

excouncil GAZETTE

February 2000, Vol 2 No 3

Hello my fellow engineers. Just recently the E-Council held elections, and suddenly, I became the president of this esteemed organization that I've been a part of since my freshmen year. We've grown and changed and attempted to improve all of our engineering lifestyles. However, even after we've put in our blood, sweat, and tears (well, no blood to my knowledge), some of you still don't really know about E-Council. I'm optimistic that soon E-Council will become a household word. And honestly, you're reading this article, so that's a good start. The Gazette you hold in your hand is a relatively new periodical put out through E-Council. Our other publications include Frosh Help, the internship binder, and departmental course guides. Moreover, we also cater to your instinctual desire for food; you probably remember some E-Quad-wide study breaks, typically involving lots of pizza or bagels. We also administer the Teaching Awards, a semi-annual event when students finally get to thank teachers and teaching assistants that deserve A*'s.

Yet that's only what we've done so far. We plan to continue to try out new ideas. Some things that may materialize in the not-so-distant future include basketball or other tournaments involving professors and deans, more diverse study breaks with mass quantities of food, maybe some sort of competition between departments or class years, and well . . . I'm not exactly sure what else. I'm open to suggestions! All you need to do is e-mail me at kulansky@ or ecouncil@.

Okay, so I've basically given you my unofficial statement on the E-Council, but here's a more formal and defined mission statement from the E-Council: Our mission is to improve and enhance the quality of life at the E-Quad and offer support to undergraduate engineers. In order to accomplish this, we are working to provide advice on different aspects of engineering at Princeton and a means to network with other fellow engineers. We are also here to implement ideas or suggestions from the student body and to act as a liaison between the students and the faculty and staff.

As the new president, I had the option of revising this official statement, but I felt it really characterized the E-Council and it's goals. I hope that under my leadership the E-Council will continue to thrive and to uphold the principles in our mission statement! **f**

State of the E-Council Address

Dave Kulansky '01

Engineering Council President



Brian Kernighan:
Back to Princeton
Joyce Chen '00

Kernighan: it's pronounced kûr'ni han, or ker'ni gen; he responds to both. In his hometown in Canada, the 'g' was silent, but Kernighan has since adjusted himself to the different pronunciations of his name. Can anyone imagine the articulate, witty, story-telling lecturer standing in front of a hundred students and experiencing stage fright? Or perhaps imagine the amiable, mild-mannered man sitting in his office with a black belt in karate? Brian Kernighan is all of the above.

As one of two visiting professors holding the 250th Anniversary Visiting Professorships for Distinguished Teaching, Kernighan has returned to the computer science department here at Princeton for the 1999-00 school year. Kernighan grew up in Canada and attended the University of Toronto before receiving his Ph.D. at Princeton in 1969. Since then he has taught at several schools and has contributed much to computer science. He began his teaching career in the early 70s with evening classes at Stevens Institute of Technology in Hoboken, NJ, but later focused his attentions on Bell Labs at AT&T (now Lucent Technologies) in Murray Hill, NJ for the next two decades. He continued his teaching career in 1993 by teaching COS 333, Advanced Programming Techniques, as a guest professor here at Princeton University. In 1996 Kernighan taught Harvard's only introductory computer science course which influenced the creation of COS 109, Computers in Our World, which was offered this past fall semester here at Princeton. Now Kernighan has returned to COS 333 this spring, but with a new agenda, since much has changed since he last taught the course seven years ago.

Most people immediately recognize Brian Kernighan as one of the authors of the C programming language, but his immediate response to this is always a humble denial and a correction that he "just happened to be there." Even so, Kernighan's accomplishments have contributed greatly to computer science and technology. (*continued on page 2*)

New Executive Members of the E-Council

President:	Dave Kulansky
Vice President:	Sonia Jain
Vice President:	Mike Cohen
Treasurer:	Lisa Hsu
Secretary:	Catherine Farmer

(continued from page 1) He is the inventor of the well known name, Unix; he has written numerous books about C, Unix, and other tools; he has created ratfor, a Fortran pre-processor; and he wrote a text formatter called "roff" in college, in the days before word processing software. Kernighan also worked with specialized languages, such as "eqn," a program which displayed mathematical expressions from text, "pic," a language for drawing pictures, and "awk," a scripting language which allows simple computations in very few lines of code.

Kernighan currently works for Bell Labs of Lucent Technologies with the Computing Science Research group that brought us C, Unix, and C++. His most recent work involves user interfaces, creating a "glitzy veneer" for applications. One of his past projects involved creating a user interface for a wireless design system that draws a "spiffy picture" showing the radio strengths within a building with equipment placed in certain positions. Currently, he spends three and a half days a week here in Princeton and the other three and a half at Bell Labs. **f**

The Birth of ELE 391: The Wireless Revolution Pat Lu '00

ELE 391, "The Wireless Revolution: Telecommunications for the 21st Century," got off to an auspicious start this semester with a class size of almost 130 students. The largest EE class in recent history, drawing engineers, pure-science majors, and humanities students alike, the new course offers a rare blend of technological, social, regulatory, and economic material.

Professor Poor, the instructor, attributes his motivation for starting ELE 391 in part to another interdisciplinary course offered by the EE department, ELE 491, "High-tech Entrepreneurship." Students of the latter, required to write a prospectus of a tech-related industry, would frequently approach Professor Poor for material they would later include in their write-ups. This happened regularly several years in a row, according to Poor. (continued on page 4)

Interview with Brian Kernighan, Inventor and Teacher Joyce Chen '00

Why COS 109? Why "Computers in Our World?"

It started as a reaction to the course at Harvard in a way. It was the only introductory computer science course on campus, and that meant that it swept in essentially everybody who had the dimmest interest in computing... So that course started out with over 450 people in it, and even in the end had over 380... it was an enormous class. It was clear to me that... at one end of the spectrum were the computer science people who wanted to go on and do computing in some way or another, and it was okay for them. At the other end, there were a lot of people who wanted to know something but not anything like the level of detail or the programming depth that we went into in that class... they were just there because they wanted to know something about how computers affected their lives and what they were all about. And so I was kind of interested in the question of whether we could do a course for people from different backgrounds... When I got a chance to come down here for a year I figured, well, let's try it.

COS 111 is a little more hard-core computer science than what I originally had in mind. I had something more in mind where you pick up the paper in the morning and you see a story, and it's something about computing and underneath it there's something technical which is within the grasp of people... and then there's all the social, political, societal implications of the thing above it... That's what I was trying to do; I was not trying to do a miniature computer science course.

How do you think the class turned out?

I enjoyed it a great deal because I met a class of people I would not otherwise meet—it's a very different class than, say, a computer science class... And it's a real challenge to take something technical and explain it to people whose backgrounds are just different. And a lot of the folks in that class are going to go on, and they're going to be the captains of industry or lead our government in 20 or 30 years. From my standpoint it turned out wonderfully. I had a wonderful time; I learned stuff; I met a lot of interesting people. I'll see names 10 or 20 years from now, and I'll think, "Oh yeah! I remember him, I remember her. They were in that class."

So what's the real story of C?

The actual story is that C is Dennis Ritchie's work. It's entirely his work; he designed the language. It's a reaction or an evolution to a sequence of languages that started long ago in England when CPL became BCPL, which was done by Mark Richards in Cambridge. Ken Thompson did a language called B which was a very stripped down version. And then Dennis started with B and made C basically by putting types into the language to give it a better match for machines like the PDP11 which started to have types back in the very very early 70s. And my role in it, besides being across the hall from Dennis, was to write some tutorial material early on and then deciding it could be flushed out into a book, and I coerced him into working on the book with me... I had nothing to do with C. I'll take full credit for twisting Dennis's arm to write the book, and the book probably helps with the language; but at the same time, the language is the thing that matters, not the book.

You taught COS 333 in 1993. What has changed since then?

There was no browser in 1993; it came on the scene in the middle of '93. The Internet was very much around, so I talked about the Internet, but now it's so passé that I probably wouldn't talk about it in this course. The course was entirely Unix based; there was no PC stuff. This time I will admit the existence of PC's and perhaps make you try and make programs run on two environments instead of one. I would guess that between a third and two thirds of what I talked about before would just be completely inappropriate now, seven years later. (continued following page)

Update on Formula SAE Project

Andrew Wu '01

As the fall semester has come and gone, the Princeton Formula SAE team has been hard at work on their first open wheel racer. After the initial buzz, which attracted over 40 people, the main team is now headed by a core group of seven people working in three different groups, with Harris Yong '00 as team manager. One group of two people has been concentrating on the drivetrain, another group of two has been working on the car body, and a third group of three has been focusing on items relating to vehicle control. The drivetrain team has been working on an intake system that will meet competition regulations, which dictate that the diameter of the intake leading the air to the engine can be no wider than 20 mm. A unique design element of this intake system is that it can function with either fuel injection or carburetion. The team working on the car body aimed to design a lightweight but sturdy frame. They used ProE and ProMechanica (a CAD software finite-element analysis program) to determine which beams in the frame were important and which were unnecessary to support the expected loads under 1.2 G of braking and 1.5 G of cornering. The third group on the main team concentrated on designing a suspension system. The prototype that this team eventually settled on - an unequal length, non-parallel double A-arm configuration - is favored in most race car designs for its dynamic and kinematic characteristics and a good strength-to-weight ratio.

After the Formula SAE crew completed the majority of their designs by mid-semester, they began acquiring parts and began actual construction soon afterward. Thus far, they have constructed the intake and restrictor system and part of the frame as well as the left front and left rear suspension. The team acquired their engine from a motorcycle junkyard: a 600 cc, 4 cylinder, Honda CBR600 F3 that produces close to 90 hp at about 12000 rpm in stock form. The engine will require some tuning before it will become serviceable again.

For this upcoming semester, the team will again work in three groups, with one moving to the braking and steering systems, another on the differential and cockpit items, and the third on the shifter mechanism. All three groups will also be working together on the welding of the various parts to complete the frame onto which everything fits. Furthermore, the team has revised its goals, deciding not to enter the May competition this year, and instead to aim for the completion of a driveable car that will serve as a prototype with some carryover parts for competition for subsequent years.

For more information and current updates on the Formula SAE project, all reports and presentations (from fall semester independent work) are in PDF format on the web at www.princeton.edu/~hccyong/fsae. **f**

What role did you play in creating Unix?

This is another example of the Matthew effect. I believe I was the one who created the name, although not exactly spelled that way. The people who were doing Unix had just come off this thing called Multics, so I thought, "Unics." And somehow in the period of about 24 hours, it mutated into "Unix." I had nothing to do with the creation of Unix, but I helped popularize it with books. My user ID on the original Unix system was 9. The first real person was 5, and then 6, 7, 8, and I was 9, a single digit user ID on the original Unix system. So that's the measure of closeness I had with Unix.

Did you expect all these things to become so huge?

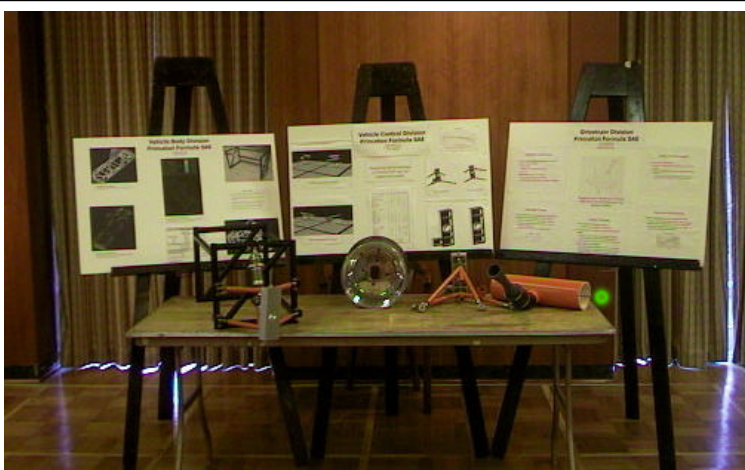
This is one of those things that are what surfing must be like. Every once in a while you catch the perfect wave. This is an example of catching the perfect wave, except that maybe there were a couple of them. There was a wave that came along with the mini-computer, computers like the PDP11 that were cheap enough that individual departments could buy one; so they didn't have to go to a big centralized operation for a big expensive computer. So it spread through universities that way. The second big wave was the PC which came roughly ten years later. I wasn't expecting anything, it was just something happening near me.

What would you do if you weren't at Bell Labs?

If I were thrown out tomorrow, I would probably try to land at a university. It's fun to hang out, it's fun to talk to people, it's fun to try and explain things to people who don't know it yet but then you see them get it.

So teaching is something you've always wanted to do?

When I was a grad student, I was scared out of my mind to do public speaking. We had to stand up and give a one-hour talk on something. I remember just being terrified! I remember this blur as I stood up there and read my prepared speech. And then a few years later I taught a programming class at Bell Labs and discovered it was fun. Teaching is a blast. **f**



Formula SAE Project: Display of work by all three groups.

To all the sophomores out there who joined a club in these past few weeks, and to all the upperclassmen who did it before, and to all the freshmen who are going to do it next year, we'd like to just talk about how this semester began. Last semester ended hellishly – finals are always hellish in courses with names like Intro to Materials Science Engineering and its Applications to Complex Computing Structures (not a real course). But the biggest sleight of hand, the biggest slap to the face, the biggest insult to our intelligence is the fact that a lot of courses here still begin with Intro to (blank) or Elementary (something not elementary). What's the deal with that? We've all taken at least 1100=14=0xC=12 years of math and science, and they still have the NERVE to call these courses intro courses. Call it Really Hard Math for Smart People or something, just to make us all feel better—it's hardly an ego booster to flunk a course with the word Elementary in front of it.

But we digress. Back to the beginning of this semester. Until Bicker/Sign-In Week (BSIW), we lived in a world all our own -- where the sun rises at the end of our day and a PUDES meal plan is the occasional trip to Stevenson when not playing salmonella-roulette at Hoagie Haven. But, for that brief wonderful BSIW, sophomores had a taste of the good life, the life of the AB, the life of humanity. For one week—one short week—we went out every night. We ate, drank, and were merry, and we didn't do ANY work. So the revelry began Sunday night. Everyone we knew was drunk. Even those whom we didn't know drank—they drank... a lot. One of us (guess who) must have had our sense of sight passed through a low pass filter or something because everything was so blurry. What a convoluted evening it was. And so the week went on—at nights we'd go out and have fun, during the days we'd go to class bleary-eyed only to fall asleep. We had no problem sets, no labs, no Friday morning quizzes. The lectures weren't technical (yet), and we hadn't even touched our TI-8* (or our RPN HP's, if you swing that way).

Then the clock struck midnight. Our Cinderella week came to an end as BSIW was replaced with "Your Average Week of Normalcy" (YAWN). Our bleary eyes were once again the result of hours on end in front of those CS101 lab computers. Labs started up, and the Wa and the Haven re-entered our lives. Quad once again had an "e-" in front of it. All in all, BSIW was a week to be remembered (that is, what the alcohol didn't make us forget). It was fun—like a vacation, a hiatus if you will, from YAWNs. It was a fun place to visit, and it dispelled some of the myths of AB life. Think of AB life like ice cream. Ice cream is yummy, but you can only take so much. Eventually you have to get back to the meat and potatoes if you want to avoid a life of serving them in processed form (i.e. flippin' burgers and servin' fries – my, that was so corny, it was practically on the cob). If we weren't engineers we wouldn't have an excuse to make bad jokes (see above...anywhere above), constantly complain about work, and play Starcraft. So all in all, our brief interlude as virtual AB's was fun, and gosh, we wish it could go on. But there are problem sets to be done and equations to be derived. Besides, the geek-squad of the Geek-quad is the best club on the Street anyway! **f**

Club Week:

Where's the Humanity?

Chris Gerson '02 and Lisa Hsu '02

(continued from page 2)

Realizing that there was widespread general interest in wireless communications, Professor Poor decided to start a new course, which he tailored for engineers and non-engineers alike. Topics of his new class not only touch on the technical aspects of wireless communication, but also include issues related to the great worldwide changes that wireless technologies promise. Economic issues include, for instance, the different service providers and equipment manufacturers on the wireless market and various recent entrepreneurial efforts. Regulatory aspects include the impact that various forms of government and intellectual property practices have on wireless technology development. And an example of the social dimensions would be studying history to see what effect wireless communication has had on our society today.

Though wireless technologies are predominantly used for cellular telephony, Professor Poor predicts a future where mobile phones serve not only for voice, but also for images, video, stocks, weather, and on-line orders—in short, the very things that we associate with internet-connected computers today. He also thinks that over half of all telephones will be wireless in less than five years, as has happened in nations such as Finland and South Korea, and which is close to happening in Japan. According to Poor, America lags behind in this area in part because we have a somewhat confusing set of services resulting from multiple technical standards, which is not the case in Europe and much of Asia. "Our multiplicity of standards creates a 'Tower of Babel' effect."

Nonetheless, wireless communication is an industry that is about to explode, with a "new generation of services on the horizon." To get a feeling for the magnitude of the changes to come, consider that, at present, there are only a billion users telecommunications in a world with six billion people. That makes five billion who have little access to telephone, many of whom live in undeveloped countries which both lack a wired infrastructure and the material resources to afford it. Wireless technologies stand to change these societies as profoundly as telephone did the western world. And that, according to Professor Poor, is ample reason enough to take his class. **f**

E-Council Gazette is brought to you by:

Editor: Steve Chen '01

Writers: Dave Kulansky '01, Joyce Chen '02, Pat Lu '00,
Andrew Wu '01, Lisa Hsu '02, Chris Gerson '02.

Layout: Darren Philip '02

Distribution: Queenie Chi u Ki Chan '02