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Engineers' Forum

Volume 29 No. 3 August 2009

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Editor-in-Chief

Julia Alspaugh

Managing Editor

Sumedha Mohan

Layout and Design

Darius Emrani, Michael Miracle

Business Manager

Alex Horner

Webmaster

Sarah Hendon

Copy Editor

Laura Dicker

Writers

Julia Alspaugh, Darius Emrani,
Christina Kazmer, Valeriy Vislobokov,

Special Contributor

Bailee Roach

Editorial Adviser

Lynn Nystrom

Director of News and External Relations for
the College of Engineering

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223 Femoyer Hall Virginia Tech

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Email: forum@vt.edu

URL: <http://www.ef.org.vt.edu/>

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FROM THE EDITOR

Dear Readers,

Welcome (back) to campus! I hope your summers were relaxing and/or productive.

As the new Editor-in-Chief of the Engineers' Forum, I am proud to offer you this gem of an issue. My goal this year as Editor-in-Chief is to produce for you, our faithful readers, the most interesting and useful magazines possible. In this issue you will find articles on a wide variety of topics, including information on the new nuclear and biomedical engineering programs offered by Tech, an article on communication on campus, a review of the forthcoming Windows 7 operating system, a look at tablet PC use over the past four years, advice on whether the FE/Pe exam is for you... and more, so you'll just have to keep reading!

On the business side of things, the Engineers' Forum is proud to be able to offer scholarships to our officers and payment to our members, starting this fall (see the February 2009 issue for details on our endowment to the College)! If you've ever thought about joining the EF, now's the time!

In closing, I would like to reinforce my statement that the goal of this magazine is to inform and entertain you. Therefore, if you have any feedback, questions, articles you'd like to see, or ideas of how the Forum could be improved, please do not hesitate to email us at forum@vt.edu.

Good luck at Expo and have a great semester. Go Hokies!

Julia Alspaugh



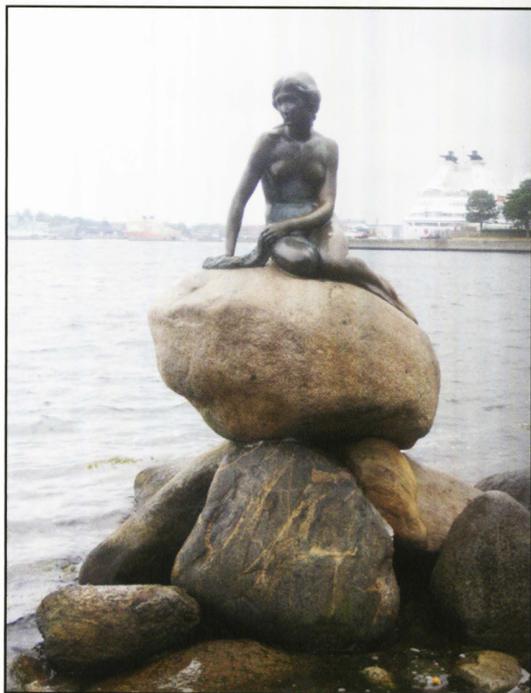
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Photo cover courtesy of Quin Costin.

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VT Nuclear Engineering Program Going Strong

With an educational institution as vast, populated, and academically diverse as Virginia Tech, it's often difficult to keep up with every single opportunity that's offered. As such, Engineers' Forum is taking the initiative to inform and update readers on one of the lesser advertised programs here at Virginia Tech: Nuclear Engineering.

For some history on the subject, the Nuclear Engineering program had been established at VT for some time until the nuclear incident at the power plant at Three Mile Island in 1979 put nuclear power in public disfavor. After that, schools around the country started dropping their respective programs one by one until less than half remained. As for the power plants, absolutely no new ones have been constructed since the Three Mile Island catastrophe.

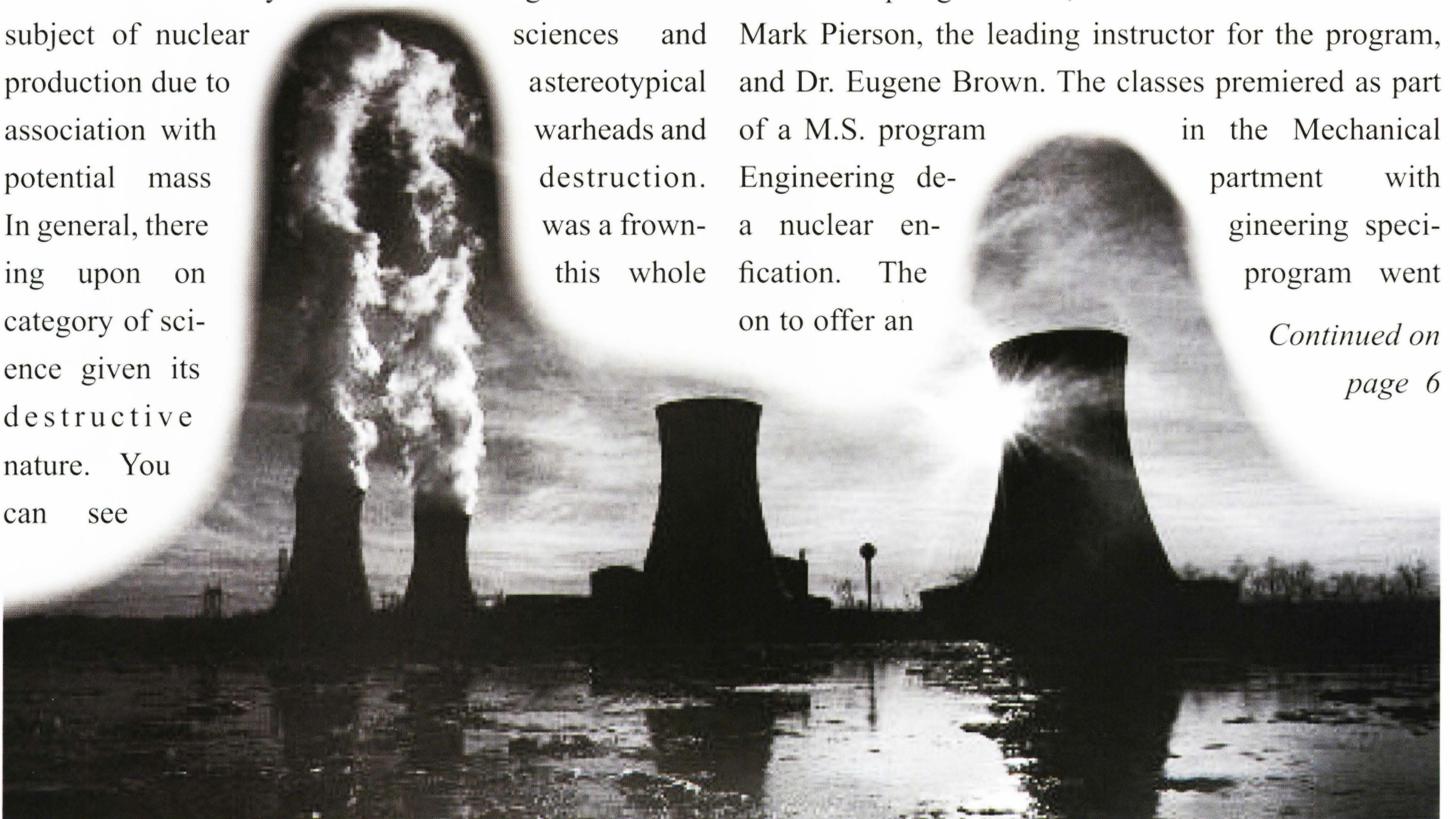
By this period in time, the public had also developed a biased view on anything related to the subject of nuclear production due to association with potential mass destruction. In general, there is a frown upon this whole category of science given its destructive nature. You can see

this for yourself: when you hear of the word "nuclear," chances are that the first thing you think of is danger, Hiroshima, those circular radiation symbols, the Cuban Missile Crisis, and the numerous power plant accidents, which include Three Mile Island and Chernobyl (1986).

Jumping forward to 2008, with an increasingly destabilized energy crisis and an economic recession putting a strain on the pocketbooks of most Americans, nuclear energy, one of the world's cheapest energy sources, is making a comeback given its new appeal and rather tame recent history. With 45% of the nuclear engineering workforce eligible for retirement in the next five years due to a lack of instruction nationwide, brand new and renewed graduate level and undergraduate programs are popping up around the country.

At Virginia Tech, the nuclear engineering program kicked started in spring of 2008, thanks to the efforts of Dr. Mark Pierson, the leading instructor for the program, and Dr. Eugene Brown. The classes premiered as part of a M.S. program in the Mechanical Engineering department with a nuclear engineering specialization. The program went on to offer an

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The Three Mile Island post incident [photo courtesy of Wikipedia].



Dr. Mark Pierson is leading the VT nuclear engineering program.

nuclear engineering; and (2) facilitate networking between faculty, students, and employers in nuclear engineering applications.”

Now, pending approval this winter, the Mechanical

undergraduate-level certificate for those who complete 12 credits of nuclear engineering classes (two required fundamentals courses, and two electives from varying subjects). The certificate is designed “to (1) provide a purposeful, cohesive set of technical electives in

Engineering department has produced its draft for the Nuclear Engineering minor. With the usual 18-credit minor size, one would have to take the two required fundamental courses from the certificate, plus a required radiation detection and safety course.

Program participants also have to choose from 3 elective courses of a list of 8. The minor is intended for those planning on entering the field.

The Mechanical Engineering department is offering these courses in partnership with the Materials Science and Engineering (MSE) department. However, given the small staff size (chiefly Dr. Pierson), classes are in limited availability and vary from semester to semester. Depending on how long you have left at Tech, either the certificate or the minor might interest you, but you must get started as soon as possible in order to be able to take the classes you need. Classes are currently given the ME special studies designation (4984) but are in the

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transition to switching to the Nuclear Science and Engineering (NSEG) naming prefix. Keep your eyes open! Those interested in learning more about nuclear power and what it has to offer should also consider joining the VT chapter of the American Nuclear Society (ANS), supervised by Dr. Pierson himself. Events include trips to power plants and nuclear material manufacturing plants and lectures by specialists in the field. Some frequent lecturers include graduates of the United States Navy Nuclear Power School (NNPS), which not only trains the nuclear submarine and aircraft carrier crews for the U.S. Navy but also is the biggest provider of nuclear power plant engineers employed today. Dr. Pierson, a 23-year veteran of the nuclear U.S. Navy, is a big supporter of the NNPS and often promotes the \$100,000 scholarship offered to future attendees of the school. For more information, contact ANS Chapter President Nathan Whitelaw (whitelaw@vt.edu) or Dr. Pierson (mark.pierson@vt.edu).

As a student currently attempting this program, I can verify that it is a fantastic experience. It suits almost any engineering major that wishes to integrate their discipline with the nuclear sciences or simply shows an interest in Chemistry/Physics but does not want to indulge into either of the two majors. Prerequisites for the program are limited to the introductory general chemistry course (CHEM1035) and the introductory differential equations course (MATH2214). The course material is easy to absorb and Dr. Pierson does an outstanding job teaching it, but attending classes is a must in order to make the grade.

Check the course timetable for details on availability each semester!

Valeriy Vislobokov is a junior in Aerospace Engineering and Computer Science.



The Three Mile Island nuclear power plant is pictured above. [Photo courtesy of Wikipedia].

Becoming a Professional Engineer: Do You Have What it Takes?

Every Virginia Tech engineer either has, (or will) learn about the Professional Engineering license (PE) in ENGE 1024. Most students do not linger on these particular facts, likely filing the requirements for becoming an Engineer in Training (EIT) and PE in the back corner of the brain to think about later. After all, having just finished the process of applying for and selecting a college, who wants to think about eight hour exams? I certainly didn't, that's for sure.

However, as a senior I now have to call back all of those important bits of information so that I can decide what to do with my life post-graduation. This article highlights what becoming a PE is all about so that you can decide whether it is important to your future. In the process, I also hope to answer that same question for myself. Not only of use to seniors, this information should allow freshmen through juniors to decide whether or not to take the course in the future: put it on your pathways planner/course of study planner now so you don't have to think about it later!

The first thing you should know about becoming a PE is that it is a multi-year process. All Virginia Tech engineers are already graduating from an ABET-accredited university, which fulfills the first requirement automatically. There are also two long tests to pass, and a number of years of experience that must be accumulated. The number of years required varies by state, but the minimum is often working four years under a licensed engineer. Some states also have "continuing education" requirements that must be met for license renewal.

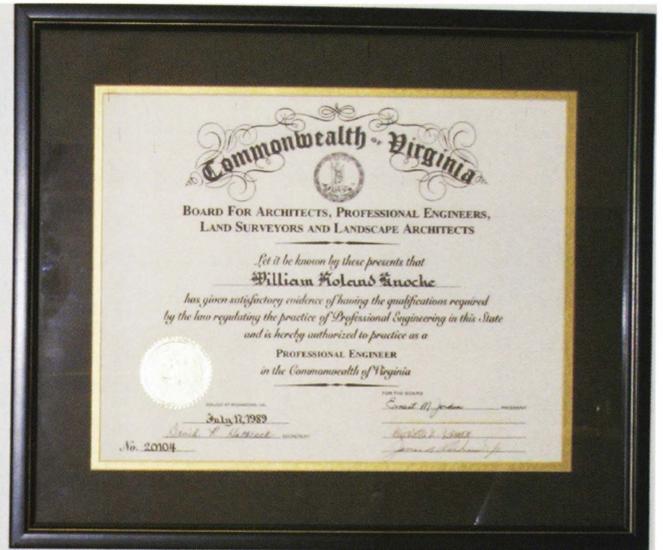
Much of the following information can be found on the The National Council of Examiners for Engineering and Surveying (NCEES) website at www.ncees.org, but I have summarized it here for your convenience.

Once you pass the Fundamentals of Engineering (FE) exam you earn the title EIT, or EI for an Engineer Intern. For your reference, the FE exam used to be called "Engineer-in-Training" (EIT). After gaining the appropriate experience, the Principles and Practice of Engineering exam must be passed before the licensure is obtained. While the FE has a "general" morning section and seven options for the afternoon section, the PE exam has seventeen specifications, so you can choose the one most closely associated with your field.

Why would anyone want to become a PE? Well, the National Society of Professional Engineers lists five main reasons on their website (<http://www.nspe.org>). They are prestige, career development, authority, flexibility, and money. Having a PE will purportedly give you those five things, "[opening] doors for the rest of your life." You must be a professional engineer to sign or stamp designs presented to the public, because that kind of responsibility needs to be held by those who have proven their worth. Many professional and industrial clients feel more comfortable working with a PE because of the reputation of excellence tied to the title.

So, what about the tests themselves? Both are eight hours long – a four-hour morning section and a four-hour afternoon section – but the specifics of format and the breadth of materials covered are quite different. The FE's general section covers basic science and engineering topics – including chemistry, electricity and magnetism, economics, and mechanics – while the afternoon section covers the fundamental concepts of whichever test you choose. The morning section has 120 multiple choice questions, and the afternoon sections all have 60 multiple choice questions. You are not allowed to bring anything except certain approved calculators (certain models of Casio, HP and Ti calculators – check the

Continued on page 10



Dr. Knocke of the Civil and Environmental Engineering department displays his professional engineering license in his office as a testament to his skill and dedication to engineering.



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Continued from page 8

NCEES website for details). Mechanical pencils and a reference book will be provided to you.

Although the format of all twenty-seven PE exams is not the same, most have forty multiple choice questions per section. You must bring your own (hard-copy) reference materials for the PE, as the exam is open-book. The questions are more in-depth and related to practical applications.

Review texts and courses are available for both tests; Virginia Tech offers their own FE prep course each spring. During the once-a-week sessions of the class, ESM 4404, faculty members give review lectures on topics of their specialty. Printed and digital copies of these lectures are available for students' reference. In addition, a reference manual, the same one used during the exam, may be purchased in print or downloaded for free from the NCEES website.

To get three real-life perspectives on the PE licensure and the FE exam, I spoke with Dr. Richard Benson, P.E., Dean of the College of Engineering, Dr. William Knocke, P.E., professor and previous department head of civil and environmental engineering, and Dr. David Dillard, professor of engineering science and mechanics and previous leader of the "Fundamentals of Professional Engineering" course. All three of these men said the same thing: take the Fundamentals of Engineering exam while you are still in college. I learned from them that the pass rate decreases significantly – from 80% or above to well below 50%, according to Dr. Knocke – when engineers attempt the PE exam after they have left college; your senior year is the best time to take it because the concepts are all still fresh in your mind.

When asked what majors are recommended to take the

PE, the unanimous response was that civil engineers require licensure most often: "In building construction it's almost mandatory," Dr. Dillard said. Dr. Knocke added to the sentiment, saying that "public safety, protecting the common good" and public health consequences create the legal requirement that the responsible individual be certified. Therefore, civil engineering offers its own discipline-specific review course in addition to the one offered for the general section. Not only civil engineers need licensure; those in other disciplines frequently obtain a PE. Dean Benson is a mechanical engineer with a PE license, though he has "never put a PE stamp on anything," he found it earned him immediate respect and recognition when working with industrial clients for his research. Being licensed as a professional engineer will never hurt your career – Dr.

**"Taking the FE is a future career insurance policy"
–Dr. Knocke, P.E.**

Dillard warns that while some companies may not require licensure, lacking a PE may limit your upward mobility.

Dr. Knocke obtained his PE license in the early 1980's because there was a push at that time to have faculty in CEE registered as professional engineers. Virginia Tech "didn't want to have the state being able to tell us who could and couldn't teach certain classes," like design classes. Though the number of licensed faculty ebbs and flows with changes in the college's administration, it is not a bad idea for engineers in academia to become PEs. In his experience, Dr. Knocke said that the CEE department is supportive of faculty who want to become licensed, and many companies will also help front the cost for the test and/or travel accommodations. This support is likely the reason behind the nearly 75% licensure rate in the civil engineering department; an impressive statistic, given that some of the CEE faculty are scientists instead of engineers.

Dean Benson took the EIT exam and the PE licensure exam in the same weekend, well after he earned his bachelor's degree: he does not recommend it. He found

the process of reviewing for these comprehensive tests to be “a very valuable experience.” Studying the fundamental concepts of your undergraduate courses for the second time has “tremendous value” – it allows the material to “sink in,” and helps you make connections between concepts that you missed the first time around, which should actually make studying easier. Dr. Benson also found the test useful because it forces you to think about the practical applications of engineering and to practice quick thinking. Indeed, he stresses the professional part of the PE, which “helps you think about your level of professional responsibility.”

I also asked what advice these successful engineers could give to students concerning the FE. Dr. Knocke gives this council: “The day you walk out the door, a lot of the subject matter associated with the FE exam is drifting away. So your odds of passing that exam are highest while you’re still here... The challenge I give [students] is for them to tell me what they’ll be doing in ten years.” Even if “they think they’ve got a career path,” situations change in ways you wouldn’t expect. Many engineers regret not taking the exam right after school; look at it as “a future career insurance policy” and don’t limit yourself!

Dean Benson looks at it this way: “If you intend to [ever] work as an engineer,” as opposed to a lawyer or other profession, “take the FE. You won’t regret it.” Finally, Dr. Dillard had this to say: “If you take the FE preparation course offered in the spring, you must be ‘diligent in class.’” The prep class does not make up for a course that was not taken – thermodynamics for electrical engineers, for example – but it can point you in the right direction as a review. Virginia Tech has a roughly 95% pass rate, so the course is obviously a good way to become prepared for the FE exam.

Well, there you have it. Although I know that preparing for the FE exam will require more work in the spring se-

mester of my senior year – the class is not-for-credit, so you get what you put into it – to me it sounds like the wisest decision. Plus, I know it will be satisfying to have my undergraduate education fresh in my mind as I walk across the stage in May. Hopefully this article has helped you as it has helped me, in writing it. Seniors - I will see you in ESM 4404 in the spring!

Julia Alspaugh is a senior in Mechanical Engineering.

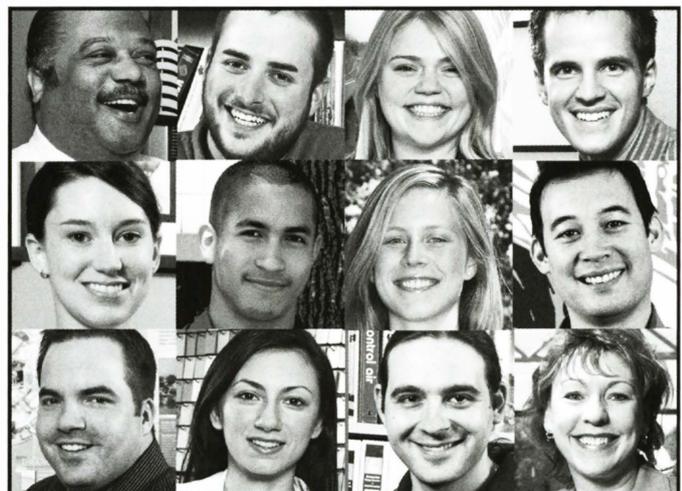
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Stefan Duma announced as Head of the School of Biomedical Engineering and Sciences

Stefan Duma, the John Jones III Fellow and professor of mechanical engineering will serve as the new head of the Virginia Tech – Wake Forest University School of Biomedical Engineering and Sciences (SBES), as of Aug. 10, 2009.

Duma, the founding director of the Virginia Tech – Wake Forest Center for Injury Biomechanics (CIB), became a faculty member in 2000. He leads a research program that now exceeds \$5 million annually. CIB is already considered the world leader in the field of injury biomechanics.

“Dr. Duma was selected from a very strong pool of applicants. In consultation with Bill Applegate, dean of Wake Forest University’s School of Medicine, and Gerhardt Schurig, dean of the Virginia-Maryland Regional College of Veterinary Medicine, we agreed Dr. Duma was the leading candidate,” Richard Benson, dean of the College of Engineering, said. “He had fabulous support from both campuses.”

In announcing the appointment, Benson also confirmed that biomedical engineering (BME) will now become a department within the college. “A portion of SBES already operates within the college with dedicated faculty and administrative support, and it has space in the new Institute for Critical Technology and Applied Science (ICTAS) building on campus,” Benson said. Duma will also lead the BME department.

At Wake Forest, a BME department within SBES already exists. Virginia Tech computer science alumnus Pete Santago chairs Wake Forest University’s BME department. Santago also serves on Virginia Tech’s College of Engineering Advisory Board.

SBES was formally created in 2001, filling gaps at both universities. Wake Forest had long sought to add an engineering program, and Virginia Tech’s engineering faculty members were seeking access to a medical school and its biomedical researchers. Faculty members in the Virginia-Maryland Regional College of Veterinary Medicine were also among the initial collaborators.

SBES was the first initiative of ICTAS, a multi-disciplinary institute that fosters the development of high growth opportunities within the university’s engineering and physical sciences disciplines.

“In the less than ten years Stefan Duma has served on our faculty, he has built an extraordinary teaching and research program. As a junior faculty member who reached full professor status in six years, Dr. Duma has exhibited extraordinary leadership abilities. He has illustrated the importance of building interdisciplinary projects, leading to constant improvement and successes for our SBES program,” Benson said.

Duma said his vision for SBES is “to be a Top 25 program within five years and a Top 10 program in 10 years. I am excited about the opportunity to lead it to the next level, and to become a world leader in biomedical engineering research and education. We have a world-class group of faculty and students, and it will be an honor to help advance their careers.”

Duma, as a member of the SBES program, has already conducted a benchmarking study of top biomedical research departments and has developed action plans to reach his goals. These plans include building on the dynamic partnership with Wake Forest University, as well as other medical programs in the region.

He also hopes to expand recruiting efforts and augment mentoring programs to allow SBES to become a leader in diversity efforts.

Among Duma's honors, he received the Army Modeling and Simulation Award in 2008, numerous best paper awards, the 2005 Society of Automotive Engineers' Ralph R. Teetor Award, and the 2006 Association for the Advancement of Automotive Medicine's Outstanding Achiever Award for 2006. He has published over 70 refereed journal papers and an additional 80 refereed conference papers. In 2005, Technology Review presented Duma with one of its TR 35 Awards for Innovation, given to researchers under the age of 35.

Duma will assume the position from J. Wally Grant, professor of engineering science and mechanics, who has served as the head of the SBES program for the past four years, and was one of the original founders.

Staff Reports.



Dr. Stefan Duma is the new head of the joint SBES program with Wake Forest University.



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Dozens of students and faculty members gathered together recently to officially open the Undergraduate Learning Center for computer science (CS) students.

Carved out of a group of older labs and offices, the \$1.2 million learning center covers much of McBryde Hall's first floor. It features a computer lab with computers for animation, game design, cyber arts and multimedia work, a software engineering laboratory and a systems laboratory, in addition to the CS's main offices, and space for faculty and graduate student advisers. A large lounge area with white boards and workspaces for

student meetings and research projects also is included, and is the largest of the rooms.

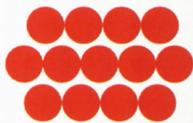
The facility was financed by funds from the provost's office, the College of Engineering, the department itself, and money collected from CS engineering fees from last year, the current year, and those to be collected during the following two years, according to Dennis Kafura, former head and now a professor of the CS department.

"The entire space has the overall goal of providing an integrated environment for computer science education," Kafura said, adding that undergraduate students will use the entire area throughout their education at Virginia Tech.

Planning on the learning center began more than two years ago, and originally was to include only the sixth floor, where the CS department has space. The first floor area that now houses the learning center once included smaller labs and office. Demolition began in June 2008 and mostly finished in October, Kafura said.

At the ribbon cutting faculty and two selected undergraduate students discussed the important role the learning center will have on future student learning. CS faculty also spoke about the impact the area will have for years to come. "Finally we have a space for our students that matches the lives that they lead," said Barbara Ryder, current head of the CS department.

Staff Reports.



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The ribbon-cutting of the Undergraduate Learning Center for Virginia Tech's computer science (CS) department was overseen by, left to right, Richard Benson, dean of the College of Engineering at Virginia Tech; Mark McNamee, senior vice president and provost for Virginia Tech; Barbara Ryder, head of the CS department; and Dennis Kafura, a former head and now a professor of the CS department.

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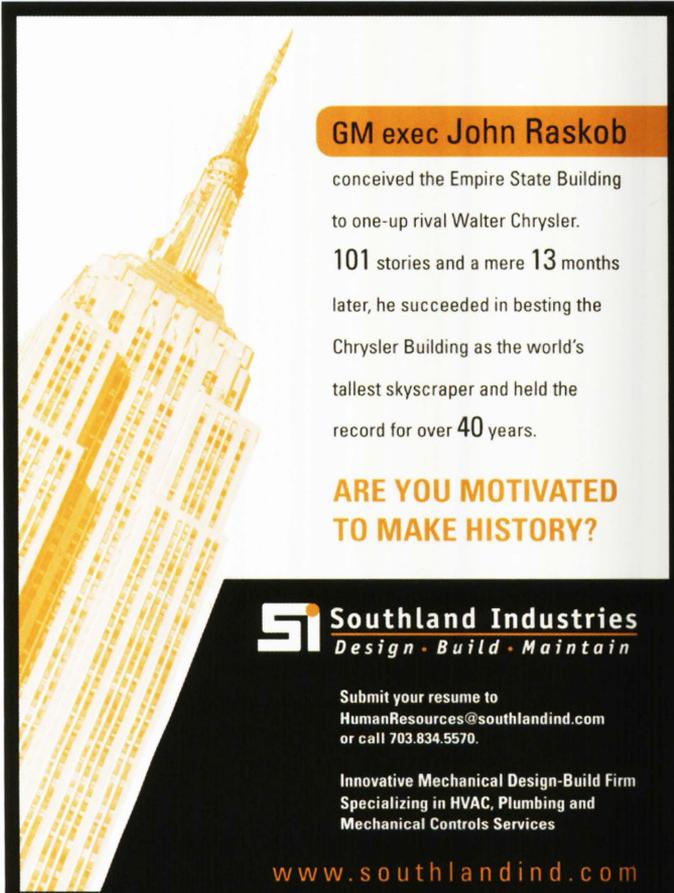
Valeriy's take: Student Communication at VT

Just a few weeks ago, I was sitting at my desk working on some summer assignments, when the sudden desire to have a chat with my brother came over me. As I was reaching for my cell phone, I remembered that he was probably still in class and unable to answer. The obvious alternative would be to send him a text. Then again, there was so much to say, and I still didn't have an unlimited texting plan. Perhaps I'd leave him a message on Facebook; he does have an account on there. Facebook would be a good way to show him a couple pictures from my recent beach trip. Of course, I could instead leave him a YouTube video; he'd definitely see it since he spends so much time looking at videos and subscribes to my account...

Many generations have passed since the heyday of the Pony Express when one of the only methods of indirect communication was a letter courier or messenger. Even as little as fifteen years ago, my fiasco in showing some brotherly love would still have been a difficult choice, this time between putting down the money for a long distance call or simply talking to him the next time he made the thousand mile trip home.

Although long distance calling is a far cry from unreliable snail mail delivery, the advancement cannot compare in the slightest to the communication expansion we have had in the past decade. The number of choices we have today for reaching our friends, loved ones, and business connections are overwhelming (I spent so much time trying to decide how to contact my brother that he ended up calling me first.) Thanks to the mass investment put into cell phones, it is now nearly impossible not to be able to contact someone anywhere on the planet

College students, being one of the most technologically ambitious and adaptive group of people on the face of the Earth, have embraced many if not of all of these methods of collaboration. At Virginia Tech, it would be a futile search to attempt to find someone attending the school that does not have some kind of mobile phone in their possession. An even more rare discovery would be to find someone who has never used the phone placed in every dorm room. With the ever growing reliability and quality of cell phones, more and more families have also disconnected their landlines in an effort to save money; they are encouraged by the incessant calling of telemarketers, a faction that has yet to successfully penetrate the cell phone market.



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I find it increasingly common to see individuals with an unlimited SMS plan and a 3G network Internet subscription, vital “necessities” for any college student on the go. It makes one wonder whether we really even need a regular computer anymore.

Once you start moving into the realm of Internet communications, it becomes more and more difficult to define what can be considered a definite mass-utilized way for correspondence. Because there are so many methods, it is sometimes difficult to find even one manner that is shared by the person you want to be in touch with.

For instance, how often do you hear a person say, when you ask them for their AOL screen name, that they instead use Windows Live Messenger (formerly MSN Messenger). Or perhaps they’re a fan of Yahoo! Messenger. Or maybe they’re Mac tycoons and utilize iChat. Even more common might be the issue if social networks. You try to find someone you know on Facebook when they only have an account on MySpace.



Modern devices help students keep in constant contact with the web.

The obvious solution would, of course, be to sign up for an account on every single communication service available on the Internet. But as we all know, not only would this be a security nightmare (imagine keeping track of all the usernames and passwords), but the time consumption in keeping up with every single service would literally keep you at your computer until the end of time. You especially know this is true if you’re one of those people who check Facebook every 18 seconds for notifications. Now add a MySpace account to that and it’s a guarantee that not only is your homework not getting done, but you’re probably going to skip your next ten meals.

Some rather archaic means of communication include e-mail and online bulletin boards, the latter otherwise known as internet forums. E-mail, while still one of the most utilized Internet communication services, is rarely used by Hokies to communicate with friends when the

Continued on page 24

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All About Windows



Introduction

We have been fangled. Windows 7 has brought us a new experience. It offers Microsoft a

Terminology

OS: Stands for “operating system,” the master program such as Windows XP, Windows Vista or Windows 7 that creates a space for programs to run in.

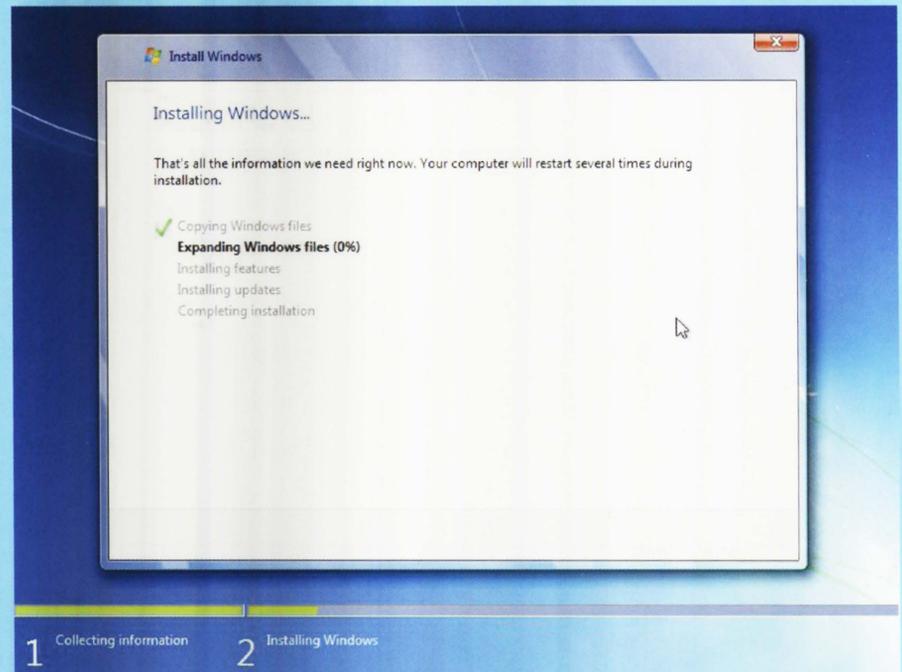
Beta: Unstable testing version of software used for evaluation purposes

RC: Stands for “release candidate,” one of the final versions of the operating system considered before release.

Mac OS X: The newest line of operating systems designed by Apple and used on Macintosh computers

Kernel: The central component of the operating system that manages system resources.

Virtual machine: A software duplication of a computer that allows you to run programs like on a real machine.



Current Vista users can install in place.

Installation

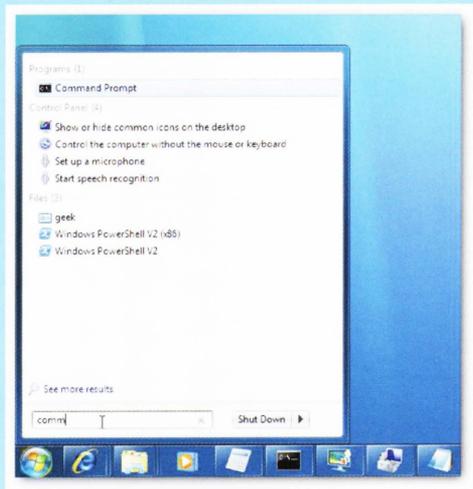
The Windows 7 install process was quick and intuitive. A clean install took less than 20 minutes of my computer’s time and maybe 40 minutes of my own time from first boot up to Windows login. An inexperienced user should be able to manage under an hour with some occasional pointers.

As an engineer at Virginia Tech you are also part of the Microsoft Campus License agreement which allows you to get free upgrades for Microsoft products such as Windows. The only caveat is that if you’re running Windows XP you will have to backup your files as the 7 install will clear your hard drive

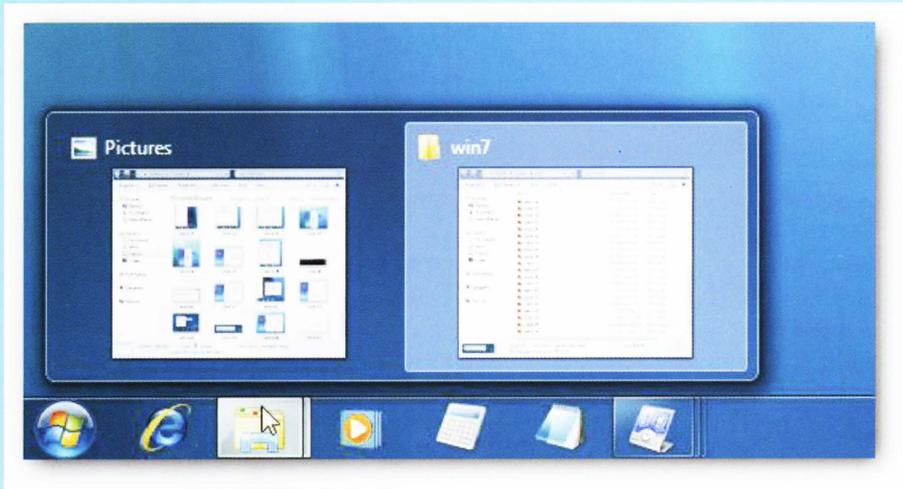
en running the Windows 7 beta and Windows 7 RC since early 2009. So what is it that you need to know about this new OS and is it worth the install time and backup headache? In contrast to the publicity Vista experienced before its release; been greeted with positive reviews. Biztech magazine even claims: "Windows 7: It's Vista done right." The new OS of- chance to maintain its hold on the OS market. Below is a basic guide to the new environment.

What's New?

Once you've logged on you'll find that in terms of interface, Windows 7 is very much like Vista. The taskbar at the bottom of your screen, desktop, and start menu all have similar functionality. A change you will notice in the taskbar is the OS X like launch icons that look like they were taken from a Mac. Mousing over these icons creates a flashy illumination animation that may please the ascetically minded. The search system has also been improved under the hood since Vista, giving you access to programs, documents, and settings through the start menu.



Windows 7 improves upon the Vista start menu and search options.



The Windows 7 revamped taskbar gives immediate access to active programs.



The new taskbar features have a number of similarities with the Mac OS X launch bar pictured above.

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The good

Windows now runs with a much smaller footprint on your computer. The OS kernel has been optimized from Vista to 7 so that even though it looks a lot like Vista it can actually run on computers with slower processors. The wireless and wired connections are now listed one integrated network access button, and wireless connections are made more quickly than under Vista. Still, if you are connected to both types of network you can't easily tell which your computer is using. There have been efforts to streamline the networking process with "Windows 7 Homegroups" to facilitate file sharing.

The useful

Startup and shutdown are definitely faster when compared with both Windows XP and Vista. Windows 7 also offers a "force restart" option that will quickly kill

the annoying background programs that tend to plague most XP and Vista shutdowns. The same Windows 7 sessions can go in and out of hibernation many times, and still run with a minimum amount of slowdown for weeks. There is also a new "XP Mode" that allows you to run a full virtual machine for older programs in an XP environment on Windows 7.

And the ugly

It's the drivers stupid!

Drivers are probably one of the most critical components of an OS and also one of the most difficult things to get right. Windows Vista was in large part criticized because of its issues with graphics drivers and other hardware devices. Many of these problems were later resolved by hardware manufacturer updates to their drivers, but some issues still persist.

Windows 7 makes improvements in this area, as almost anything you can plug-and-play in Windows Vista will work without a hitch in Windows 7. Nevertheless universal compatibility is still a pipe-dream. The infamous blue screen makes an appearance every once in a while, and a reboot is usually quick to come. Occasionally automatic Windows problem reports will find a solution online, but it's still probably a good idea to keep a techie around.

Software:

In my experience engineering applications and programs such as Matlab, Mathematica, and LabView 6 all function normally under the 7 environment, though some of the toolkits and add-ons for Matlab such as Simulink tend to run into problems.

One thing that will solve 93% of compatibility issues (XP users take note) is to right click and go to properties on the program you would like to run, go to the

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compatibility tab, and select the checkbox for: "Run this program in compatibility mode for"

The bottom line:

Though the initial switchover may be slow, we predict full scale adoption of Windows 7 in academia and industry. There's no need to rush out and install the RC today, but it's probably a good idea to take some time after the official Windows 7 release on October 22, 2009 to backup and install the new OS.

Report from Dale Pokorski- Virginia Tech Director of IT

She has been part of the department of engineering for about 6 months. Previously she worked in Pamplin as director of IT, and originally earned her BA in Computer Science from Smith College in 1985.

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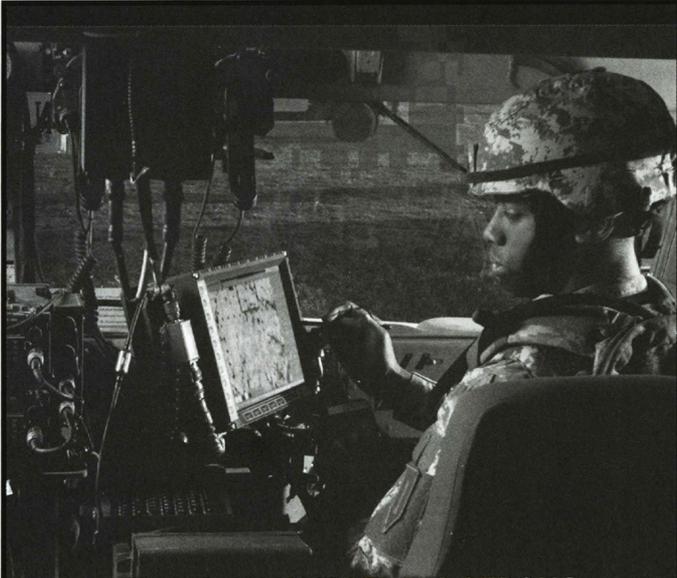
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Forum: What's the plan for deploying Windows 7?

Pokorski: We're starting semester off with Windows Vista Business or better as a university requirement, including engineering. Windows 7 is supposed to be available to us before then, but because of the timeframe and uncertainty of receiving copies; it's too close to the beginning of the semester to change what we're doing. Microsoft is supposed to release the software to us in August through the campus agreement, but we still need to get license keys and there's a lot of other things that need to be done before we can post it.

Forum: And on the departmental level?

Pokorski: That's really a decision made by each individual department. I think some of the departments are planning on upgrading early but again that's a decision that they each make. The SWAT team is looking to build images.

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Forum: How and when will it [the new OS] become available to students?

Pokorski: I suspect students will upgrade to Windows 7 as it becomes available. It'll probably be in the September timeframe or even later. But it will not be posted on the network.vt.edu website until the rush at the beginning of the semester is over. We want to do some more testing after the final client is released to make sure it works with all our software. However, feedback from SWAT team and Sysadmins in engineering is that we're not seeing difficulties on Windows 7 with any of our software. That being said we need to confirm with faculty to make sure there aren't any compatibility issues before giving the ok to put it on the computers. I know there were some bugs with the release candidate, including some with acrobat and flash that hopefully will be resolved by the final version.

Forum: What factors do you take into account when making these kinds of decisions?

Pokorski: Software and hardware compatibility. We don't expect it to be like Vista where we preferred to wait until the service pack came out first [before upgrading]. I suspect that Windows 7 won't have as many problems.

Forum: And who are the main testers on campus?

Pokorski: Mainly the SWAT team and Sysadmins as well as a few faculty members who are early adopters and trying it out too.

Forum: Have you personally tried running it?

Pokorski: I have it running on an ancient HP tablet in my office and a pretty old desktop at home. So I have tried it, and it's a little quirky right now but that's because a lot of vendors haven't released software updates

for Windows 7; those kinds of problems will go away rapidly after it's released.

Forum: What kind of future acceptance do you see on campus?

Pokorski: I think it's going to be a lot better than Vista was. I think you're going to see a lot more people moving towards Windows 7 and adopting Windows 7 than we saw moving towards Vista. We're still running XP on most of our administrative machines, if not all. And I think by attrition they'll be upgraded to Windows 7; i.e. as they get new computers they'll be upgraded to Windows 7.

Comments of other student users:

I bought my tablet in Fall 06 running Windows XP For tablets. At the time, I changed the fancy graphics for the standard gray start bars and windows to increase the computer speed. An error message popped up on day one of the installation. A year later, my computer had slowed down drastically even though I don't store music or movies on the hard drive. After installing Win 7, my computer ran like new, maybe even faster, without changing the graphics to the other version. Even after installation of Dreamweaver, Matlab, AutoCad, Mathematica, it still zips along like it never did with XP. I can't remember a single problem with compatibility.

- Gary Riggins, Senior, Civil Engineering

I'm running the 64-bit version of the 7 and I really like having such a large set of backgrounds from which to choose. It's also cool that the pictures can automatically cycle and switch. I've been having issues with my graphics card overheating when using an external monitor, but this is the same as it was under Vista.

- Iyas Attari, Junior, Mechanical Engineering

I generally have a good impression of it. The system boots fast, the main interface is crisp, and I experienced no compatibility issues yet, although my starcraft graphics are kinda messed up. But I guess it is a 10 year old game.

- Dustin Moore, Sophomore, Electrical Engineering/Computer Science

If you have any questions or comments about Windows 7 or computers in general feel free to drop the forum a line at forum@vt.edu.

*Darius Emrani
is a sophomore
in Electrical
Engineering.*



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Facebook messaging system is so much more aesthetically pleasing and texting is so much quicker in delivery. Bulletin boards, although still utilized, mainly by the most eccentric computer users, are considered to



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be a thing of the past. But the nice thing about the Internet is that a communication method does not have to be in limited use to be obsolete; the web is still crawling with many community forums.

A recent arrival to the communications scene is the once sci-fi technology of video chatting. At one

point only a feature common in cyberpunk flicks, the capability is now available in most of the mainstream instant messenger services, including MSN and AIM. I am; however, surprised to notice a new player in the market being used by more and more VT students: Skype (<http://www.skype.com/>). After taking Europe by storm a few years ago with its VoIP service (Voice over Internet Protocol; a.k.a. Internet telephone), Skype has become a hit in the western hemisphere as well with its debut of video chat.

Although very little is different about Skype from all the other IM services, the developers and producers of Skype put an emphasis on video chatting as opposed to text-based messaging and strive to maintain a high standard in call quality (fewer dropped calls, clear picture, non-distorted audio, etc.). And the best part of it all is, of course, that it is absolutely free. This is maybe not so amazing now, but would be unbelievable in the days of collect calls and operators. It is especially useful for “seeing” your family when they are so far away from our school. And for those exchange students whose entire relative-base is on another continent, believe me when I say that it is a blessing.

So what comes next?

Who knows? All anyone can be sure of is that the Internet will continue to produce more ways for us to contact each other. Very soon, with the release of higher speeds in the 4G network, video calling will be integrated into our cell phones. And if you don’t believe me, why don’t

you go download the Skype third party app for your iPhone and give it a try? Those hologram messages from the Star Wars series may not seem so farfetched if you do.

Valeriy Vislobokov is a junior in Aerospace Engineering and Computer Science.



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Tablets: Awesome Tool or Awful Idea?



As we have all been told in our freshman engineering courses, Virginia Tech has always led the pack when it comes to computer requirements. We were the first college to require desktop PC's, the first to require laptops, and then in 2006 we were the first college in the United States to require Tablet PC's. Now as we begin the year, all four classes: freshmen, sophomores, juniors and seniors, will have been required to buy Tablets. This anniversary is an important one, marking a turning point in the way Engineering is taught at Tech.

It all started with a grant. Dr. Glenda Scales and Dr. Beville Watford worked together to submit a proposal to Fujitsu for a grant to begin testing Tablet PC's at Tech. The proposal was accepted, and Virginia Tech received a grant for one million dollars in Tablet PC's and other technology from Fujitsu. These grant Tablets are still in use in STEP (the Student Transition to Engineering Program) over the summer before the freshman year of students who are accepted to the program. Compared with today's Tablets, the tried-and-true Fujitsus make me positively nostalgic. But these Tablets started it all.

In 2006, when the College of Engineering announced the computer requirements for incoming freshmen, quite a bit of hubbub ensued. This decision was met with a lot of hostility from both students and parents. Tablets cost more than laptop computers, and many students worried that they would only use their tablets for one or two classes and never again. I interviewed Dr. Glenda Scales and talked about the concerns that I have heard since my own freshman year about the Tablets.

Student: **Tablets cost more than laptops.** This is one hundred percent true. Tablets are 100-200 dollars more than laptop PC's, depending on the vendor. In 2006, Dr. Scales fought for that price point for the students, as Tablets were still just beginning to meet Tech's for-

midable wall of computer standards. They would have been more expensive without the fight for the price point that first year. **That is really a lot of money.** Just think about your textbooks. You spend sometimes well over 100 dollars on those for just one class, and you do not use them as much as you will be using your Tablet. And in the end, you'll save a lot of money by using SWAT to help you with any repairs or upgrades you need.

Student: **Tablets don't have the gaming capabilities that I could get on a laptop.** But did you really expect the school to care whether or not you can get your Crisis on? The Tablet requirement is meant as just that: a requirement for your schooling. Tech required the Tablet because it is a good tool to help you with your education. And barring awesome LAN parties, education is why you're here, right?

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Student: I'll just sit there in class and get really distracted on the Internet. As someone who has sat through ten 8 AMs in the course of my years here, I feel your pain. I do. After spending all night on that design project, the last thing you want to do is focus in Multivariable when Facebook is calling your name. *Quick fix:* if you are not in a class that uses DyKnow, turn your wireless off. Your computer won't explode. I have successfully done this multiple times, and I wouldn't steer you wrong. Then your only problem is that lovely game of Solitaire...

Student: I can't buy a Mac/Dell/Insert Company Here?!? This is crap. No, you can't buy a Mac. Macs and Dells do not fit the requirement. I am one of an unfortunate number of proud Gateway Tablet owners on campus. I have little sympathy for those that *choose* not to follow the requirement. You'll find that professors feel the same way. There is some talk about Apple

releasing a Tablet in 2010, but odds are the Tablet won't immediately be able to fit the requirements of the College of Engineering. And none of that Wacom Tablet stuff either. So I wouldn't hold your breath on that one, but take heart. By fulfilling the computer requirements, you'll actually be able to do your schoolwork the way your professors want you to do it.

Student: I'll only use the Tablet for my freshman engineering classes and then never again! The college has come a long way since 2006, when only freshman engineering classes used Tablets. Dr. Scales implemented a plan to involve the professors of sophomore level classes to begin using Tablets by 2007, the sophomore year of the first student body using Tablets. Unfortunately, it fell through for the most part that year. The year 2007 was my freshman year, and among all of the crazy late nights and 711 runs, I can say that I used the Tablet to the fullest in my 8 AM Chemistry class. The great thing was, my Chemistry professor used a



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Tablet too. The spread of the Tablets got increasingly better over the four years, and now I can say that my sophomore engineering classes used Tablets as well. It is only a matter of time before all Engineering classes and some outside Engineering at Tech make some use of the Tablets.

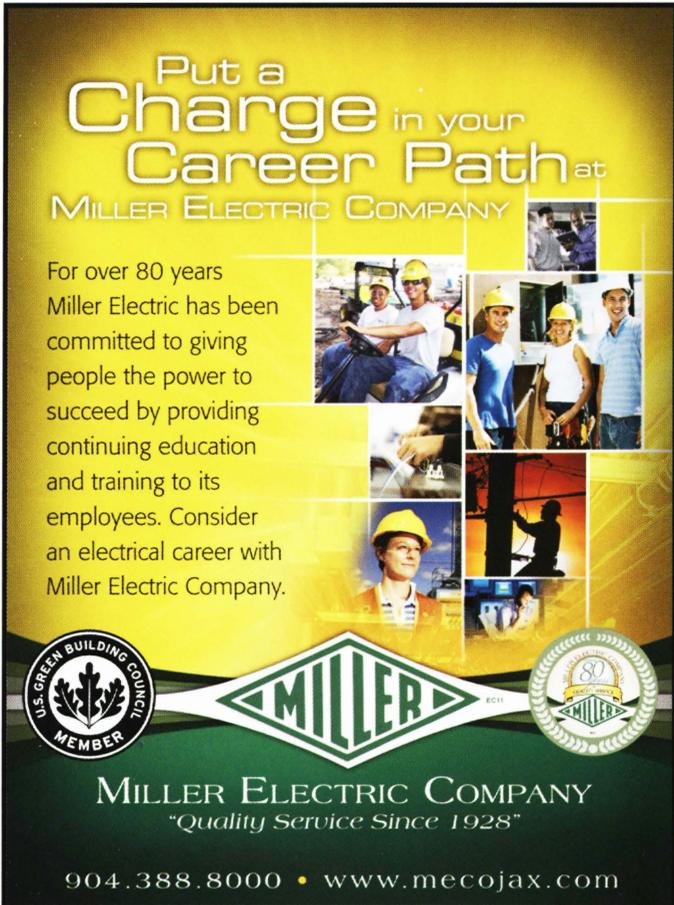
Here's the most important thing you could take from what I've learned about the Tablets. *They are an excellent tool for your education.* The Tablet is perhaps the handiest thing I have ever used in my time here. It is better than my graphing calculator, and it is more fun than the legions of legal pads I was using to take notes before. The College of Engineering had some setbacks at the start to be sure, but nowadays Tablet users are on par with laptop users. There is nothing a laptop can do that a Tablet can't (besides Crysis). What's more, you will make more use of your Tablet than some laptop users, with the right tools at your disposal and your notes at your fingertips at all times.

I will come out and say it: I love using the Tablet. I have all of my notes in one place. I have an excuse to always have my computer with me. I can search my handwritten notes for that one equation or definition that I just can't find. It's like ctrl-f for notes, and who doesn't like that? Using my Tablet, I can email a copy of my notes to someone else. Yeah, I can't play games with really heavy graphics and I sometimes get distracted in class. But to me, the Tablet is too useful a tool not to use it. If it were not a requirement here I would not have bought a Tablet. That much is true. But now that I have one, I can't imagine how much harder it would be for me to study without it.

The main reason I think that people are against the Tablets is that they do not know how to make extensive use of all that Tablets can offer. Dr. Scales has seen this problem too, and SWAT and the College of Engineering are working tirelessly to get the word out about Tablets. There is so much Tablets can do that even I, who have been using it for over two years now, did not know about. Do yourself a favor and keep an ear out for Tablet workshops put on by the College of Engineering and SWAT. You may think they're for freshmen, but you'd learn more than you think. I am running the Tablet workshops, but all plugging aside, the workshops are a great resource for making the most of your machine.

Tablets are the wave of the future, and Virginia Tech is cruising on top of the wave. So the next time you're on Facebook in Tablet mode during class, drawing Graffiti on your friend's Wall, remember that the Tablet isn't just a tool of mass distraction. Used properly, it is the single best study tool you have ever had. Four years later, Virginia Tech has incorporated the Tablets into classes and into this author's heart. I hope that you feel the same way.

Christina Kazmer is a junior in Electrical Engineering.



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Unit Operations Lab with a



Danish Twist

All chemical engineers must take a unit operations lab, in which they combine textbook education and the real world. Unit operations lab involves basic steps in a process such as drying, filtration, or even process control. Students dread this class because it is only offered during the summer, while others are soaking up the sun or earning a paycheck.

Virginia Tech's chemical engineering department offers a solution to the problem by offering the class abroad. During the summer after junior year, students can take their unit operations lab at Denmark Technical University (DTU) in Lyngby, Denmark. This opportunity makes the summer course more enjoyable and attracts a strong number of participants. Chemical engineers actually have the highest percentage of students that study abroad. This year 33 Virginia Tech students attended DTU this summer.

Before attending the class in Denmark, I traveled abroad with eight other chemical engineers throughout Europe. The initial destination for my group was London. We had to adjust to the time difference, which was much easier than I thought. We also needed to figure out the most efficient way to get around to see the sights. Thankfully, walking around Tech's beautiful campus made us physically fit to walk ten hours a day throughout Europe. Trust me, when someone says that the hostel is only a mile away, it actually means it is at least four miles away.

One of the most unforgettable nights was walking 668 steps up the Eiffel Tower and seeing the sunset. Hint: Wine is not allowed on the top of the Eiffel Tower. The guards gleefully wait for Americans to make this fatal

mistake. You will not get the wine back; instead the guards have their glasses ready.

From Michelangelo to Raphael, Da Vinci and Monet, Europe offered the most breathtaking artwork known throughout the world. One of Raphael's frescoes captivated all of us in particular because of its meaning. In this fresco, Raphael respectfully depicts Da Vinci, Pythagorean, and many other founders of science and mathematical theories,

After two weeks of seeing unforgettable sights and experiencing everlasting memories, Denmark called to us. Since we had mailed our computers and other essentials to DTU, we were lucky to not have to check bags throughout Europe. During our time at DTU, we lived in pods. A pod had nine rooms, kitchen, laundry, and

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shower facilities. It was like a large dorm room without a roommate.

The actual lab consisted of seven experiments chosen from a variety of topics. Each person was paired with a partner and one lab report was submitted per group. Some of the labs included working with a distillation column, fixed bed reactor, heat transfer in pipes, and liquid flow through pipes. Technicians and graduate students were on hand in

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Christine Sargent looks inside a large dryer.

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case of disasters (which did occur). The lab expanded beyond four walls with field trips to local companies such as Novozymes, Dong Energy, and Danisco Sugar Factory.

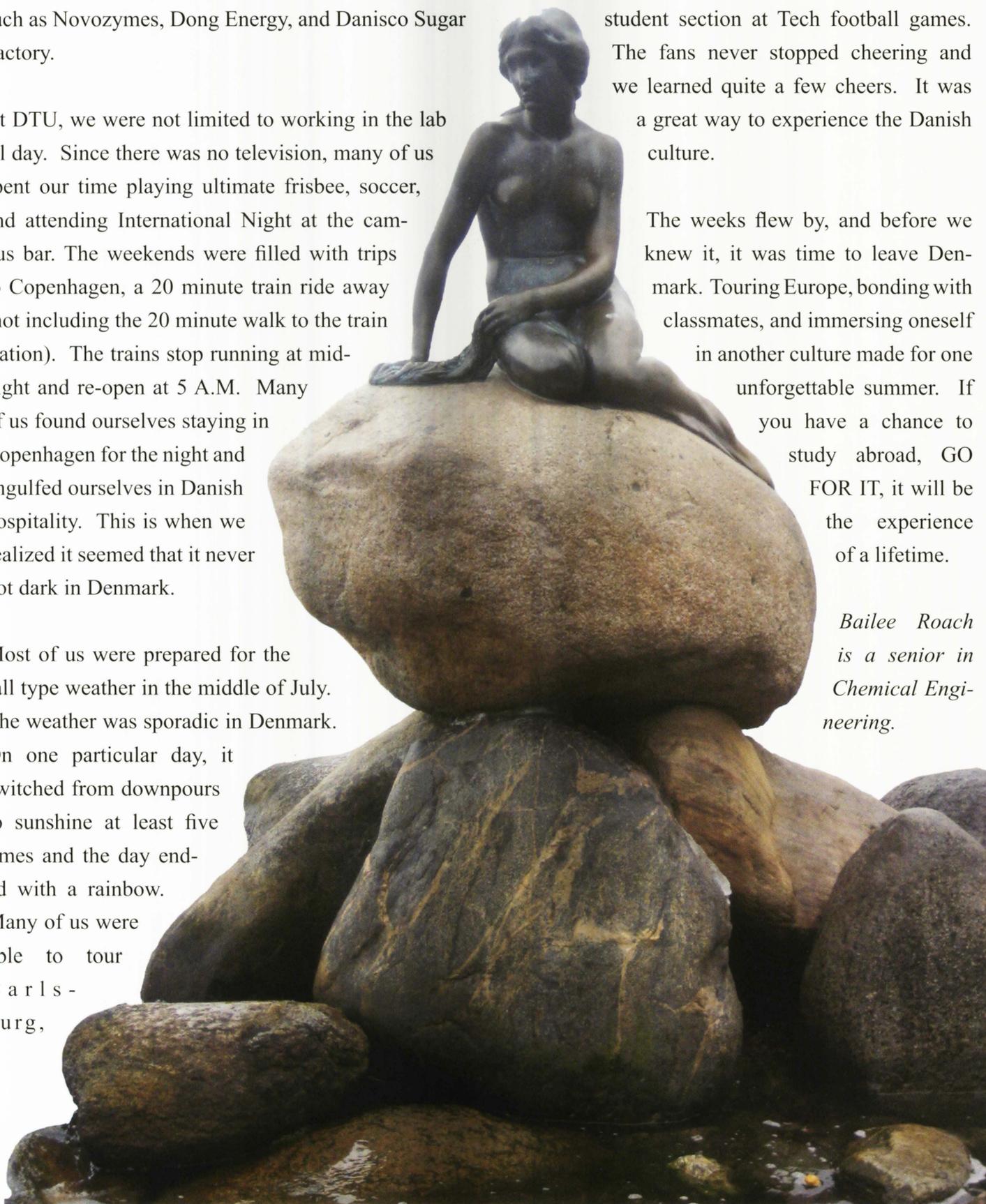
At DTU, we were not limited to working in the lab all day. Since there was no television, many of us spent our time playing ultimate frisbee, soccer, and attending International Night at the campus bar. The weekends were filled with trips to Copenhagen, a 20 minute train ride away (not including the 20 minute walk to the train station). The trains stop running at midnight and re-open at 5 A.M. Many of us found ourselves staying in Copenhagen for the night and engulfed ourselves in Danish hospitality. This is when we realized it seemed that it never got dark in Denmark.

Most of us were prepared for the fall type weather in the middle of July. The weather was sporadic in Denmark. On one particular day, it switched from downpours to sunshine at least five times and the day ended with a rainbow. Many of us were able to tour Carlsburg,

a Danish beer company as well as attend a F.C. Copenhagen soccer game. At the soccer game, we sat in the hooligan section which is comparable to the student section at Tech football games. The fans never stopped cheering and we learned quite a few cheers. It was a great way to experience the Danish culture.

The weeks flew by, and before we knew it, it was time to leave Denmark. Touring Europe, bonding with classmates, and immersing oneself in another culture made for one unforgettable summer. If you have a chance to study abroad, GO FOR IT, it will be the experience of a lifetime.

*Bailee Roach
is a senior in
Chemical Engineering.*



The Little Mermaid Statue in Copenhagen. The author, Hans Christian Anderson is from Copenhagen.



Leaving Dulles Airport. From left to right is Erica Neverman, Quin Costin, Sarah Dyer, Corey Leggett, Danielle Carey, Bailee Roach, and Ally Athey.



Our group on top of the Arc de Triomphe. From left to right is Erica Neverman, Bailee Roach, Danielle Carey, Christine Sargent, Ally Athey, Quin Costin, Corey Leggett, Sarah Dyer, and Aaron Holley.

Engineering in the New Economy

You hear about it every single day: when you turn on the news, when you speak to your neighbor, when you talk to your relatives. The economy is progressively failing and while efforts are being made to correct the situation, there is no end yet in sight to the global dilemma.

As students, we are making the ultimate investment in the future economy, expecting a return much greater than the costly price of our education. It is therefore natural for us to wonder what our future holds in terms of our careers.

For engineers specifically, one not only has to wonder what kind of career future is in store, but also what the repercussions of the economy will mean for the way engineers will have to function in the industry. For instance, given the current energy crisis' financial strain on the economy, is it ethically responsible for engineers to develop non-renewable-energy powered inventions?

In general, what should the requirements be in regard to efficiency and value of future innovations?

Considering the first problem, that of the graduating engineers' careers, there is only bad news.

There have been layoffs across the board; one of the most surprising news has been from one of the wealthier corporations. Microsoft laid off a total of 5000 employees, with a net layoff number of 2000 employees post new-hire numbers. John Langford, CEO of Aurora Flight Sciences, says we have only one thing to worry about:

Nothing.

“One of the things the aerospace industry has been famous for, has been from the beginning, is this cycle of up and down,” says Mr. Langford. Aurora Flight Sciences, which recently celebrated its 20th birthday, is a leading corporation specializing in Unmanned Air Vehicles (UAVs).

Although he's talking distinctly about the aerospace market, what Mr. Langford says indicates that the employment issue the world is suffering today is not only commonplace, but also expected for the whole engineering industry. This is supported by the fact that the United States goes through some kind of major economic depression every couple of decades or so. The one we are battling through at the moment is simply compounded by the fact that it is occurring on a planetary level.

Langford goes on to say that the work done by the engineering industry can ultimately be broken down into two

parts: commercial contracts and military defense projects. Each of these goes through separate highs and lows.

“When [the two parts are] in phase, you get very high employment followed by very low

employment and what we liked to do is shift phase so that we can just move back and forth between the defense and commercial [markets].”

Unfortunately, even given today's significant military spending, both the defense and commercial innovation market are in a slump. If the engineering industry follows this cycle; however, then it should only be a matter of time until employment returns to its normal

“Pick something you'll really enjoy doing...figure out what you love to do and then figure out how you can get paid for it. There are really exciting things going on.”

-John Langford CEO of Aurora Flight Sciences

levels. In the mean time, R&D corporations will have to try their best to survive. Mr. Langford comments on his own efforts:

“What we’ve tried to do is build a balance between research and development, which is especially prone to these big swings, and a manufacturing phase, which is more stable to the system.” Aurora has two R&D facilities, one in Virginia and one in Massachusetts, and two manufacturing facilities, in Mississippi and West Virginia.

If the engineering manufacturing market offers some stability, does that mean that all of us should strive to become manufacturing engineers as opposed to the usual developers of new products? Perhaps, but there is an indication that the issue may be related to geography. John Langford related in his interview with Engineers’ Forum that the manufacturing facilities in MS and WV tend to have employees that follow the corporate traditions of previous decades, the kind that stick with the same company for their entire career; this allows the company to maintain the stability necessary for purely domestic operations. With the Virginia R&D facility so close to Washington, D.C. and the Massachusetts center located right next to Boston, employee views are more progressive and globalized. Employees

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John Langford, CEO of Aurora Flight Sciences



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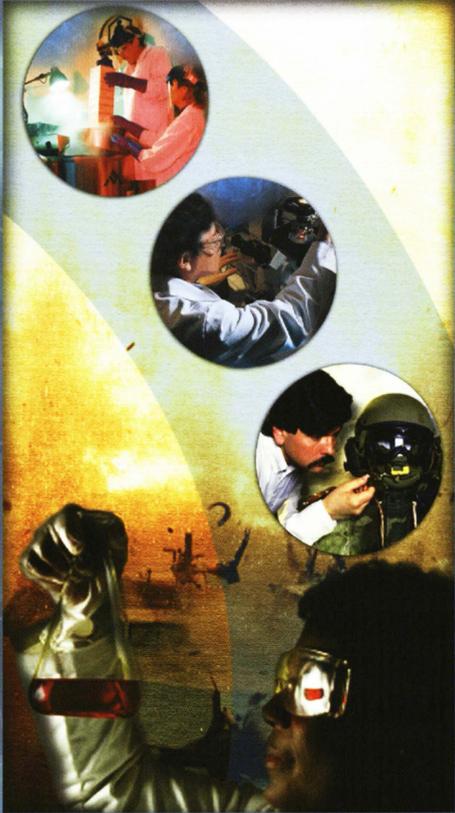
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tend to stay with their respective company for a limited time and keep their career diverse with projects at other corporations.

Finally, there is the question of funding. It is easier to find finances for larger companies' projects than for small businesses for several reasons. Firstly, larger corporations have a "treasure chest" of profits from other projects. Of course, there is the fact that larger corporations tend to "go public", a business term that indicates that the companies' stocks can be bought by any consumer on the stock market. Public corporations are usually accompanied by a board of directors, a group of individuals that tend to stifle innovation in their quest for some kind of financial return. In engineering, where product development cycles can run in the decades, profit returns don't come as fast as investors hope.

Aurora, which has lauded its status as a small business for these very reasons while competing on level

with such large aviation companies as Lockheed Martin, Boeing, and Northrop Grumman, has to find funding from alternative sources. Specifically, Aurora tends to go for projects advertised by the Defense Advanced Research Projects Agency (DARPA), the government agency most famous for previously funding ARPANet, the predecessor to the Internet.

Even this poses some difficulty now with military contracts losing their reliability. Just recently, after passing through Phase 1 of DARPA's Vulture program (developing an aircraft capable of maintaining high altitude flight about 5 years) with its Odysseus concept, Aurora had to cease its proposal for the time being; the program was cancelled due to re-appropriation of funding for Vulture to other projects.

Moving on to the question of engineering ethics, John Langford offers this, "Engineering is critical to the country's survival. The fact that we have ups and downs is insignificant...you have to take a longer view than that."



The Sunlight Eagle, Aurora's latest effort in green engineering, was a renovation of its Daedalus human-powered aircraft project from pre-1989 to be solar-powered and unmanned.

Now more than ever, the United States is competing with the rest of the world in innovation. "The fact that the United States came out as the leading economy player in the last century doesn't mean it can have any vanities in this century," say Mr. Langford. "The challenge of the individual engineer is to recognize the realities of the world and figure out how to be good citizens."

Money has always made the world go round. Perhaps at this point, it will act as an eye-opener and inspiration to fix the technology that helps the country run itself such that it becomes more

efficient. "The US is not just a place; it's more of a belief system. The reason it has been successful [in the past] is because the smartest people in the world came to the U.S. to be part of this government." Following the September 11th attacks, the United States' reputation for having quotas and restrictions on immigrants was only worsened; in the past few years, even less brilliant minds were allowed entry to the country.

In conclusion, while things are grim, they are no worse than they have been in past times of turbulence. There are many niches to fill in the field of engineering and, chances are, that whatever you have been educating yourself to do, you are in great demand. All you have to do is maintain a high level of quality and be the best you can be in whatever you do.

Valeriy Vislobokov is a junior in Aerospace Engineering and Computer Science.

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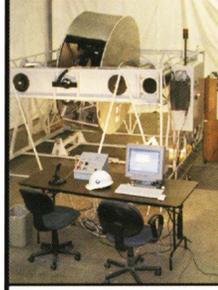
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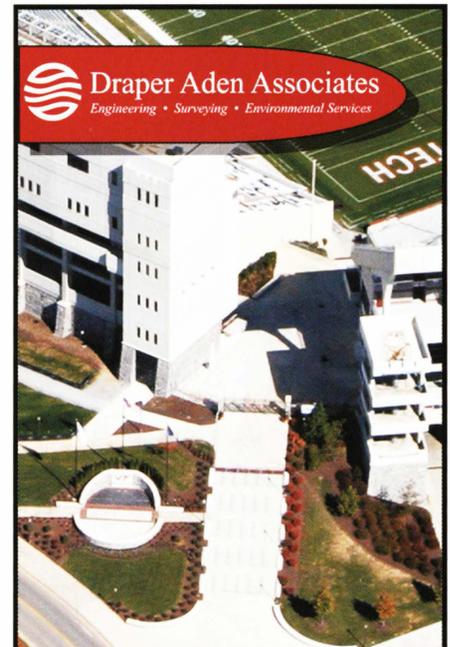
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