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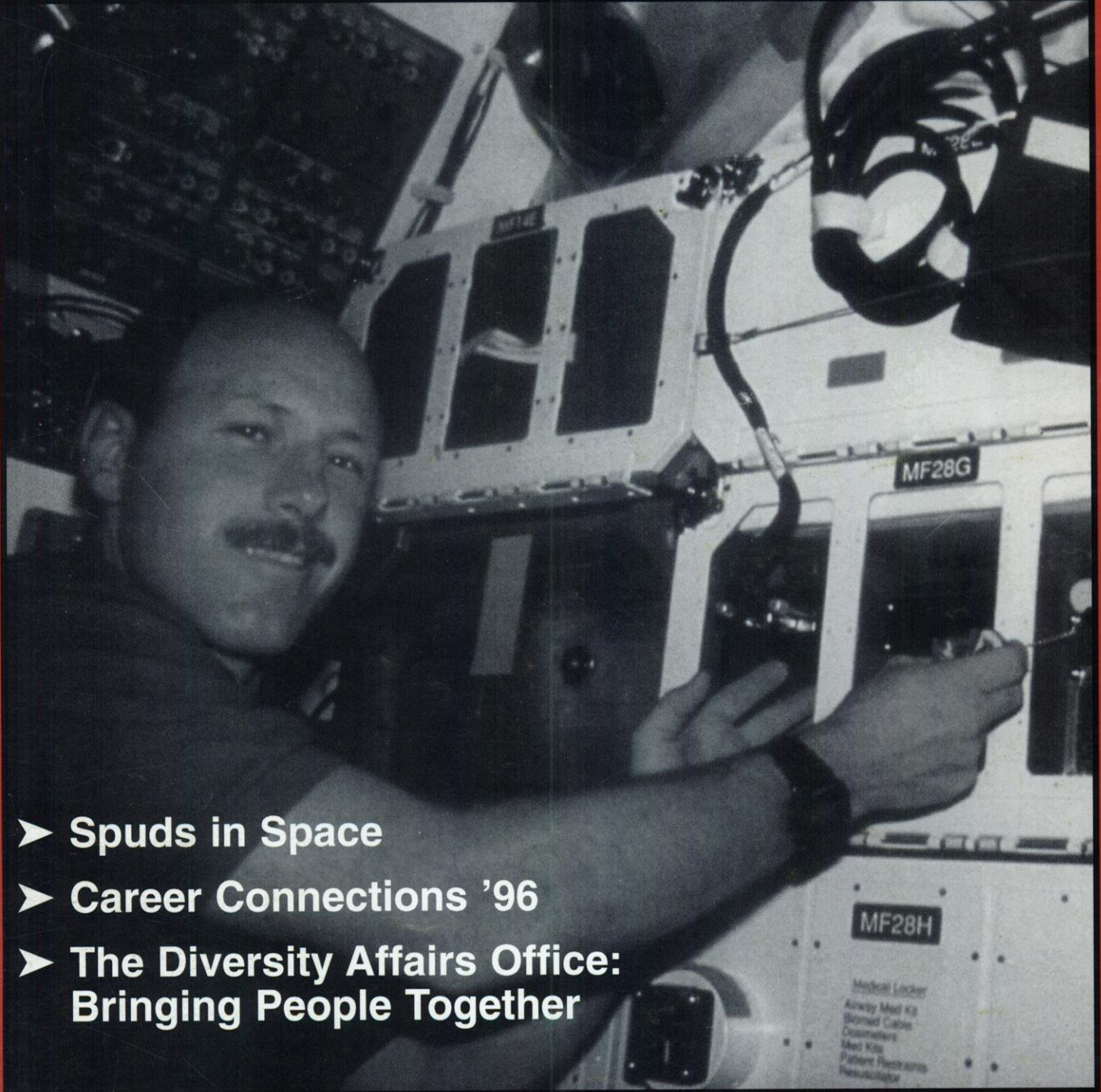
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# WISCONSIN ENGINEER

100th Anniversary

VOLUME 100, NUMBER 4

SEPTEMBER, 1996



- Spuds in Space
- Career Connections '96
- The Diversity Affairs Office:  
Bringing People Together

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ON THE COVER: Astronaut Ken Bowersox activates the Astroculture Experiment on USML-1

Published by the Students of the University of Wisconsin-Madison

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# Editorial

## *Wisconsin Engineer:* A Gold Mine for Those Willing to Dig

I knew I liked being a part of the *Wisconsin Engineer* magazine staff the first time I helped the circulation manager distribute an issue on campus. It was April of 1995 and my first article about the possibilities of fusion as a new energy source was published in this issue.

My job that night was to place the magazine all around Engineering Hall for students and faculty to read the next day. I noticed a group of students in the lobby studying, oblivious to me placing a large stack of magazines next to them. But as I left the building, I looked back in the lobby to see that group of students quickly paging through the magazine, looking at the work I and my colleagues at the magazine had produced.

It was a tremendous rush. I realized writing was something I enjoyed doing. In fact, it changed my focus as an engineering student because I developed a skill many engineering students lack - the ability to write.

I had not written much in my previous three years at the UW. An English paper here, a liberal arts paper there, but I saw no real need to focus on communication skills which most engineers are deficient. But things are changing.

More and more, engineers are called on to do more than just solve problems. They must communicate ideas and concepts, not only to their colleagues, but also to a large public audience.

That's where the *Wisconsin Engineer* comes in. We afford each and every student of the entire UW-Madison campus the opportunity to learn how to build the skills necessary to communicate in the real world. Breaking the classic stereotype of the engineer as completely math

and science oriented and having no English skills is what makes the magazine special.

I know some people think that the *Wisconsin Engineer* (or for that matter, the UW campus) does not represent the real world. Baloney.

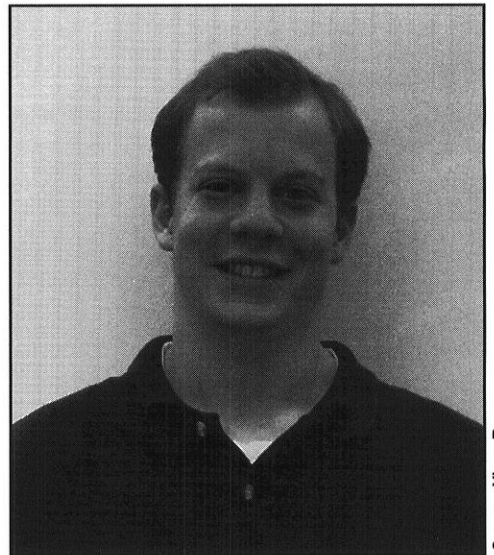
Although the magazine is celebrating its 100th anniversary this year, it faces the same problems as any small business. Financial difficulties, budget constraints and pressure from advertisers and the publishing house are just a few of the hurdles the magazine has had to jump as it moves into its second century of publication.

Fortunately, the *Wisconsin Engineer* is in a growth period. It is now available as a one credit class called EPD 690 for those who would like to learn the basics of writing articles, advertising and layout.

But more than that, the magazine is a chance to get involved with the people and activities which make the UW engineering campus unique. The choices are endless on the types of issues one can tackle.

The uniqueness and variety of each issue is why I enjoyed being involved with the magazine. Instead of learning the same material and doing the same homework as hundreds of other engineering students, my colleagues and I at the magazine have the freedom to write about things we find truly interesting at the UW and beyond.

For me, this story is a happy one. That first article I wrote for the magazine, about fusion, won an award for best general science story, judged by a group of my peers from across the country. I had



Source: Vince Rose

Editor - Jeremy Marwil

no journalistic experience and a very limited writing background when I wrote the story, but it clearly showed off my interest in scientific subjects. Through writing, the excitement of sharing my interests in science and engineering with others was satisfied.

I know there are other budding writers who, like myself, needed a little push to get started. The *Wisconsin Engineer* is the opportunity you're looking for.

# WISE:

## Helping Women Break Through the Boundaries

Being a freshman at U.W.-Madison can be intimidating in itself, but being a female with an interest in a male-dominated field of study can be downright scary. Not only are you dealing with a new roommate, going to huge lectures full of unfamiliar faces and having to make new friends, but all of the other women on your floor are liberal arts or business majors. Not another chemical engineering major among them. What's a girl to do? Become involved with WISE of course.

WISE (Women in Science and Engineering) is a brand new program started for females who intend to pursue a career in science, math or engineering. The program is designed to provide a support network for women while they receive education in areas that are dominated by males.

The program was created and is run by a committee of University professionals. Both Dick Barrows, Associate Dean of the College of Agricultural and Life Sci-

ences, and Barbara Smith, an Assistant Dean of the same college, have played roles in the creation and installation of the program. Students also play a part in

ing in Kellogg House, except eight returning residents (sophomores) who had already selected to live in Kellogg House again, were members of the WISE pro-

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**WISE (Women in Science and Engineering) is a brand new program started for females who intend to pursue a career in science, math or engineering. The program is designed to provide a support network for women while they receive education in areas that are dominated by males**

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the planning and organization of the program. A WISE planning committee made up of members of the program was formed to plan activities and make suggestions about how the program should be run in the future.

The program was put into action for the first time in the '95-'96 school year. At that time, WISE was a residential program with women living in the Elizabeth Waters dormitory. All of the residents liv-

ing in Kellogg House, except eight returning residents (sophomores) who had already selected to live in Kellogg House again, were members of the WISE program. Because more women were interested in the program than could be accommodated in one house, ten members of WISE lived in Pearson House and eight members lived in Hill House. The program consisted of forty-nine members total, twenty-eight of which were majoring in biological sciences and twenty-one of which were majoring in physical sciences (including engineering).

The program was split into an "educational" semester and a "social" semester; however, both semesters contained elements of social activity and educational or informational activity.

Megan Moore, a member of the WISE planning committee, said, "The WISE program serves as a scholarly basis on which incoming freshman women may form relationships with their peers, professors and mentors." Therefore, the program tries to integrate social and educational aspects of the participants' lives to give them both.

During the fall semester, participants enrolled in a one credit colloquium course entitled "Women in Science Seminar." Classes were held on Mondays at 4:35 in the Cedar Room of Elizabeth Waters Hall and were followed by dinner at 5:30. The course was designed and instructed by



Source: Vince Rose

A tutor working with WISE helps a student tackle a tough problem.

Dr. Ken Todar of the Department of Bacteriology and Dr. Jo Handelsman of the Department of Plant Pathology.

The course was set up so that every two weeks a new guest lecturer came to visit. On the first week, the guests would give a talk about their work, and on the second week they would return for a discussion. All of the guest lecturers were female professors from different departments on campus. The lecturers covered a wide variety of fields including: physics, botany, computer sciences, pathobiological sciences and electrical and computer engineering.

According to Megan Moore, this class was great. "Not only have I had the chance to debate and discuss current scientific issues, but I have had the chance to learn from female professors that it is possible for women to succeed in the sciences, no matter what circumstances they must overcome."

While there wasn't a class for WISE in the spring semester, several different social activities were available for the women to take part in. Besides social gatherings and a trip to the zoo, the program also scheduled excursions to different labs and professional facilities in the area. These tours were arranged to cover a wide variety of fields, so that members interested in a particular field could take the tours that would interest them the most. The tours also gave the women exposure to real-world settings and a chance to see career paths other than academics.

Another important aspect of WISE is the mentor program. Each member is assigned a mentor whom she can go to for answers to questions or for advice about academics, the University or anything

eral of the program's participants.

Karen Lewis, a physics major and member of WISE, said, "I have found that the most beneficial part of WISE was the mentor program. My mentor has been a great source of information, encouragement and inspiration."

The WISE program also provides tutorials for the women and the chance to form study groups. Lewis found this to be another important aspect of the program, "It's great to have people in your classes that live just down the hall." After all, as freshman many of the participants take the same basic, introductory science and math courses.

As a new program, WISE has run into some problems with organization and planning for the future. These are the kinds of problems that all first-year programs face, no one has any experience precisely because nothing like this has ever been done before. It will probably take a few years to get the planning and organization smoothed out, but WISE is definitely "up and running."

Plans for the future include switching the first semester to more of a social time so that members can get acquainted and build friendships. This, in turn, would mean the class would be held second semester. According to Laura Jensen, the housefellow for Kellogg and a double-major in zoology and mechanical engineering, they will also probably try to keep all the residents in WISE in Kellogg House in the future.

There has also been talk of turning WISE into more of a club program after the first year, while still giving freshmen the opportunity to be involved in the resident program. In all likelihood, women

In order to participate in the WISE residential program, incoming freshmen must complete an application and submit an essay. For the first year, anyone who showed an interest in the program

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## **In order to participate in the WISE residential program, incoming freshmen must complete an application and submit an essay**

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(by doing these two things) was admitted; however, this also may change in the future.

WISE may be in the very beginning stages of existence, but it has already provided valuable resources and support for forty-nine women interested in science, math and engineering. Traditionally, these areas have been dominated by men, and even though that is beginning to change, entering the professional world in one of these fields can still be daunting for many women. WISE offers invaluable support for these women who may need the encouragement of someone who's been through it all and knows what it's like. WISE also offers women studying in the sciences a chance to form relationships with other women who are in similar positions. Programs like WISE may be an important step in getting women, who may have much to offer, interested in science and engineering to begin fulfilling careers in science and engineering, and this is something we could all benefit from.

**Author Bio:** Soon to be Editor, Michelle Truscott brings her knowledge of English, Psychology and sometimes Industrial Engineering to the Wisconsin Engineer magazine.

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## **The WISE program also provides tutorials for the women and the chance to form study groups...many of the participants take the same introductory science and math courses**

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else. The mentors are all professors or faculty members in science departments who can offer advice and relate firsthand experiences to the students. This program has been very beneficial for sev-

would live in Kellogg their freshman year, and for the rest of their academic years they would live wherever they wanted and participate in WISE on a club-basis.

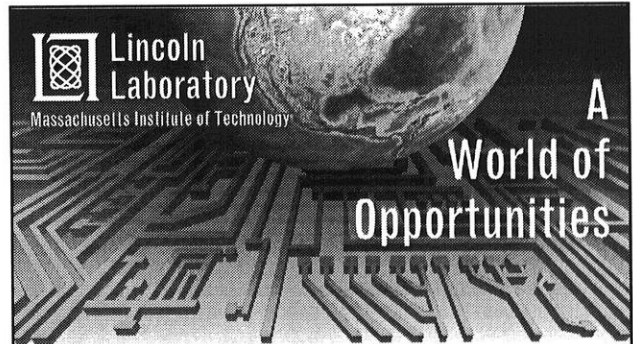
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# The Yoke's On You

**"W**hich came first, the chicken or the egg?" This question has blossomed in today's society to the point that almost any situation is compared to it. For instance, "Which came first: depressed persons or alcoholics, bees or flowers, proteins or nucleic acids, confidence or success?" If you thought that was enough, I have heard even better ones. How about, "earnings or reverse stock splits, designer clothes

or enon drives many people to decide that the question is unanswerable, or not worth the time to answer. Bernice Napach writes, "It's a matter of the chicken or the egg. There's not one without the other. And no one truly knows which came first."

The source of the confusion is laid in the foundation of the question itself. Many people make the assumption that the egg

conundrum and are making their decision by probability alone, much like flipping a coin.

The point is that no one knows which came first, the chicken or the CHICKEN egg. It is a conundrum, to which people postulate an answer by probability alone. But to get to that point, the assumption of the chicken egg must be made. The whole riddle is dependent upon it and this is why the question was formulated in the way that it was.

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**For many people the chicken-and-egg question is the source of much frustration because it is a conundrum. They imagine a chicken which lays an egg which hatches to produce another egg-laying chicken**

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or styles of the street, Perry Mason or theatrical real-life lawyers?" These answers cannot be determined because the two options are dependent upon one another to exist.

A question like "Which came first?" is called a conundrum. Webster's dictionary defines this as "a question having only a conjectural answer." The answer is conjectural for two reasons. First, no human being was witness to observe which option actually did precede the other. Second, there is a cyclic nature to the two options. One is dependent upon the other, and therefore it becomes impossible to trace the source because you always end up coming back to where you started.

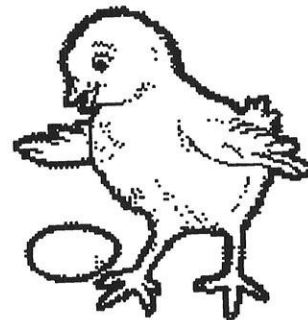
For many people the chicken-and-egg question is the source of much frustration because it is a conundrum. They imagine a chicken which lays an egg which hatches to produce another egg-laying chicken. This cyclic phenom-

referred to in the conundrum is a CHICKEN egg. This is the supposition that leads the majority of responders down the cyclic road to frustration. To demonstrate this more clearly, a survey asked four dozen college students between the ages of 18-23 the question "Which came first, the chicken or the egg?" The responses were nearly cracked right down the middle: 52% (25 of 48) said chicken, 48% (23 of 48) said egg. To go further, the responses did not seem to be influenced by the age, course of education, gender or living environment of the individuals in the survey. One explanation for these results is that people are falling into the

So what happens if the assumption of a chicken egg is not made? An answerable question results, namely, "Which came first, the chicken or ANY TYPE of egg?" Laura Erickson writes, "Every chicken came from an egg, but eggs come from many species—from turtles and dinosaurs to duck-billed platypuses." This leads back to the inevitable rebuttal, "All right, if the egg was first, where did it come from?" A small Arkansas girl counters best, "The Easter Bunny" (Carter). Unfortunately, it is not that easy.

**Continued on p. 10**

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# SPUDnik

## Growing Potatoes in Space

Researchers at the UW have developed the technology to grow a potato in space.

No, you have not mistakenly picked up the weekly Onion™, and this is not Dan Quayle's report on education in America.

for eventual use as a food source on the space station. According to Professor Judy Croxdale who has researched plant growth for the project, "With the cooperation of the world's countries I'm quite positive the station will be built by 1999."

you can use it on the moon; you can use it on Mars."

Potatoes were chosen for testing the module, because the botany department has worked with a potato that can grow from a leaf cutting to a tuber in 16 days regardless of being on or off Earth. Sixteen days is the time available on the longest space shuttle missions. According to Croxdale, potatoes use their tuber as a storage place for starch, which is the end result of photosynthesizing sugars, and is eventually used as the plant's energy source.

The research conducted in the October-November 1995 mission of the Microgravity Lab II aboard the shuttle showed that starch accumulation in the tuber was no different in space than on earth. Professor Croxdale had expected problems because of previous experiments that failed to work. "I thought it (the tuber) would look like some kind of gnarled cauliflower. In the past, the roots went up; the leaves went down; everything went all over." However, researchers determined that equipment design error had caused the problems in other experiments. These ongoing experiments show it is possible to grow normal, edible plants in space.

Remember Tang and Velcro? These were offshoots of the space industry's rush to the moon in the 1960's.

Some of the technological breakthroughs that have resulted from the ASTROCULTURE™ Project have already produced commercial benefits. Owners of large commercial nurseries nationwide have snapped up the module's water and nutrient delivery tubes. The project also developed a system of air

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### The members of the ASTROCULTURE™ project are doing research on plant growth and respiration, for eventual use as a food source on the space station

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Can you imagine coming into existence, and growing up within the confining space of a five inch cubicle — all without gravity to strengthen you and without sunlight to gain energy? Those are the limits that the Wisconsin Center for Space Automation and Robotics (WCSAR) was given when designing the miniature greenhouse module that would send a cutting from a potato leaf into space to grow into a potato tuber.

Why is sending potatoes into space so important? Don't we have enough cropland here on earth? Raymond Bula, director of the WCSAR ASTROCULTURE™ Project, was very positive that the US would be participating in an international space station before the end of the decade. The members of the ASTROCULTURE™ project are doing research on plant growth and respiration,

It would be impossible to send a shuttle home to Earth for groceries every few weeks when the astronauts run out of munchies, because each shuttle flight costs taxpayers \$400 or \$500 million. The best alternative is for the astronauts to grow their own food in space.

The University of Wisconsin's ASTROCULTURE™ Module is the only plant growth module in the world that works in space. According to Bula, "Handling fluids in microgravity is by far the most difficult thing. The Russians have tried it. Their chamber is inadequate. NASA had a chamber developed which is inadequate..."

"In the system we developed we were able to show that it functions independent of gravity. You can use that system here on Earth or you can use it in space;

humidification/dehumidification that does not need a gas or liquid separator as other systems do. The plant lighting subsystem uses light-emitting-diodes (LED's) to give large amounts of light at specific wavelengths while using very little power. These LED's are already being used in photosynthesis research, and some unique medical applications, such as measuring blood sugar levels or use in photodynamic cancer therapy.

Other applications of the ASTRO-CULTURE™ technology include improved dehumidification/humidification units, with efficient irrigation systems, and energy efficient lighting systems for large scale commercial nurseries. The traditional method of studying plants has been in their natural environment. Over the past few decades that approach has changed to one of research in a controlled environment where scientists are able to control each

variable. Bula says the space station offers two good additions to plant research compared to the shuttle. The volume available to grow potatoes in is much greater, and the lengths of time available to grow plants and study them will be unlimited, unlike the current maximum flight of 16 days. There are still more questions: plants on the missions died earlier than earthbound plants.

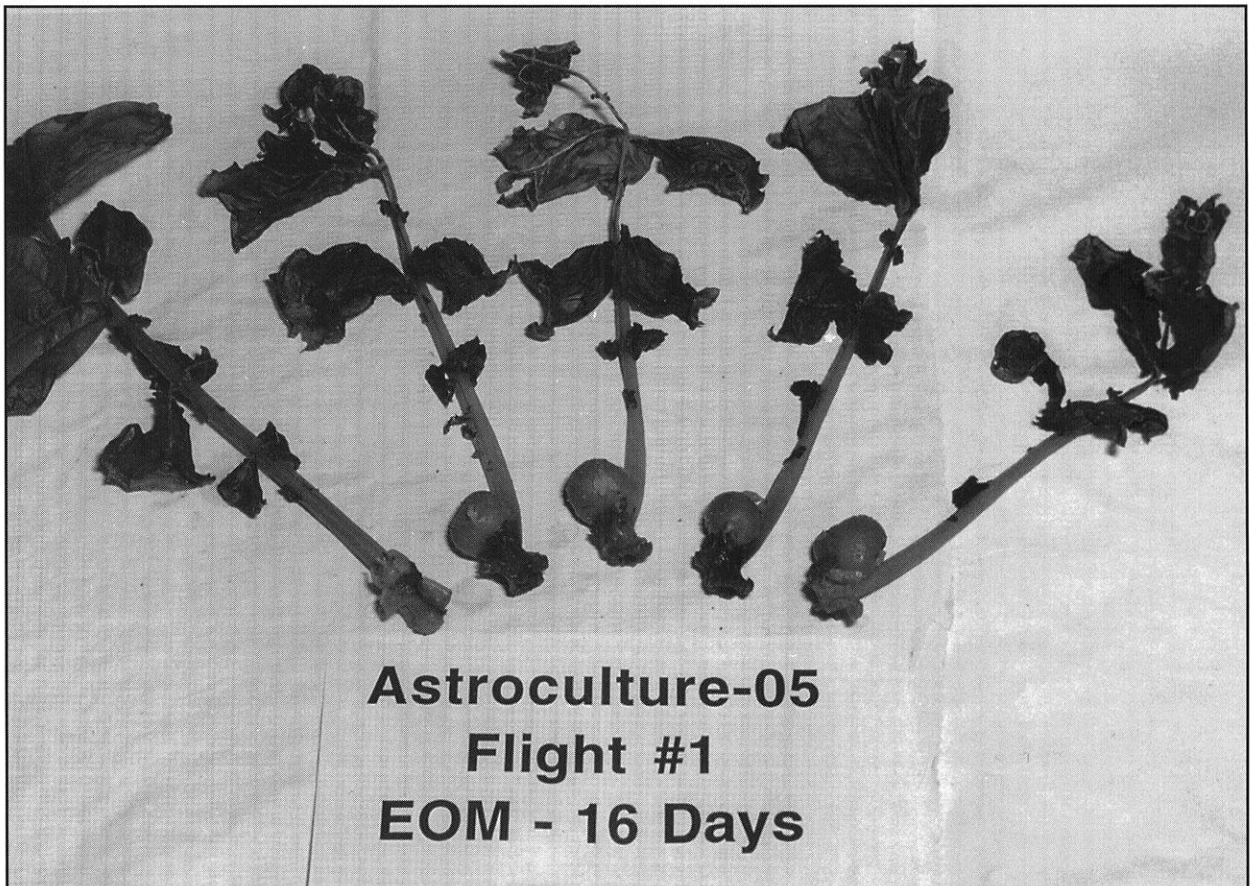
According to Bula, "It's worthy of going up there on the space station and determining whether this is a reaction to microgravity or is it a reaction to the growing system that we have."

WCSAR has now moved to the next step and is actually building the refrigerator sized ASTROCULTURE™ unit that will supply food for the space station by 1999.

The first astronauts on the permanent

space station will be farmers — farmers operating high-tech robotics, but farmers nonetheless. As William Cowper Braun said in the 1800's, "No-one can be a patriot on an empty stomach."

**Author Bio:** Dan Hanson is a sophomore in Engineering Mechanics who loves to mountain bike and train for the upcoming marathon in his spare time.



Source: Kennedy Space Center, Florida

Tubers grown from a potato leaf during a 16-day shuttle flight returned perfectly healthy.

## Continued from p. 6

The original source of the egg lies within a much larger question. That is, "Do you believe in evolution?"

Some argue that there is no such thing as evolution. Creationists, those who believe that God put everything on Earth in the first six days of its existence, do not

recorded egg-layer, an animal called *Amphioxus*. According to Dal Stevens, *Amphioxus* was "a two-inch long, unobtrusive little sea lancelet which spent most of its time burying itself in the sand." This evidence should be enough to prove to an evolutionist that the egg came before the chicken.

But what if the red jungle fowl was not the first type of chicken? Or what if the

through the riddle, "Which came first, the chicken or the egg?" and emerge with an answer. Most people make the assumption that the egg is a chicken egg and guess the answer by chance. This is the trick to the riddle and it must be avoided. Without this assumption, an answer can be determined. However, the exact answer is personal and specific to your evolutionary beliefs. According to the beliefs of the study group, over 90% of people should believe that the egg came first.

The evidence is strong for both sets of beliefs, and knowing that they exist breaks open the conundrum. Now instead of making you frustrated, your educated answer to the riddle can make you feel sunny-side-up or finger-lickin' good.

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**Author Bio:** Jay Wilkins was a chemical engineering major who graduated in the spring of 1996. He also completed majors in Biochemistry and Molecular Biology in his five years at UW-Madison and is currently enrolled in medical school. He enjoys playing golf, singing and enjoying a cool lemonade on a hot summer day.

## By using genetic and fossil evidence, it is relatively easy to compare the evolutionary origins of the egg and the chicken

believe in evolution. They contend that since God created all animals, the chicken would naturally come first. This is called the foul-fly-first theory according to Janice Okun. She claims that, "according to the bible, the chicken came first." This is in reference to the animals that God created on the fourth day of creation. Verse 1:20 from the book of Genesis reads: "And God said, 'Let the water teem with living creatures, and let birds fly above the Earth across the expanse of the sky.'" So how are we to know that a chicken was one of those birds? Well, Noah took two of every animal on the ark with him during the great flood. If he hadn't, no chickens would have survived to be alive today. This evidence proves that the chicken beat the egg.

However, most people in this study do believe in evolution. In a survey of the same four dozen college students, an overwhelming 92% (44 of 48) replied that they accept the theory of evolution. Now we can look back at the question of "Which came first, the chicken of ANY KIND of egg?" with these beliefs in mind.

By using genetic and fossil evidence, it is relatively easy to compare the evolutionary origins of the egg and chicken. The origin of the chicken as we know it was recently discovered by a team of American and Japanese geneticists. Ross Clark writes, "Farmers in 6,000 BC first thought of capturing and domesticating the red jungle fowl." Even if this estimate is off by 2,000 years, the egg fries the chicken by nearly 500 million years. In that time period lived the first

lancelet egg is not developed enough to be considered a true egg? To address these types of arguments it becomes useful to focus the question further. If a developed egg (like a chicken egg) predated the earliest known bird, it follows that it would have also preceded the first chicken.

So now the question becomes, "Which came first, the DEVELOPED EGG or the FIRST BIRD?" This question can be answered readily due to amount of research on fossilized dinosaurs. Among one of the fossils from the late Jurassic period (150 million years ago) is that of *Archaeopteryx*, the ancestor of all birds. *Archaeopteryx*, meaning "the ancient-winged one", was a "poor flier, capable only of gliding flight" (Stevens). Despite its skill in the air, it was named the ancestor of all birds because it was the first animal to have feathers. But archaeologists have found that a developed egg hatched about 75 million years before *Archaeopteryx* glided. Dal Stevens writes:

"The oldest land egg we know of is a dinosaur egg—a fossil egg found in the lower Permian deposits in Texas and thus about 225 million years old. You'll probably be disappointed to learn it's a rather small egg—only two and three-quarters of an inch long and slightly larger than an average domestic hen's egg."

But, there is no disappointment with this evidence for it proves for those who believe in evolution that the egg came before the chicken.

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# Computer Science and the College of Engineering?

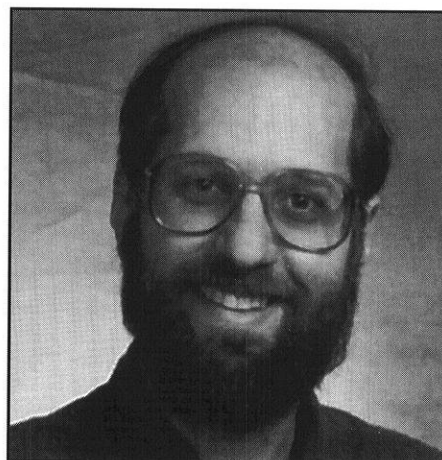
At UW-Madison, there has been some talk of the Computer Science Department (presently in the college of Letters & Science) moving into the college of engineering. It should be noted that, as of this writing, the talks had completely broken down in mid-March with each side uninterested in going further.

This is an interview, from Wednesday, March 27, with the Chair of the Computer Sciences Department, Marvin Solomon and it shows the disparity between the departments in this hotly political issue. It should be completely spelled out that this is not a new concept unique to this university. The idea has been implemented in other universities, most notably MIT. In addition, saving money is not the central issue. Rather, the clash of different cultures in the two disciplines is the central point. The differences between the anti-establishment culture of computer science and a militaristic engineering culture are noticeable to many. However, both may benefit in learning from each other.

talking about different sized units here. Computer Science is a department of the College of Letters and Science, just as the department of Electrical and Computer Engineering is a department of the College of Engineering. The discussion was whether the Computer Sciences department would be better off administratively under the direction of the College of Engineering than under the College of Letters and Science. Several other Computer Science departments in other universities had to make similar switches. There are not that many Computer Science departments that are still in arts colleges except at schools that do not have Engineering schools.

**W.E.:** Could you give a general overview on what happened in the past?

**D.S.:** Several years ago, one of the associate deans in the Engineering College approached the Computer Science department about the possibility, and we considered it in informal talks and



Source: Computer Science Department

**Professor Marvin H. Solomon, Chair of the Computer Science Department, dismisses the rumors about Computer Science merging with the ECE Department.**

sion as various people had suggested that it might be a good idea... There was never any formal proposal.

**W.E.:** Who were the prominent supporters and non-supporters in this change of departments?

**D.S.:** It never got as far as a formal debate, because there was no proposal. So, those of us that had been chair of the department in the past saw the benefits. I guess everyone that had been chair of this department in recent years was generally sympathetic and could see the various advantages in terms of infrastructure and support itself. I don't know if there are any real opponents, but there are people who have various ideas about what would be acceptable terms. So it's really the question of what are the pros and what are the cons.

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**'There are concerns, basically whenever there is a change, people are concerned that people are not going to lose already what they have and they are going to gain something in addition'**

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**Wisc. Engineer (W.E.):** Dr. Solomon, how do you relate to the merging of the computer science department and the college of engineering?

**Dr. Solomon (D.S.):** First of all, let me explain, this is not a merging. You are

I wasn't the chair at the time, so I don't know what happened then. It never went anywhere, so we dropped the issue. It then began a year or so ago, maybe longer than that, maybe a year and a half ago. There was some discus-

**W.E.:** Could you name some of the pros?

**D.S.:** Certain aspects of the infrastructure, for example the engineering college has a very good co-op program, well organized. In L&S there is no such program, there is simply anything that co-op interests are making to the department. There are a few other things like that.

**W.E.:** Is there any negative aspects in what this would entail?

**D.S.:** For example, we have a very large number of graduate teaching assistants. A much larger number than any engineering college department. That could be larger because we do a very large service function, teaching various things across the university, not just the college. There is a very obvious concern that if we switched colleges, that we would possibly lose positions.

**W.E.:** So there is resistance on the part of Computer Science as well as Engineering to this?

**D.S.:** There are concerns, basically whenever there is a change, people are concerned that people are not going to lose already what they have and they are going to gain something in addition. Otherwise, there is no point in voluntarily changing and so we were concerned about maintaining certain things that we liked about our current situation. If we were to move, we would need certain guarantees.

**W.E.:** Do you see a lot of benefits toward education, I am a Computer Engineering major myself and I think that I could see quite a few benefits to this.

**D.S.:** There is a lot of misunderstanding about this, as a matter of fact, I wrote an article in our alumni newsletter at least a year ago about the possibility of changing colleges. Our response from the alumni who look at it in a curriculum point of view said "I was a Computer Science major in L&S and wouldn't want to be an engineering student and I was very happy about this major in a Bachelor of Science degree." I think that was a misconception, the academic programs are considered tied to colleges but they are not 100 percent wedded to them. So if

we were to switch colleges, we would want to maintain a degreed program. As a matter of fact, we currently have a large degreed program in Engineering, something like a third of our majors are actually second majors from people who are majoring in Electrical and Computer Engineering. So in some sense we are already straddling two departments...As you know as a

touchy, maybe they are still thinking it is going to work.

**D.S.:** Never say never. There are a lot of attractive features to being in Engineering that's one of the reasons as I say, many of the other Computer Science departments at other universities have made similar moves at other universities but right now there are no active talks. You have to understand that

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### **The discussion was whether the Computer Sciences department would be better off administratively under the direction of the College of Engineering than under the College of Letters and Science**

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student, your major is only part of your degree, most of your requirements have nothing to do with your major. Your major corresponds to about  $\frac{1}{3}$  of your courses. So students who are majoring in Electrical and Computer Engineering and are majoring in Computer Science, who are getting a bachelor of Engineering degree, have all sorts of Engineering requirements, conversely students in L&S have all sorts of liberal arts requirements, so it's a very different program.

**W.E.:** This topic appears to be a very touchy subject, especially in the Engineering college, can you tell me why that might be so?

**D.S.:** People are always worried about major changes. This is understandable... People are always worried about are they trekking on our turf, are they going to be doing as good a job as we would with this course, are they going to convert resources that we would get otherwise. So I could imagine and I'm just hypothesizing, some of the departments of Engineering are worried that we would change the culture, that we would soak up resources and if there is another department there is only so many dollars to go around...I don't think that our move to Engineering would affect anybody really, except for our people and people in Computer Engineering.

**W.E.:** I can't understand why some of the people in Engineering are so

difficult to be in limbo, we really have to be 100 percent in one college, in that way. So we talked about moving into engineering and it was all in the up and up. But at some point we decided that it wasn't going to happen. A year from now, if people want to open up the case, it could happen. Quite definitely, right now there are no discussions.

Reflecting on what Dr. Solomon said, and going further, technology will dictate how Computer Science and Engineering become intertwined. Thus, questions of if the Computer Science department should join the Engineering college should only intensify in the years ahead.

**Author Bio:** Rob Nelson is an ECE junior. Writing is like sex, the more you do it, the better it becomes. After a while it becomes an irreplaceable form of expression.

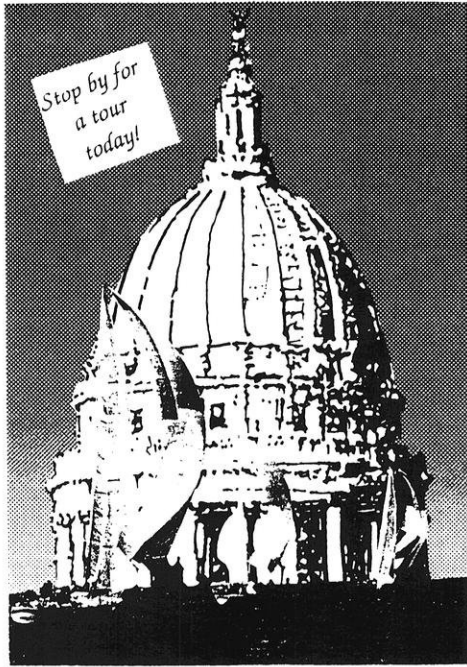




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# The Times, They Are a Changin'

As the *Wisconsin Engineer* comes to an end of its 100th year, we find that it is not only a time to look forward to the next 100 years, but it is a time to reflect back. The University of Wisconsin-Madison has been in existence for 148 years, since 1848 to be exact, and for over two-thirds of that time the *Wisconsin Engineer* has been a part of it. So, before moving on to our next centennial, let's take a moment and see how the University has changed, how the College of Engineering has evolved and how the state of Wisconsin itself has grown.

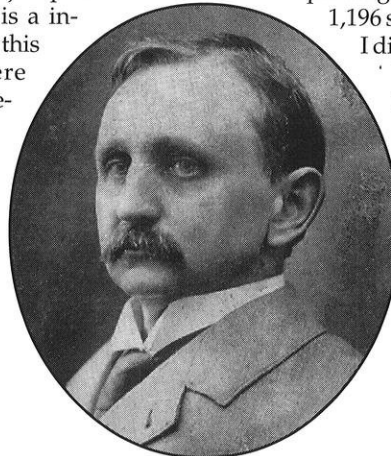
## Let's Talk Size

Starting big and working small, we are not at all surprised to find that the population of the state of Wisconsin has grown tremendously in the past 100 years. What may be surprising though, is just how much this state has grown. In the 1890s, the population of the state of Wisconsin

was 1,693,000 people. Of this, 51.9% of them were male while 48.1% were female. In 1993, the population jumped to 5,058,000 people. This is an increase of 299 percent. Of this population, 49% were males and 51% were females.

With this tremendous growth we might expect a similar trend to occur at the University. And it does, to an even greater degree. Including undergraduate, graduate, law and professional students the total enrollment for the 1894-95 school year was 1,196. Compare that to the 40,305 total students enrolled in the 1994-95 school year and you'll see that this

is a whopping increase of 3,370 percent. Gee, think of how easy it would be to find a parking space if there were only 1,196 students here. But I digress.



**J. Butler Johnson**  
The First Dean of Engineering  
(1899-1902)

Unfortunately, there is no data as to the number of woman enrolled at the University in 1894. The first year for which there are numbers is the 1916-17 academic year in which there was a total student population of 5,020. Of these, 3,330 were men and only 1,690 were women. In 1994-95, this ratio goes from 2:1 to al-

Source: Photographic Media

most 1:1. At that time, 20,276 men were enrolled at the University and almost an equal number of women at 20,029.

## Why, I Remember the Good Old Days...

As always, the question of money always seems to pop up. Obviously, things cost a lot more today than they used to, but why is that. Are things really getting more expensive? Is the cost of living truly increasing that much? Maybe we all just have a lot more money than we used to. Or maybe things cost

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**...in 1907, "Young men of the ... College of Mechanics and Engineering ... are required to take gymnastic exercises during the first two years of their course, and are also required to take military drill"**

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relatively the same as they always have, but inflation has just increased that



Source: Photographic Media

And you thought that today's construction was bad! This photo from before 1900 takes us back to a time of wooden plank sidewalks before the use of concrete. Science Hall can be seen in the foreground and what is now Music Hall is in the background.

### Notable Accomplishments at UW

Now let's move away from the statistics for a while and let's learn about some neat facts and historical firsts accomplished at the University in these past century and a half. The following is only a small portion of the many fascinating things that have taken place at this university.

- 1854 - UW awards its first degrees to Levi Booth and Charles T. Wakeley
- 1869 - First bachelor's degree to women
- 1907 - Wisconsin Union founded as one of the first college unions in the nation, second only to Harvard
- 1910 - The genetics department, known as the experimental breeding department until 1918, is the first such department in the U.S.
- 1917 - WHA opens and becomes the first radio station in America (the WHA call letters were assigned in 1922)
- 1928 - The Memorial Union opens with the first university art gallery
- 1933 - The Memorial Union becomes the country's first public university union to serve beer (3.2 percent alcohol as declared by Congress as non-intoxicating)
- 1951 - UW-Madison researchers are first to transfer a fertilized ovum from one cow to another, which gives birth to a calf
- 1967 - On October 18, protest against DOW Chemical begins a series of anti-war protests which culminate in the August 1970 bombing of Sterling Hall, killing one graduate researcher and causing extensive damage
- 1968 - First bone marrow transplant, performed at UW Hospital
- 1970 - First gene synthesized by Professor Har Gobind Khorana
- 1971 - Union South opens
- 1989 - The touchtone registration system goes into effect

much. To begin, a brief economic lesson is in order. The Consumer Price Index (CPI) is how economists relate today's dollars to those of years past. Using CPIs, one can take the price of something from any given year and adjust that price to reflect what that item would cost in today's market. In other words, we can convert how much something cost in a past year to how much it would cost if it were being purchased today. CPIs are recorded for numerous items, but for our purposes we will just be using average CPIs for the given years. These numbers, coupled with a few adjustments, can be used to determine if items cost more due to the cost of living increase or simply because they are now more expensive.

With the beforementioned adjustments already taken into account, the CPI for 1900 was 25, for 1950 was 72.1 and for 1994 was 459.9. This means that what cost \$25 in 1900 cost \$72.10 in 1950 and \$459.90 in 1994. If we now look at the cost of tuition in 1900, we find that if you were a resident of the state of Wisconsin, undergraduate tuition was free, but there

was a "fee" of \$10/semester to attend this University. If you were a non-resident, undergraduate tuition was \$15/semester and again there was a "fee" of \$10. This brought the total to \$25/semester. Converting this into 1994 prices, a resident would be paying \$183.96/semester and a nonresident would be paying \$459.90/semester. Comparing this to the cost of undergraduate tuition in 1994 we find quite a discrepancy. Tuition for residents was \$1,368.25/semester and for non-residents was an amazing \$4,547.75. Apparently, tuition has risen dramatically over the years, well above and beyond that of inflation. And so it seems as though those "good

old days" weren't so bad afterall.

### The University of Old

To paint a better picture of the way things were at the University perhaps it would be helpful to look at more than just statistics. What was it like to be on the University at that time? How were

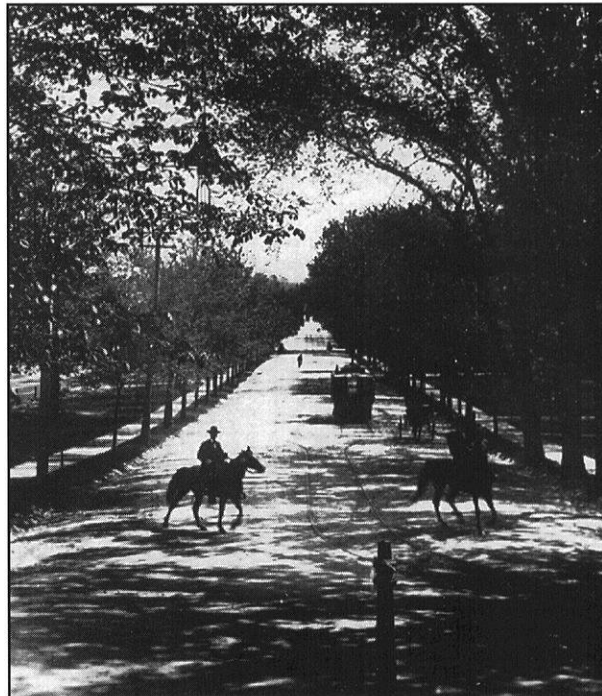
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**The University of Wisconsin-Madison has been in existence for 148 years, since 1848 to be exact, and for over two-thirds of that time the *Wisconsin Engineer* has been a part of it**

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things different. Maybe looking at the University of Wisconsin student handbook from 1907-08 will supply us with the answers we seek.

At that time there were 4,039 students at the University and while the University owned a comparable amount of land, there were only 44 total buildings on



Taken from the bottom of Bascom Hill, looking East, this picture shows State Street as it was in May of 1896. Visible are the cutting-edge trolley car, a horse-drawn carriage and two men on horseback.

Source: Photographic Media

campus. Compare this to 204 buildings today and it's no wonder things are crowded. There were only five libraries on campus (compared to 45 now) and almost all of the buildings were located around the East side of Bascom Hill with only the Agriculture buildings being further away.

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**This measurement signifies what cost \$25 in 1900 cost \$72.10 in 1950, and cost \$459.90 in 1994**

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Women were enrolled at the college by this time, but the concept of a co-ed dormitory was not to be found. According to the handbook, "By a resolution of the Self Government Association women students will occupy rooms only in such lodging houses as accommodate women exclusively, and in which a parlor is provided for the reception of visitors." Does Elizabeth Waters sound familiar? And what about professors? Did you ever have class in Van Hise Hall? How about Van Vleck, Sterling, Bardeen or Lathrop? And how about living? Ever live in Cole, Bradley or Sellery? If you were a student here in 1907 you didn't, but chances are you still knew these names. With the smaller number of people in residence, there was actually a pretty good chance that you would accidentally run into one of the gentlemen whose names adorn these buildings. They were all professors here at this

time and they have all made lasting impressions on our lives.

### The College of Engineering

We've seen that the state has changed in the past 100 years and we know that things are more expensive, but what about our beloved college. Has the College of Engineering changed as much as the rest of the world?

To answer that question let's again see what the University of Wisconsin student handbook from 1907-08 has to say. At that time, there were 921 students enrolled in the College of Engineering. Fifteen of them were graduate students and another 43 were adult special students. Though the classes were somewhat different, the degrees offered were very similar to those offered today. The main engineering disciplines were civil, mechanical, electrical, general and chemical engineering with nuclear engineering being the notable exclusion.

Industrial engineering fell under the general engineering group as well as did mining engineering. Within those disciplines the classes were different than today, but the ideas behind them were still the same. Many of the basic requirements, such as mathematics, English and foreign language, were the same, but certain upper level classes are no longer available. Classes in railway engineering and mining engineering are examples of these.

Though foreign language was a requirement in 1907, it should be noted

that German and French were the recommended choices, although Spanish was acceptable. It is no coincidence that at this time, Europe was the scientific center of the world. Another notable change is that in 1907, "Young men of the College of Letters and Science, College of Mechanics and Engineering, and the four year courses in agriculture and pharmacy, are required to take gymnastic exercises during the first two years of their course, and are also required to take military drill." Women had to take gymnastic exercise, but were exempt from the military drill.

### So What's Ahead?

It is clear that much has changed in the past 100 years. Some people say change is good, while others would hotly debate this. Regardless of which is true though, one thing is clear. For better or worse, the world will continue to change and the *Wisconsin Engineer* plans to be there when it does.

All statistics for this report came from the U.S. Census Bureau, the U.S. Department of Labor Bureau of Labor Statistics, WiscInfo and various sites on the Web. For more information, check out the WiscInfo page on the internet.

**Author Bio:** Rumor has it flying pigs were seen flying over the frozen tundra of Hell. Apparently, Jon Furniss is supposed to graduate this semester. But wait, the fat lady ain't singing yet...



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# Different Strokes for Taller Folks

## Wisconsin Alumnus Rows to Olympic Glory

Ex-UW student and athlete, Eric Mueller and friends did something that no other Americans have ever done. On Sunday, July 28 at the Olympic Summer Games in Gainesville, Georgia, Mueller, a former University of Wisconsin crew member, was part of the U.S. men's quadruple sculls crew that won a silver medal. Started in 1976, no other Americans have ever won a medal in this event.

Considered a long shot to medal, the American team gave it their all in this 2,000 meter race. The favored German team jumped out to an early lead which it never relinquished. But the American team showed early that they were there to compete. After battling a strong Italian crew for second, Mueller and company began to pull away by 1,500 meters. In the final 300 meters, the U.S. crew had the best boat on the water and closed to within three-fourths of a length of the Germans to finish second with a time of 5:59.10.

There were no fancy tactics or strategies from the American crew. They just rowed as hard as they could, for as long as they could. "We were just redlining the whole way, from stroke one," said Mueller. "We got the rhythm of the race going five strokes in and just all the way, that was our plan, no moves or anything."

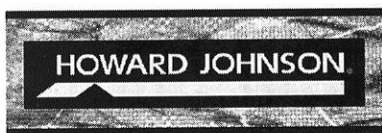
Eric, who worked as a student for Dan Dudley at the U.W. Heating Department, began rowing in 1989 as he was studying to become a mechanical engineer. After graduating with a degree in mechanical engineering, the 6-foot-7, 215-pound Mueller worked as a Fire Safety Engineer with MBS/Hughes Associates, Inc. until moving to Augusta, Ga. in 1995 to make a renewed push to make the Olympic team. A member of the National Team for two years, Eric and his buddies have been traveling and competing for most on the last year and have spent nearly 25 weeks on the road. They competed in

the 1995 world championships where Eric helped the U.S. team to a sixth place finish.

Eric, who is now 25, has not decided what is next for him. He has his degree in mechanical engineering from the UW, and beyond rowing and more conventional work, he may pursue the possibility of graduate school. "I'm going to take awhile before I have another race like that," Mueller said. "It was pretty painful. As of right now, I've got to take some time to think about it. I think I need to look into some other ways to make money."

Jon Furniss

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# Diversity Affairs

## Where Minorities' Paths Converge

A relatively new fixture on campus is the Diversity Affairs Office. The Diversity Affairs Office (DAO) has developed a number of programs geared towards recruiting and retain-

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**The DAO, in cooperation with offices and departments throughout campus, has committed itself to making [a student's] stay here academically rewarding, culturally enriching, and professionally satisfying**

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ing students from traditionally underrepresented groups in engineering, including women, African-Americans, Latinos and Native Americans.

A publication titled "Unity Through Diversity" states the DAO's purpose as recognizing, "that traditionally underrepresented student groups in science and engineering frequently have unique needs. At times they require assistance in negotiating their way through such a large multi-ethnic and multi-cultural institution. With this in mind, DAO, in cooperation with offices and departments throughout out campus, has committed itself to making [a student's] stay here academically rewarding, culturally enriching and professionally satisfying."

### Assistant Dean for Diversity Affairs

Alem Asres, the Assistant Dean for Diversity Affairs, leads the DAO. He says that his goal is "to make a better climate for minorities, not only in the College of Engineering but also on the whole campus. The experience that a student has is not only in the College of Engineering, but is campus wide, so we need to network with the entire campus to create an environment that is inviting and friendly," says Asres.

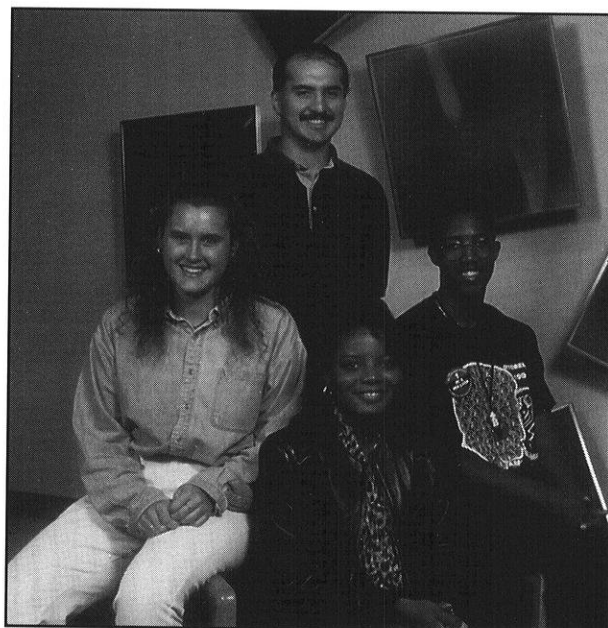
"My specific role [as Assistant Dean for Diversity Affairs] is to create a bridge between various ethnic groups so that they can interact, work with each other, help each other, learn from each other and teach each other." Dean Asres added that he works with industry, alumni and faculty to bring services and programs to underrepresented populations on campus.

"I'd like to see us increase the number of minority students, the number of traditionally underrepresented populations on campus. The women are doing very well, so we are very happy with that, but it is not enough yet," explained Asres. "The

African-American student population is very small, so we are working to increase that. The Latino population is very small, so we want to increase that. The Native American population is almost invisible, and we want to make it visible."

### Pre-College Programs

The DAO is doing various things to increase the number of minority students on campus. It sponsors a number of summer programs for minority students interested in engineering, including the Engineering Summer Program, which prepares



**A wide array of students are brought together thanks, in part, to the Diversity Affairs Office.**

Source: Engineering Publications Office

high school-aged participants with the skills they need to succeed in the College of Engineering.

The DAO visits high schools to talk to and recruit minority students to the College of Engineering. They also sponsor a program called "College Community Partnership." In this program, the College of Engineering works with the Madison district school system, beginning with the third grade. "We'll be mentoring and also talking about why science is important, and why it is not race or economic-class based, but is for everybody. We hope to show kids from the third grade on that if you work hard, you can see that science is fun, it is do-able, and it is a hands-on experience," said Asres.

"We hope that our graduate students and senior-class students can go to high schools, middle schools and elementary schools and help [the younger students] with hands-on kinds of things." Dean Asres added that the program may "bring [the young students] onto campus and have them shadow [an engineering student so they can] picture what [science and engineering] is all about, and to see that science is fun."

Through all of these programs, "we hope to increase the numbers of students" from under-represented populations in the College of Engineering.

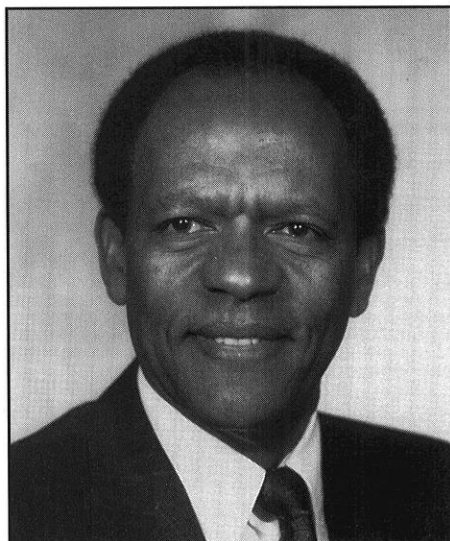
### Programs for Engineering Students

After students are recruited to come to the UW, Dean Asres says that DAO is faced with a number of different issues, namely that "once students get here, how do we keep them, how do we keep them happy with what they're doing and how do we get them through college?" To address this challenge, the DAO has formed a number of programs geared towards retaining the minority students who are already on campus. Early academic advising programs ensure that students are on track and taking the right classes. A tutoring pro-

gram exists which aides students who find they need additional help in some courses. "Some [students] have financial need so we see how we can help them financially," explained Asres.

A mentoring program has also been created. This program matches engineering students with professionals

who work in a field that the student hopes to work in after graduation. This mentoring relationship can give a student guidance and support, and help them to make informed career decisions. Dean Asres works on the



Source: Engineering Publications Office

**Assistant Dean, Alem Asres, leads the Diversity Affairs Office and says his goal is, "to make a better climate for minorities."**

mentoring program with Julie Johns and the Engineering Career Service office.

"We have about 40 students participating, 25 alumni participating and we've made 15 matches so far - and we've just started," said Asres.

Dean Asres is particularly proud of the

new Diversity Affairs "Umbrella" events, which unite the Society of Women Engineers (SWE), the Society for Hispanic Professional Engineers (SHPE) and the Wisconsin Black Engineering Student Society (WBESS). Dean Asres explained that the three student groups have similar goals; however, in the past they had worked

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## The DAO has formed a number of programs geared towards retaining the minority students who are already on campus

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towards these goals on "parallel paths, never crossing." Now the three groups work together. Each month, an "Umbrella" meeting is held for members of all three groups; last March, for example, speakers from industry came to discuss diversity issues in the workplace. According to Asres, these Umbrella events allow the three groups to support each other, learn from each other, and teach each other.

Katie Flicek, SWE's Vice President and Diversity Affairs Liaison, said that the Umbrella events are beneficial because "before, everyone [in SWE, SHPE and WBESS] was working separately, and now everyone is working together and being friends... before, we would pass each other in the hall and not even say anything."

When asked about his future goals, Dean Asres said, "My vision for the future is to increase the numbers and to increase the graduation rate. We have a lot of vision, and we have a lot of hope. It is all achievable. It is a possible vision."

**Author Bio:** Jen Hattan just finished her first semester on the Wisconsin Engineer and will hopefully be back for more.



# Exciting, Exceptional, Exhilarating, E-Week! Energizing, Enthusiastic, Excellent,

Everyone remembers the highly successful E-Week held last March: the egg drop contest, challenge day, display of societies, scavenger hunt, casino night. Those were plenty of fun, but did you ever think about what it was all for?

Engineer's Week is a national movement to promote what engineers do. It's a chance for engineers to show what they have learned. This is especially a unique opportunity for underclassmen to apply skills learned in class. Above all, E-Week is a chance for us engineers to relax and blow off some steam. This annual event

is held in February in engineering colleges all across the United States, though at Wisconsin, we usually have it around April because of our weather. Each college does their own thing. They call it different names, hold different activities, but it's mostly all the same, and accomplishes the same goal.

Here at Wisconsin, it has been tradition even before Dean Bollinger was a student here. According to Doug Herman, E-Week coordinator, the reason it was bigger this year than other years is because Polygon is undergoing restructur-

ing and wants to have more influence on the engineering campus. Next year, look for a robot triathlon and elementary school outreach.

Dean Chu

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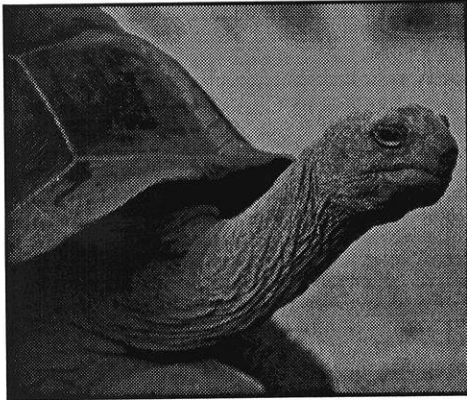
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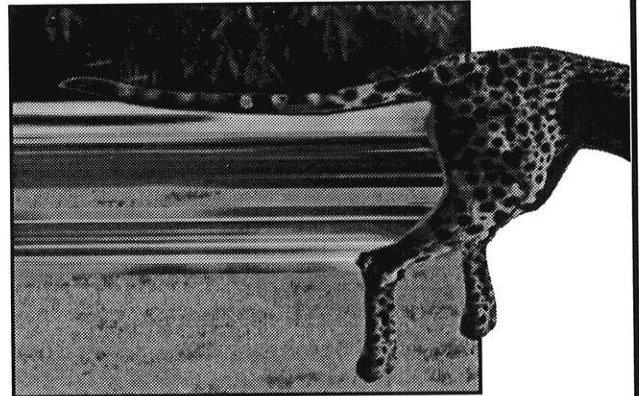
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# Get Connected at Career Connections '96

So what kind of job will you get and with whom?" How many times have friends and relatives asked you this question, and you really didn't have a convincing answer? If you want to find a possible answer, attend the Engineering Career Connections in September.

Career Connections has been at UW-Madison since 1988. Sponsored by Polygon and Career Services, Career Connections consists of a company fair in the lobby of Engineering Hall and a formal banquet at a Madison hotel. The company fair lasts for two days with various companies representatives available to answer questions about their company in a

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**Sponsored by Polygon and Career Services, Career Connections consists of a company fair in the lobby of Engineering Hall and a formal banquet at a Madison hotel**

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booth-based setting. This informal setting allows more students to get an idea of the number of companies that are looking to hire engineers, and the Career Connections Banquet gives students a chance to spend time on a one to one basis with representatives.

I attended Career Connections in the fall of 1995. As a freshman, the experience of talking with companies was intimidating. At the banquet, most of the students there were seniors. Looking at my name

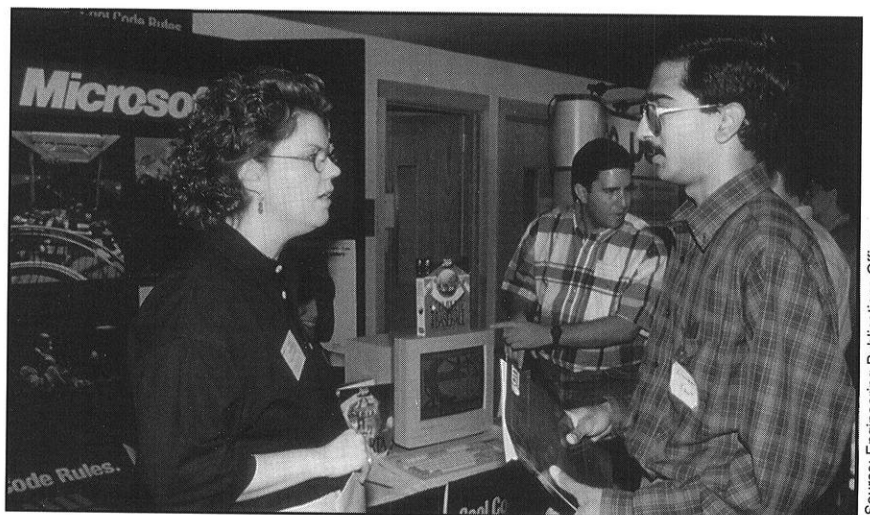
tag, which labeled me as a freshman, I felt very young with nothing to impress a company representative. I discovered that the representatives are interested in each person's goals and successes. Many of the representatives were impressed that I took the initiative to find out more information about companies and opportunities for engineers. The best part of attending Career Connections as a freshman is that I got over the intimidation and can now be focused on looking for opportunities in the future.

Whether you are a freshman or a senior, Career Connections gives you answers to what the "real world" after college can be like. Many graduating seniors have found Career Connections instrumental in becoming employed. Julie Johns, assistant director of Career Services, says, "The majority [of students] who are looking for jobs attend Career Connections." Johns also emphasized that Career

Connections draws more companies each year. Career Services uses Career Connections as an incentive to urge more companies to recruit from UW-Madison. "It's a high priority for most companies to attend," Johns said.

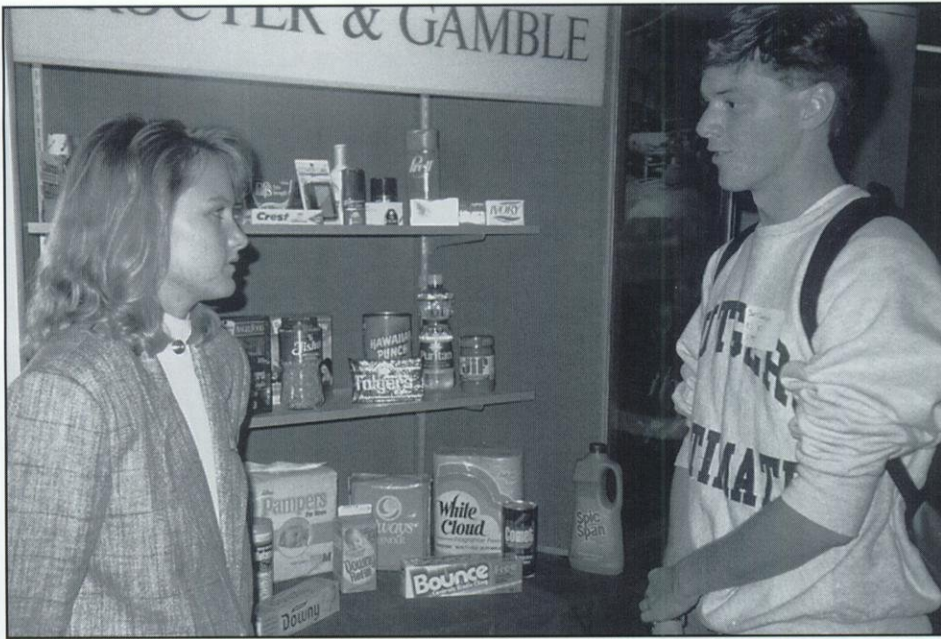
To prepare for Career Connections, students should have a current, professional resume to give to company representatives. Students attending Career Connections should also try to do research on companies in their field. Johns encouragingly says to, "Impress them with your knowledge so that you can find a career opportunity that would match your interests."

If you are interested in Career Connections, there will be information posted in the Badger Herald and around the engineering campus. For extra information about the companies, a booklet profiling the companies is available when students register.



A representative from Microsoft answers a question from a student.

Source: Engineering Publications Office



Source: Engineering Publications Office

Many students are lost when it comes to looking for specific information on companies. Career Connections provides answers. Whether you are looking for information, an internship or Co-op, or a job after graduation, Career Connections may give you the extra help you need.

To volunteer, contact Julie Johns at Career Services or the co-chairs for this year: Julie Hromadka, Heidi Rush, and Stacey Peterson at 258-3399.

**An aspiring engineer learns more about opportunities from a representative of Procter and Gamble.**

Do you want to get an extra edge on a specific company? Johns suggests volunteering to help out.

The extra effort may give you some time to talk to that specific contact and help you stand out from the competition.

**Author Bio:** Jennifer Schultz just finished her first year at Madison and on the Wisconsin Engineer. This year she'll be tackling more responsibility as she takes over the role of Editor.

## GRANT THORNTON LLP SALUTES CAREER CONNECTIONS '96

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# Engineering Professional Development: An Investment In Your Future

Whether you are in the process of interviewing or are one of lucky ones who has already landed a job, you may be thinking that you will finally be done with school — well, think again.

We live in a world where, to stay afloat, going to school and getting a job isn't enough and it definitely isn't the "end of the road," especially in the field of engineering. Technology is developing and changing so rapidly that in order to face the challenge of keeping up, today's engineers must continue to learn while on the job.

The University of Wisconsin-Madison Department of Engineering Professional Development (EPD) is designed to do just that. Many students are familiar with the EPD department in that it offers two courses required for the completion of most engineering degrees: Technical Writing (EPD 397) and Technical Presentations (EPD 275). These and other undergraduate courses are just a small part of what the EPD department is really all about.

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**The University of Wisconsin–Madison Department of Engineering Professional Development has been recognized both nationally and internationally as being a leader in continuing education**

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Since 1949, the EPD department has been dedicated to continuing the education of technical professionals, practicing

engineers, scientists and others who can't afford to take time away from their

job, but also can't afford to get behind in their professions. Without furthering their education, most engineers would

not be able to remain in practice for more than ten years.

The University of Wisconsin-Madison Department of Engineering Professional Development has been recognized both nationally and internationally as being a leader in continuing education. Many members of its faculty are experts from various occupations, such as government, industry and private practice.

The main goal of the Engineering Outreach Program, that is such a large part



Source: Engineering Publications

**Since 1987, the EPD Department has offered health and safety training classes. Here, students learn a method to contain barrels of toxic waste.**

of the EPD department, is to provide information on advances that may be taking place in a given field, and to demonstrate new methods and applications that may be beneficial for individuals to use in their place of work. To do this most effectively, and for the greatest benefit to professionals and the companies they work for, the EPD department uses a variety of formats for teaching and communication, such as videotape and correspondence courses, satellite and audiographic and video teleconferencing. Approximately 13,000 professionals enroll in the Outreach Program annually and find these formats beneficial.

undergraduate level. At the time, the only EPD course offered on the UW campus was EPD 397, technical writing. It was then that she and other faculty members realized the need for more undergraduate level courses. (Why should professionals have all of the fun, right?) So, with Sandra's help and the help of Adjunct Assistant Professor Gisela Kutzbach, and Assistant Dean Don Woolston, several new courses were developed for undergraduate level studies. Two of these such courses were EPD 275, Technical Presentations, and EPD 201, On-the-job Writing (Basic Engineering Writing). They also established a certifi-

every student at every site is capable of communicating with each other. Prof. Davis agrees that the students "learn just as effectively" as if they were right here in Madison.

The benefits to these approaches to education are numerous. The variety of courses offered to students is increased without a huge increase in cost. Not as many people need to be paid for what one person can accomplish. For professionals and practicing engineers, travel time and money is saved because they can take courses right from their own desktop or conference room. This also saves their companies money otherwise spent on additional training for new employees that would be needed if other employees had to take time off to go back to school. They are getting the maximum productivity by taking advantage of continuing education courses. Some of the companies that have participated in the Outreach Program through the University of Wisconsin are General Motors, Hewlett Packard, IBM and Motorola.

So be aware of the opportunities that the Department of Engineering Professional Development has to offer. Although you may not be done with school as soon as you might think, you have access to many opportunities that will aid you in your current education and your future employment.

**Author Bio:** Bridgett Marsh is an engineering student who also enjoys playing clarinet and cheering on our Badgers.

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### **Since 1949, the EPD department has been dedicated to continuing the education of technical professionals, practicing engineers, scientists and others who can't afford to take time away from their job**

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The majority of the courses offered through the Engineering Outreach Program are *not* taken for credit. Instead, a system of CEU's (Continuing Education Units) is used. One undergraduate credit is equal to 4.8 CEU's. The CEU is a standard measure for those professionals wishing to pursue a Professional Development Degree in Engineering. The Professional Development Degree is basically a program designed to guide practicing engineers in obtaining an advanced engineering degree; in addition to a previously earned B.S., M.A. or Ph.D degree.

Sandra Courter, an adjunct professor in the Department of Engineering Professional Development, has been directly involved in the shaping and teaching of some of these courses. The early part of Sandra's career in the Department of Engineering Professional Development was focused around working as a program director for some of the 2-3 day seminars given to practicing engineers and professionals. Her instruction included many of the same topics that she is currently teaching in the undergraduate level courses, such as technical writing and technical presentations.

Then, in 1985, a position opened up that allowed her to work more closely at the

cate program familiar to many on the engineering campus. The TCC, or Technical Communications Certificate, is a program designed to give students a broader background for communicating with people in technical fields. One of the ways in which EPD is attempting to reach a wider audience for its courses is via audiographics teleconferencing. Professor Steven Zwickel teaches EPD 397 Technical Writing to students all over the state of Wisconsin using this remarkable new technology. "Audiographics lets students participate just as though they were in the classroom in Madison," says Zwickel. The computer screen becomes the chalkboard, and there's a microphone and speaker so they can listen and participate. We use e-mail and fax to communicate—they can even do a live presentation as part of the course."

Professor James Davis is also actively involved in continuing education. He teaches several Technical Japanese courses within the University's EPD department using two different formats. One is Audiographics teleconferencing, previously described, and the other is satellite broadcast. Satellite broadcast features one-way video, where students at sites all over the country can see the instructor, and multi-point audio, so that

# Graduating?

## Toss your cap and burn your books! Now what?

Students are at somewhat of a disadvantage when we're in college because we don't have a really good sense of what the word "time" means. A lot of us (myself included) have spent months stressing over exams, homework, internships, co-ops, breaks, money, grades, etc. So it is only natural to fly by the drawstring of your sweat pants, winging those hectic schedules we all have sometimes. Think about how many mornings you didn't shower, put on a hat and sprayed on some cologne. Unfortunately, it isn't a good idea to live that way after you graduate, especially when trying to get into the professional world.

The number one reason why is students think too much in the now, and not enough in the future. For example, think about what your concerns are for getting a job. Okay, I think at the top of everyone's list is to find one right away. Can't let those four or five years in college go to waste, right? Got to pay off those bills, buy a car, live in a decent apartment, right? WRONG. You really put your back to the wall thinking this way because everybody wants to make money, and everybody wants to work for the big companies. Finding the job of your choice is harder than getting into college. It might even take you one or two years. Sounds like a long time to look? Okay, let's talk math. If the average person lives to be 87 years old, finding that solid job will only take you 2.3% of your entire life. But there are things that you can do that will help you find your job a little quicker.

Here are some tips to help you minimize those job-finding headaches:

1. Ban the "I'm-a-geek-engineer" stereotype by reading the Wall Street Journal. When you talk to future employers, you will be able to make casual conversation a lot easier if you've read something

more than your thermodynamics textbook.

2. Research the company that you would like to work for. Helpful things to watch out for are a strong financial background, a small employee turnover rate and consistent stock market trends. It might even be a good idea to research their competitors, see how they add up. Your results might make you want to apply for a job with the competitor.
3. Get an edge in your field by maintaining correspondence with

have because they might hear of job or research opportunities for you. Besides, someday you might want to consider graduate school. It would be better for you to get a recommendation letter from someone that remembers you, rather than from someone that doesn't.

4. Watch for new products and processes. Several of you out there might want to try design and patent something that might help America's aging population, those who have limited access to



your professors, past and present employers and fellow researchers. They are good connections to

expensive technology or anybody else you might think of.

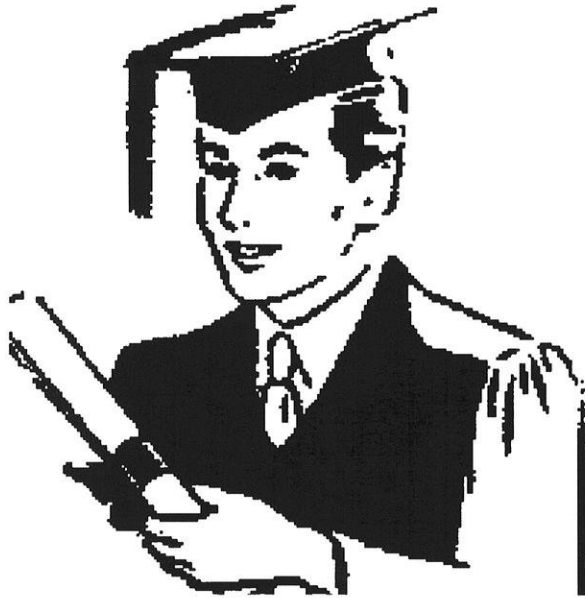
5. Make up some business cards to

hand out to people wherever you go. Let them know you are available for hire.

So now that you've read all of these tips, what do you think? You have all of these handy ideas in your fingers, but you still don't know what to do. Here is some good news! It is now okay to plan

To communicate your engineering smarts well to someone who isn't familiar with your field is both a big concern and need in the workplace.

- Join some volunteer groups. One interviewing question a few months down the road might be about what you have been doing



six months ahead. A timetable for next semester isn't going to be there for you to help you out, but there are things you can do now to help your personal life shine in a future, professional setting.

Here are some options to consider:

- Take a class at the local university in your town as a special student. At your future interview, you will come across to your employer as being a motivated individual, someone who wants to better themselves. No ideas about what to take? You might consider taking something other than in the engineering department, something you didn't have the time to take when you were in college. One suggestion for a class might be a speech class, to help you organize your technical material in order to speak to a non-technical audience.

since you graduated. Telling them that you've been trying to set the world's record for the longest beer-drinking binge isn't going to go over very well.

- Think about going to graduate school. The academic life could be the best way for you to go.
- Buy a subscription to your favorite engineering journal, and write to the people in charge of the articles you are interested in. People will remember you if you show your interest in other people's work. It is especially important for you to try and communicate through letters because it proves two things; one, that you are interested in someone other than yourself and two, that you know how to write a decent letter.
- Find an okay job while looking for the one you want. Helps to pay off

those bills.

- Travel a little bit, find out where in the world would be a good place for you to live. It may even help you narrow down your choice of companies.
- Take some time off after you graduate to gain some life experience. A lot of us go right from high school to college; studying our pants off, working from noon until midnight. We don't have enough time to grow within ourselves, and, for some of us, doing nothing but studying grinds our people skills down to zero. Taking a three month vacation may not be a bad idea. Why? Because it will only be less than .5% of your whole life. Given of course that you will live to be 87 years old.

So when counting the gray hairs and the college loan bills, just remember that it is okay to give yourself a break. Think about how funny it is to stress about what you are going to do right after you graduate. After all that signing up for four years of classes I can't even remember what I took last semester let alone my freshman year. I don't know if I want the rest of my life to be that way, do you?

And as far as knowing what job you want, or what direction you're headed? The not-knowing part is definitely the worst. You want that classic car with the V8 engine NOW. You want that apartment with a sun deck NOW. I would like to repeat something that a friend of mine once said to me a billion times over which helps me through these not-knowing times, "Everything will be told to you on a need-to-know basis." Now quick! Read through the rest of this magazine, go buy a Wall Street Journal, and show them what you've got!

**Author Bio:** One of Monica Valentinelli's favorite hobbies is to piece together story lines from the broken images and phrases that bombard her senses as a result of incessantly flipping channels on the T.V. set.

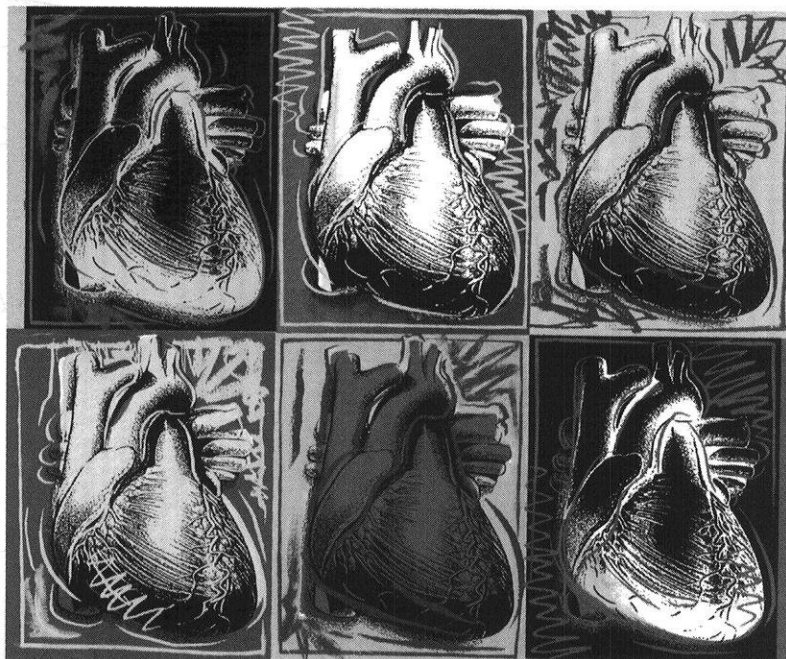


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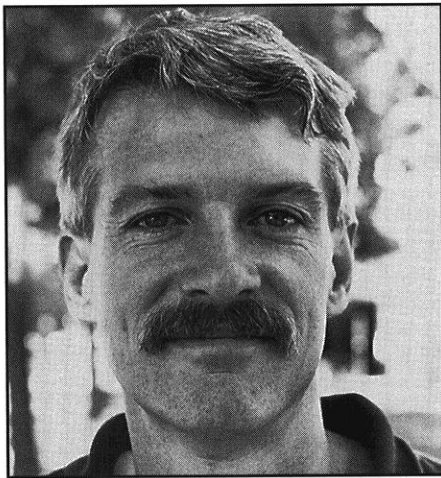
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# Faculty Profile: Professor James Rawlings

James Rawlings knew from an early age he wanted to be a chemical engineer. "My father worked for DuPont and he took me to a lot of plants while I was growing up. I was very familiar with what chemical engineering was all about at a young age," says Rawlings.

Today, Rawlings is an up-and-coming faculty member of the Chemical Engineering Department at the University of Wisconsin-Madison. After receiving his Ph.D. from the UW and traveling to Stuttgart, Germany for a one year post-doctoral position, he settled down for nine years as a professor of chemical engineering at the University of Texas at Austin. In July of 1995, Rawlings returned to Madison.



**Professor James Rawlings**

At the UW, he teaches process control which deals with the implementation and analysis of control systems to achieve better production results. By manipulating the inputs to a chemical system (e.g. temperature or pressure), improved process conditions and higher product quality can be achieved.

Specifically, Rawlings is interested in an

advanced method of process control called model predictive control (MPC). It looks at what the system sensors are reading and simultaneously adjusts the entire process towards a better trajectory. "It's modeling all the variables and all the effects which could occur," says Rawlings. "Basically, it's a centralized controller which can see what everyone is doing and manipulate the valves."

This method of control has gained a following in industry. "The petrochemical industry is inundated with MPC. This is big business along the Gulf coast area," says Rawlings.

He forecasts that the pulp and paper industry in Wisconsin will start to feel the impact of MPC. "They will start to understand that they have a lot of multi-variable interactions when you try and control a paper machine," remarks Rawlings.

Listening to Rawlings talk about the exciting industrial possibilities of his work, one gets the impression he would have liked working in industry. Rawlings admits he wasn't always so sure he wanted a life in academia. His philosophy was that if a position at a top academic department was not available, then he would prefer to work in industry.

"If you're not at a top university, you don't have a lot of the necessary resources," says Rawlings. "The institutional facilities are poor."

"If I could find a pretty good faculty position at a good university with an outstanding chemical engineering department, I couldn't imagine a better career than that," he says. He favored going to academia since it wouldn't involve the day-to-day pressures of plant operations. Besides, Rawlings notes, "I like teaching students and

having the possibility of writing a textbook as part of an academic career. None of those things are available in industry."

Rawlings points out the UW's healthy reputation almost everywhere he goes. "In chemical engineering, this department is quite famous for its long tradition of excellence," says Rawlings.

Rawlings has six Ph.D. students and two post-doctoral candidates who made the journey north with him to Wisconsin from Texas.

"I really like the academic environment and the ability to focus on fundamental issues and being able to study in depth in various pockets of interest," he says.

When Rawlings is not bust with work, he admits to having a weakness for one of the UW's sweet treats. "I love Babcock ice cream at Union South or Babcock Hall," he says. "I love taking my kids there."

Rawlings also enjoys skating at the Shell and cross-country skiing. He even admits he's working on his golf game at the driving range.

The future looks bright for James Rawlings, who isn't bashful about his career goals. "I want to have high-profile research activity in the control area and have outstanding graduate students in my group," says Rawlings. "I want to graduate significant numbers of Ph.D. students per year so we have an impact in the kind of research we've done."

**Author Bio:** Jeremy Marwil, a graduating senior in chemical engineering, would like to thank the staff of the *Wisconsin Engineer* for all their outstanding work.

# Just One More

While sitting in class and taking notes, many students are commonly surprised to find that what their professor has said, and what has occurred, are all too often different. You can't deny that this has happened to you. Did you hear the professor wrong? Did you incorrectly write it down? Probably not. Chances are you merely fell victim to the fact that most, if not all, professors speak their own language. What they say is commonly not what they mean and we, the students, have no way of knowing when this is occurring. To help remedy this situation, the Wisconsin Engineer offers this "Guide to What Professors Really Mean." Use it well, and good luck in the future. You are not alone.

## What They Say

You'll be using one of the leading textbooks in the field.

If you follow these few simple rules, you'll do fine in this course.

The gist of what the author is saying is what's most important.

Various authorities agree that...

The answer to your question is beyond the scope of this class.

You'll have to see me during my office hours for a thorough answer to your question.

In answer to your question, you must recognize that there are several disparate points of view.

Today we are going to discuss a most important topic.

Unfortunately, we haven't the time to consider all of the people who made contributions to this field.

We can continue this discussion outside of class.

Today we'll let a member of the class lead the discussion. It will be a good educational experience.

Any questions?

The implications of this study are clear.

The test scores were generally good.

The test scores were a little below my expectations.

Some of you could have done better.

Before we begin the lecture for today, are there any questions about previous material?

According to my sources...

It's been a very rewarding experience to teach this class.

## What They Mean

I used it as a graduate student.

If you don't need any sleep, you'll do fine in this course.

I don't understand the details either.

My hunch is that...

I don't know.

I don't know.

I really don't know.

Today we are going to discuss my dissertation.

I disagree with what roughly half of the people in the field have said.

1. I'm tired of this, let's quit.
2. You're winning the argument, let's quit.

I was out too late last night and didn't have time to prepare a lecture.

I'm ready to let you go.

I don't know what it means either, but there will be a question about it on the test.

Some of you managed a C+.

Where was the party last night?

Everyone flunked.

Has anyone opened the book yet?

According to the person who taught this class last year...

I hope they find someone else to teach it next year.

*Compiled by Jon Furniss with help from Neil Burgard. They are really funny.*

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