reform. Many believe that engineering in the K-12 grades can effectively integrate not only science, math, and technology but also language arts, social studies, and the arts. As the NAE report states, engineering "habits of mind" - systems thinking, creativity, optimism, collaboration, communication, and ethical considerations - make up a basic 21st-century skill set for an informed citizenry. Never has the climate been so conducive for engineers, and engineering organizations such as ASEE, to lead a fundamental paradigm shift in education by deliberately, intently, and systematically implementing engineering design in K-12.

There are opposing views on whether the goal should be better-prepared future engineering students or an increase in the technological literacy of the population in general. It doesn't matter. The number of students - any students - who plan to pursue engineering is dropping, retention rates of engineering students remain stubbornly low, and the diversity of our profession has changed little in the past quarter century. The idea is not that every student in K-12 will become an engineer, but rather that exposure early and often to engineering will not only increase technological literacy but also provide students the tools to make an informed choice about engineering as a career.

Defining engineering in K-12 is best begun by defining what it is not. K-12 engineering is not technology education, reformatted to fit a STEM-focused world. It is not applied math and-or science. It is, rather, a logical and systematic approach to problem solving. It is designing under constraints and cultivating the ability to apply concepts. It is failure and the ability to weigh results against limits and make an informed decision. It is big picture and hands-on, with consideration given to impact. It is engaging, collaborative, and fun. ...

"by Elizabeth Parry" (Published in PRIZM (ASEE publication) Feb 2010) director of the K-16 Partnership Development program at the North Carolina State University College of Engineering.

America Falling Further Behind in STEM Education



America is no longer a nation at risk, rather it is a "nation falling further behind," in science and engineering education said Rick Stephens, Senior Vice President of Human Resources and Administration at The Boeing Company. In recent testimony before the House Science and Technology Subcommittee on Research and Science Education, Stephens highlighted the challenges facing the U.S. defense industrial base as it seeks to replenish the workforce with tens of thousands of engineers in the very near future. "These are becoming difficult jobs to fill, not because there is a labor shortage but because there is a skills shortage," Stephens said. "Our industry needs more innovative young scientists, technologists, engineers, and mathematicians to replace baby boomers as they retire."

Testifying on behalf of the Aerospace Industries Association, Stephens outlined proposals for Congress to strengthen undergraduate and graduate education in the STEM fields. Among these are encouraging and expanding retention programs for undergrads, addressing the critical shortage of well-qualified primary and secondary teachers in STEM disciplines and motivating pursuit of STEM careers through enhanced support of programs that provide hands-on experience that is directly transferable to the workplace. Stephens chairs the AIA Workforce Steering Committee, which is actively examining ways that the aerospace industry can strategically address STEM education, including coordination of STEM efforts within the industry, as well as coordinating with other industries such as information technology and health. "If we in the United States hope to retain our nation's leadership in science, technology, and innovation, we must immediately address the looming STEM skills gap," Stephens concluded. Stephens' full testimony can be viewed [online](#).

Source: Triangle Coalition Electronic Bulletin, February 18, 2010 - Volume 16, Number 7, [Online Version](#)

RECOMMENDATION #4 of the National Academy of Engineering report, Engineering in K-12 Education

The American Society of Engineering Education (ASEE), through its Division of K-12 and Pre-College Education, should begin a national dialogue on preparing K-12 engineering teachers to address the very different needs and circumstances of elementary and secondary teachers and the pros and cons of establishing a formal credentialing process. Participants in the dialogue should include leaders in K-12 teacher education in mathematics, science, and technology; schools of education and engineering; state departments of education; teacher licensing and certification groups; and STEM program accreditors. ASEE should consult with the National Center for Engineering and Technology Education, which has conducted research on this topic.

Feel free to contact me if you need more information.

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Kent School

lobbying campaign late last week to press lawmakers for more federal dough for math and science education programs." The coalition, comprised mainly of business groups, "has set a national goal of producing 400,000 science, technology, engineering and mathematics university graduates by 2020 - double today's yield." During a kick-off event at the National Academy of Sciences last week, organizer Rick Stephens said, "We are intent on finding out what programs work...bringing those to the table and sharing those with the rest of the coalition members."

Workforce

Engineering Majors Dominate List Of Highest Starting Salaries

[Inside Higher Ed](#) (3/15) reports, "The National Association of Colleges and Employers has released [its latest survey](#) on the majors that yielded the highest starting salaries. Eight of the top 10 are in engineering, with the non-engineering majors being computer science and information sciences." The highest starting salary on the list belongs to petroleum engineering (\$86,220).

Systems Engineer Tops Best Job List in US

Chris Matyszczyk wrote in his "Technically Incorrect" blog at [CNET](#) (3/14) about a Focus.com survey that "has declared that systems engineer is the best job in America." The survey examined "more than 7,000 jobs." For the top 50 jobs, the site "surveyed 35,000 workers and asked them to rate their current employment on a variety of factors that might be described as 'quality of life.'" The top 50 were then placed in order, according to long-term growth, pay, security, projected openings, and other human factors." To pick the top 10, Focus.com "spoke to industry experts and people who actually held down these lucky, lucky job titles." After system engineering, second place was physician assistant, followed by college professor, nurse practitioner, and IT project manager.

Research and Development

Engineering Students NEW Website

The [new K-12 website](#), eGFI, presented by ASEE and its partners, is stated to be "the best resource available for students and teachers to learn about engineering". The website is receiving a lot of traffic and contains the engineering students that are profiled on the student blog: <http://students.egfi-k12.org/category/meet-more-students/>.

First Bell from ASEE is a service to the engineering & technology education community.