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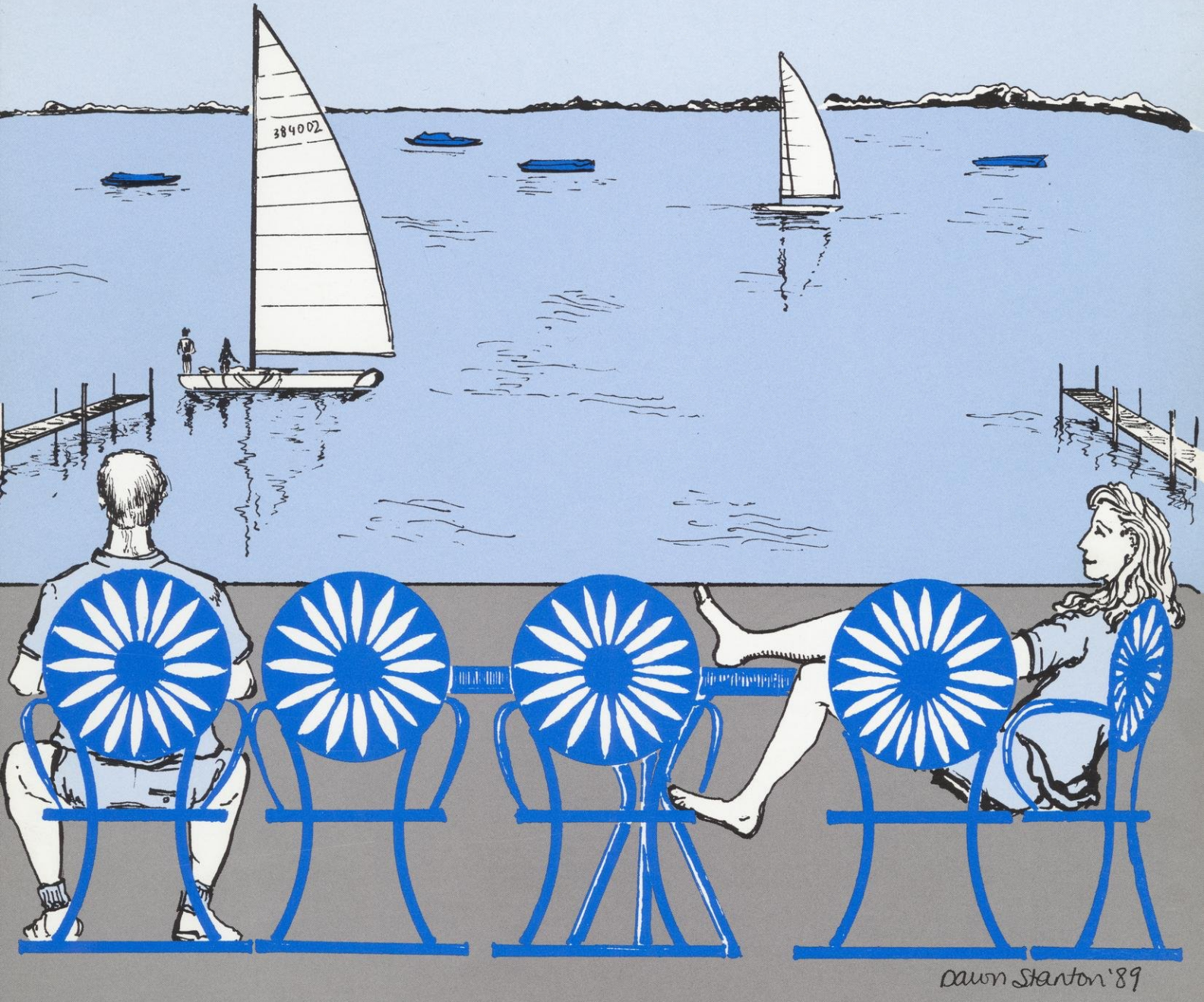
Volume 93, No.5 *Summer 1989*

wisconsin engineer

Inside:
Back to School Issue
Technical Communications
Farewell to General Engineering
and much more...



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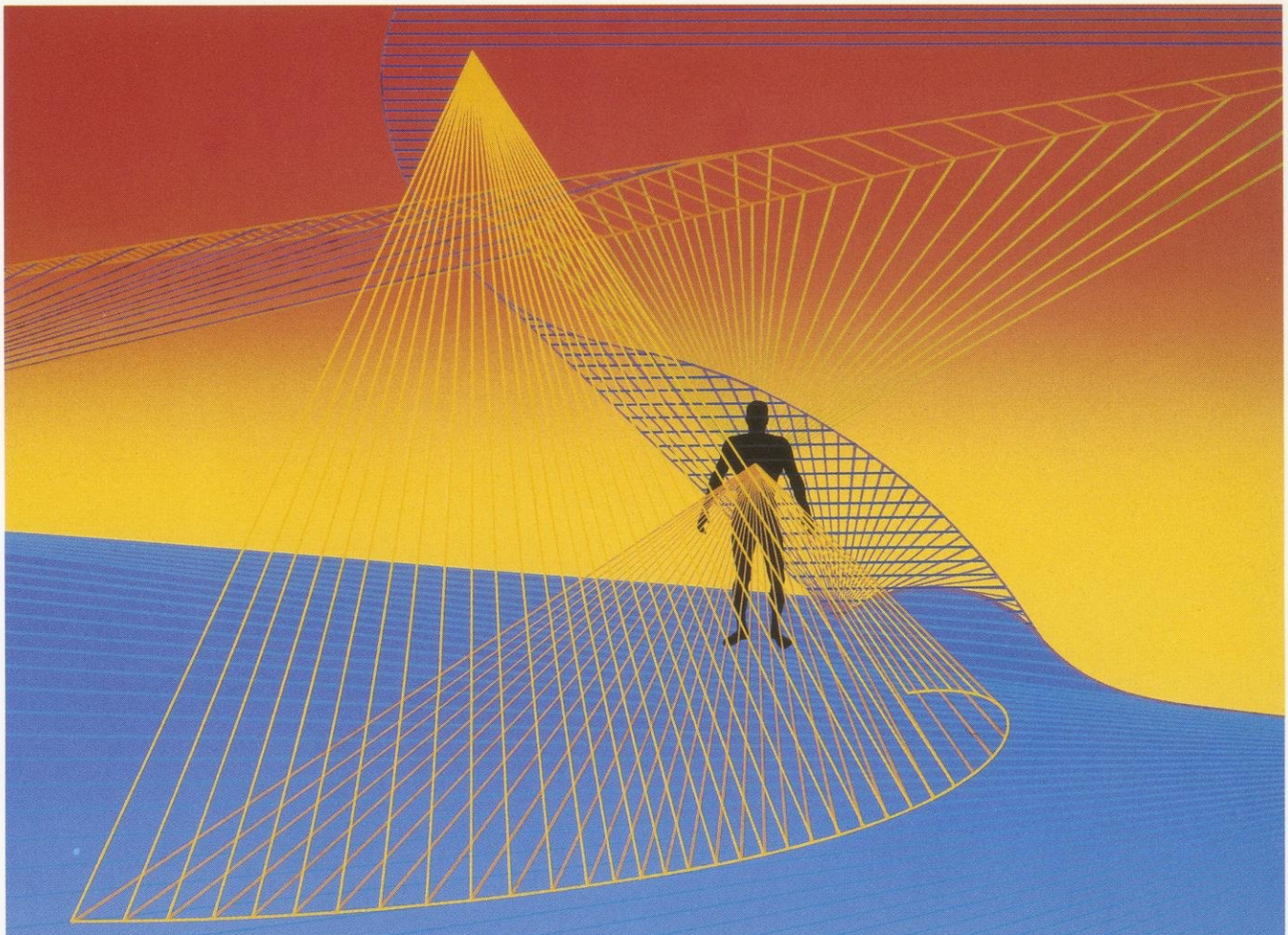

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wisconsin engineer

summer issue

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The *Wisconsin Engineer* magazine, a charter member of the Engineering College Magazines Associated, is published by and for engineering students at UW-Madison. Philosophies and opinions expressed in this magazine do not necessarily reflect those of the College of Engineering. All interested students have an equal opportunity to contribute to this publication.
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EDITORIAL

WHAT TO DO?

by Shelly Hoffland

I received my first issue of the Wisconsin Engineer two summers ago. A student named Mark Voss wrote a great editorial for that issue. He emphasized that when things get tough you have to hang in there and say, "No big deal!" Back then, and I say that like it was 1910 or so, I had various ideas of what college would be like, but I never expected things to get as tough as Mark described. I acted excited, a little ambitious, and very determined. And I *knew* I would succeed.

Humble? Not at all. In high school, I involved myself in everything. I never had time to be bored. I studied as necessary, but seldom intensively. I expected the future to be much the same. Mark's editorial had a point, but it didn't apply to me.

Then I went to college.

Basically, I attended class–sometimes. Classes proved to be unexciting (so far, just like high school), and naturally, studying was even less exciting.

The first midterm reminded me of a bad hangover (which many freshman encounter at least once). I crammed more for that test that covered three weeks of material than I ever studied for an entire semester of finals in high school. Needless to say, I didn't do very well, and I was not used to that at all.

Other midterms came out the same. I knew I needed to study more. I had to go to my classes, too–all of them–every day. Suddenly, college became serious stuff.

But something held me back. I lost all of that cocky ambition that I toted around the previous summer. Then it dawned on me.

Plain and simple–I was bored. I couldn't go to class every day only to go home and study every night. And I didn't even try to. I always found things to occupy my time, but nothing I could *contribute* to.

I went to college expecting the world, but offering nothing in return.

Second semester changed a little. I inquired about General Engineering 199: Independent Study. They said I'd be on the staff of the Wisconsin Engineer magazine. Yes, I knew what that was–they sent me an issue last summer.

So I joined the staff and met Mark Voss and the others I'd read about six months earlier. Now, they didn't give me much responsibility at first, but I learned about how the whole magazine was put together. Better yet, they took me to Virginia Tech for a convention of all the schools who produce similar magazines.

After that trip, I knew I had found my niche. I finally fit in somewhere. Given something extra to do made it easier to study. My grades improved a little and the ambition started to come back.

Well, it came back a bit *too* strong and knocked me over. I picked up three part-time jobs (one I'd had since highschool, the others in engineeering departments), which required 30-40 hours a week. I also accepted the position as Editor of the Wisconsin Engineer. First semester sophomore year proved to be a challege.

Instead of being too bored to study, I became too busy to study. Although I didn't want to quit any of my jobs–all were fun, I was angry that I couldn't study more. The key, though–I *wanted* to study. The grades slid again, but wow, I sure fit in.

I kept going, recalling what Mark said in his editorial. "No big deal." Suddenly, that *really* had a meaning, and it couldn't have applied more.

With the negative experience of first semester in mind, I cut back the work schedule and reorganized my time for second semester. I realized that *too much* ambition can be detrimental.

It took four semesters to find the happy medium. But now I know where I fit in. I know how many things I can handle at one time and still succeed at all of them. I even want to study, and my classes have become interesting. I'm glad I followed Mark's advice and forced myself to keep working. Now, I really enjoy what I am doing.

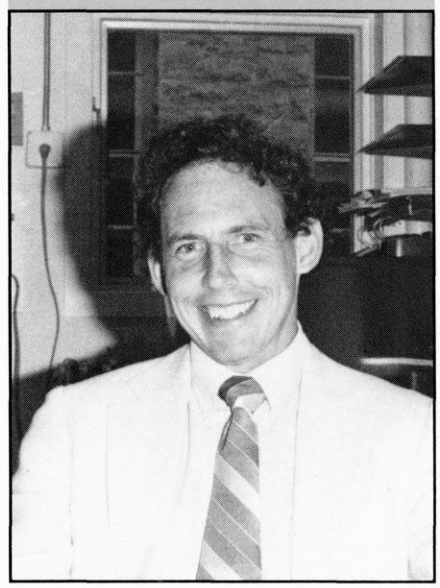
Too often, I hear students my age say that engineering isn't for them afterall. It's too boring, too difficult, too something that's not right. I wonder how long they thought about it before they changed majors. Did they ever try to find anything that could bring back their ambition? Are they happier doing something else, or is something still not right?

This is not to say that everyone should find an activity within engineering. I have a friend who teaches ballet, and others who participate in intramural sports. Anything works. I admit that I made a grave mistake by taking on too much, but doing nothing proved to be an equal mistake. Often, we tend to accomplish more when we have less time.

Thanks Mark. I believe you now. ■

Dean's Corner

by Donald C. Woolston
Assistant Dean, Pre-Engineering



Maybe the Trivial Pursuit craze started the trend. Or perhaps the computer-on-every-desk phenomenon has made it easier. Whatever the reason, we are being inundated by trivial data.

In particular, the media is bloated with results from surveys, opinion polls and cute graphics about the results of person-on-the-street interviews to determine useless facts such as how many teen-age girls use deodorant, how many French people never brush their teeth, and how many current residents of Alaska were born in that state (Answers: 98%, 20% and I have no idea, but I would guess less than 25%). My favorite trivial statistic to date is that 78% of all adult males think that they are "better than average" at sports.

I notice that even the *Wisconsin Engineer* is getting into the act. Although no statistics were included, the last issue of the magazine included results of a random sampling of Rathskellar patrons' opinions of engineering students. What I thought interesting about that poll was that it asked for both objective data (such as the percentage of minority students in the college) and subjective data (such as "How social are engineering students?"). The results showed that the Rathskellar residents were way off on the objective data; for example, someone guessed that females make up 1% of engineering undergraduates, when in fact the figure is much higher (18% and rising).

What I'm wondering is if the responses to the subjective questions—which, in effect, asked for a short description of the stereotypical engineering students and got answers such as "brainy," "money-grubbing," and "nerdy"—weren't just as far from the truth. Indeed, what I'm wondering about is just how accurate our subjective impressions—especially our stereotypes—really are, given, for example, how easy it is for us to think that we are better than average—a subjective judgement if there ever was one.

Actually, there are two questions: 1) Are most people prone to stereotyping?; and 2) Are those stereotypes accurate enough to be useful. If this were a poll, my answers would be 1) Yes and 2) No.

The Dean's Corner might seem like a strange place to discuss these answers, but I think all of us in the College of Engineering need to think about how common subjective judgements are in the engineering profession, and how unfortunate it is that stereotyping is one of our most common strategies for making subjective judgements.

The pervasiveness of stereotyping can perhaps be illustrated best with reference to dress and stature within a hierarchy. When I was in the Army, I worked in an operating room as a technician side by side with nurses and doctors. Inside the room everyone wore identical green scrub suits. Since it was a small hospital, everyone knew who was what, so we could interact smoothly. The problem arose outside the operating room. When the staff went down to lunch in their identical outfits, no one could tell the majors and colonels from the peon enlisted men (like me). That caused the mess hall staff so much mental anguish—they didn't know to whom they were supposed to show respect—that a rule was passed that officers would henceforth wear white coats and enlisted personnel yellow coats when leaving for the mess hall.

The mess hall people aren't unusual in wanting a single, easily identifiable characteristic attached to every person. I think we're all like that. We are tempted to use something simple—like major, hometown, gender or race—as a simple label so that we don't have to bother getting to know and understand other human beings. And that temptation must be resisted.

Don't get me wrong. Categorizing and labeling are productive activities. My desk is full of information that would be useless if it weren't categorized into different folders, each of which is clearly labeled.

The problem lies in how the multidimensional nature of humanity and our own problems making accurate subjective judgements make stereotyping a dangerous practice. Each time a student enters my office for advice, I have to react to that student's uniqueness, not his or her gender/major/race/academic record.

Obviously, we could get by without stereotypes if society were homogeneous. At one time engineering was indeed a monolith of white males. But not anymore.

That is why I see the College of Engineering's new liberal elective requirement as a step forward. As part of that requirement, which will apply to all students who enter a department in 1990 and after, UW-Madison engineering graduates will have to take a course dealing with other societies. That course will provide the in-depth information on other societies that makes stereotyping of their members unnecessary.

One course does not an education make. Neither does attaining a degree make an engineering student instantly educated.

But it is a start in the right direction. ■

THE "ALL HYDRAULIC CAR"
A CAR FOR THE FUTURE

The automobile has undergone a great deal of change in the past several years. High speed engines capable of performance and economy, anti-lock brakes, and adjustable suspension are just a few of the many technologically advanced features of many of today's cars. Still, engineers are constantly trying to improve on current car designs.

Ongoing research headed by Norman H. Beachley, Professor, and Frank J. Fronzcak, Associate Professor in the U.W.- Madison Mechanical Engineering Department, has led to a design concept for an "all-hydraulic" automobile. The concept uses several unique fluid power features including a free-piston engine-pump, a hydrostatic transmission, regenerative braking, accumulator energy storage, a hydraulic suspension, and hydraulic accessories. The system advantages are reduced size, weight, and cost, as well as greatly improved fuel economy.

Background

The research has been going on for more than 10 years, with Beachley and Fronczak teaming up for the last 6 years. The project evolved from the Pinto/flywheel research of the late 1960s. Funding for the project has been from several sources through the years including the General Motors Research Lab, the State Department of Development, and a Graduate School grant. It is hoped a pending grant from General Dynamics will enable continued development of the project.

PhD candidates Ed Lewandowski and Don Benson have been involved in the day-to-day details of the project for the past few years. The goal of this research has been to provide a basic understanding of the concept as well as demonstrate its feasibility.

Hydraulic Car Design

Figure 1 shows the basic layout of the hydraulic car. It is assumed the empty vehicle weighs 2500 lbs, and has a maximum load weight of 3500 lbs. The car's power comes from a unified internal combustion engine/hydrostatic pump shown schematically in figure 2.

As figure 2 shows, when the engine fires, the pump piston transmits most of its energy to the drive motors or energy storage accumulator by pumping oil at the system pressure. A small portion of the energy, however, goes to the rebound accumulator which is used to return the engine piston to the Top Dead Center position for the next cycle.

The energy storage accumulator is one of the most critical components of the system. The accumulator stores compressed hydraulic fluid which has a high potential energy. This energy can then be used to drive the car. The accumulator uses a gas (usually nitrogen) on one side against which the hydraulic oil compresses. The process works much like pushing against a spring, only the gas properties provide more desirable results.

The accumulator has a 4 1/2 gallon capacity, is made of composite construction, and uses plastic foam on the gas side to act as an insulator and heat sink.

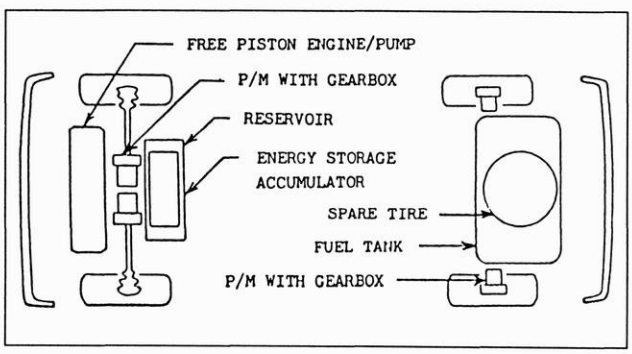


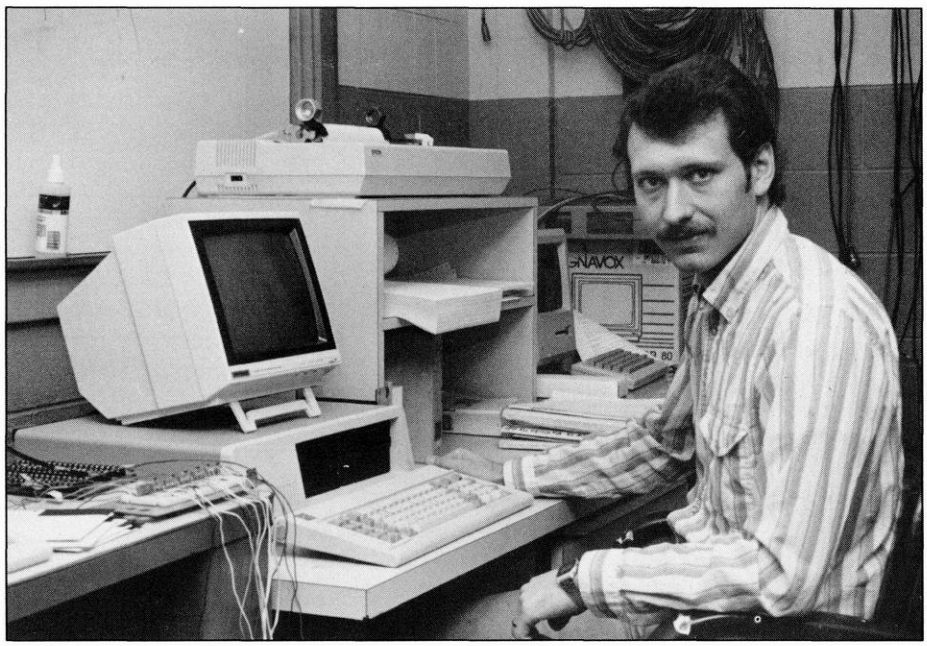
Figure 1 - Proposed layout of the "All Hydraulic Car"

There are four separate pump/motors (p/m's) operating at the car wheels. They act as motors while driving and pumps while braking. They are not "over-center" units, which is one way in which a p/m is made reversible ("over-center" refers to the angle of the p/m's bent axis being beyond vertical). Therefore, they require a somewhat complicated valving system to change from one mode to the other. The increased efficiency of these units, however, makes this a worthwhile design feature.

Torque for both driving and braking is easily controlled by varying the displacement of the individual p/m's. This is a nice feature, because it allows each wheel to be independently controlled. By simply changing a p/m's bent axis angle, the displacement and thus torque is adjusted.

The car's accessories are all powered hydraulically. Power steering, for example, is controlled in the same manner as in standard vehicles.

Of course, for the system to operate properly a great deal of computer control is essential. It is expected that a sampling rate of 30 to 50 Hz will be sufficient to provide the driver with an "instantaneous" response to his actions. This is the area currently being worked on by Ed Lewandowski in the M.E. basement. It is hoped that a prototype vehicle can be built in about a year.



Ed Lewandowski is currently working on the car's computer control algorithms.

SYSTEM OPERATION

Starting

The rebound accumulator should provide enough energy to start the engine if it fires on the first stroke. Otherwise, the main accumulator will provide high pressure fluid for further attempts at starting. In the unlikely event the engine still doesn't start, a hand pump will be provided to recharge the rebound accumulator.

Engine Control

The engine/pump will not always be on. It will be on under low power conditions to drive the car and charge the main accumulator. However, it can be shut off when it is more efficient to run the car off of the accumulator until it is depleted.

Driving Modes

One of the most desirable features of the system is its ability to use 2 or 4-wheel drive, with the 2-wheel option of front or rear drive. This, again, is possible because of the separate p/m at each wheel. Ideally, the computer will determine the driving mode for maximum efficiency.

For braking, however, 4-wheel braking is always used. This, obviously, is for safety reasons which take precedence over efficiency considerations.

Traction Control

Traction control is the process of varying the individual torques at each wheel to keep maximum traction. Anti-lock brakes are an example of traction

The system advantages are reduced size, weight, and cost, as well as greatly improved fuel economy

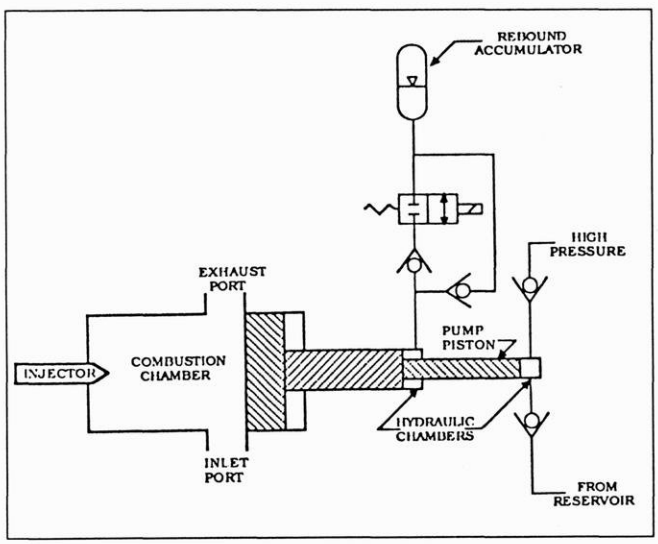


Figure 2 - Schematic representation of the free piston engine/pump

control in the braking mode. In today's cars, traction control in the driving mode is done by the limited slip differential, which allows greater torque to be applied to the wheel with more traction.

By using individual p/m's at each wheel, the basis is there for greatly improved traction control on the "all-hydraulic" car. Speed sensors at each wheel will sense loss of traction through excessive acceleration or deceleration of a wheel. Obviously, computer control will be an essential aspect of the car's traction control.

Comparisons

The "hydraulic" car's biggest advantage is its increased efficiency. Though it is too early to cite actual numbers, the researchers have run simulation experiments that show fuel economy could approach 100 mpg. Other experiments on the test rig in the M.E. basement have shown the concept to be quite feasible.

In Copenhagen, for example, the buses are currently using a standard engine and transmission coupled with an accumulator charged pump/motor. These buses have had a 30% to 40% improvement in fuel mileage, while also improving performance. Although this is not a straight hydraulic approach, it has given encouraging results.

Table 1 shows the major components added to the hydraulic car and those eliminated or reduced in size on a conventional car. The hydraulic car clearly holds its own from a weight and size perspective.

With further research from Beachley and Fronczak, as well as continued support from graduate students, we may all be driving an "all-hydraulic" car in the future. ■

TABLE 1

COMPARISON OF MAJOR COMPONENTS ADDED TO THOSE ELIMINATED (OR REDUCED IN SIZE) IN THE "ALL-HYDRAULIC CAR"

(Weight estimates in pounds)

Added		Eliminated or Reduced in Size	
Free-piston engine/pump*		Engine*	
2 Front p/m's & gearing	(138)	Starter	(30)
2 Rear p/m's & gearing	(56)	Transmission/torque conv	(100)
Accumulator	(25)	Rear differential/axles	(40)
Reservoir	(20)	Front differential	(30)
Hydraulic oil	(36)	Transfer case	(30)
Valves, tubing, hoses	(40)	Power steering pump	(20)
		Battery size reduction	(25)
		Alternator size reduction	(10)
		Brake System	(50)
Total est. weights:	(315)		(335)

* it is assumed that the free-piston engine/pump weight is equal to that of the conventional engine

AUTHOR

Don Korjenek graduated in May with a BS in Mechanical Engineering. Don contributed many great articles to the Wisconsin Engineer during the last two years. Thanks Don!

The Technical Communication Certificate Program

Bridging the Technical Communication Gap

As more sophisticated technology becomes part of our daily lives, the world needs skilled writers and speakers who can communicate technical information. The Technical Communication Certificate Program at the UW-Madison College of Engineering is working to meet this need by teaching students to present complex information in ways their audiences can understand.

In addition to promoting better communication, TCC students are also investing in their own future. According to Pat Robinson, past director of the TCC program, "Students who want a career in engineering are more attractive to employers if they have good technical communication skills." Gretchen Schoff, an instructor of TCC courses, adds, "There's an increasing demand from industry for better writing by engineers."

The program also provides an avenue for students of any major who want to be technical writers. "Technical writing is an incredibly valuable skill to have, and a well-defined career path," says Rob London, manager of the software department for Physicians Insurance Company of Wisconsin. "Companies seek out good technical writers."

The TCC program is open to anyone who can fulfill the prerequisites: 12 credits of engineering or science, nine credits of humanities and social science, and proof of basic English composition skills. Students from any degree program receive a broader education by fulfilling the requirements that are not included in their own majors.

To earn the certificate, students must complete 24 credits of skill-developing courses: nine for technical proficiency and 15 for technical communication. According to Elise Lind, a technical writer and graduate of the TCC program, engineering students can focus their free electives by using them to fulfill the program requirements. "You can enjoy fun courses away from engineering, plus have something to show for it," she says.

> ***"Technical writing is an incredibly valuable skill to have, and a well-defined career path."***

TCC projects such as research funding proposals, computer manuals and progress report presentations help students develop their speaking and writing. Many students take their written projects to job interviews to demonstrate communication skills. On-the-job professional writing experience also helps them in employment interviews; all TCC students work for at least one semester as an intern for a local agency or firm. According to Robert Longfield of Ohmeda, a Madison engineering firm, "There is a world of difference between a graduate with internship experience and one without that advantage." (Please see "TCC Internship Program," page 9.)

This summer the TCC program has become part of Engineering Professional Development. According to Robinson, the move will benefit both programs. "EPD will become more diverse by offering these undergraduate courses," she says. "Also, the TCC program will be able to reach professionals who want to further their education through EPD's involvement with outreach courses."

All of the faculty involved see the program expanding in the future. Says Sandy Courter, coordinator of the TCC internship program, "It's a dynamic program, bound to grow."

In the Beginning...
History of the TCC Program

Although the Technical Communication Certificate program did not accept its first students until January of 1988, the program's history reaches back more than a decade.

General Engineering's involvement in technical writing began with a joint effort of the General and Industrial Engineering departments. Professor Gerald Nadler of IE wanted students in his design course to write reports on their final projects, so he worked with Gretchen Schoff of the GE faculty and graduate student Pat Robinson in the fall of 1977 to develop a class teaching both report writing and industrial design. After helping instruct the course, says Schoff, "we started thinking about how students could use technical report writing in other areas of engineering."

General Engineering began to offer a technical writing course open to all engineering majors, GE 397, a year later.

Although the faculty was eager to offer broader technical writing instruction, a flood of new engineering students kept them busy teaching sections of GE 397. According to Don Woolston, "There was no time for anything but grading papers." Says Pat Robinson, "When that crush eased, we could finally think about other things."

The "other things" finally got rolling in 1986, when the technical writing faculty started planning intensively at a series of monthly planning meetings. By the end of April, the staff had assembled a Technical Writing Industrial Advisory Board with representatives from several local engineering firms. Board members helped the faculty determine what technical communication skills employers really wanted. According to Gisela Kutzbach, "Once we had the support of industry, the program developed even faster than we thought it would."

The TCC Program's history reaches back more than a decade

After winning Dean Bollinger's approval in the summer of 1986, GE faculty members drew up a tentative curriculum for a certificate program and negotiated with other communication departments on campus to find the proper niche for the TCC program.

In the fall of 1987, the long-awaited moment finally arrived: with the enthusiastic endorsement of the College of Engineering and campus-wide support from the English Department and the schools of Agricultural Journalism, Business, Family Resources, and Journalism, the UW-Madison Academic Planning Council formally approved the Technical Communication Certificate program.

Fall 1989 TCC Courses

Note: Most TCC courses are listed in the Timetable under Engineering Professional Development.

EPD 201
Basic Engineering Writing.
Required course for TCC students, but all engineering students are encouraged to enroll. The course teaches writing skills students need for reports and projects in their engineering courses, and introduces them to the written communication techniques engineers and technical staff use in the workplace. If you aren't sure what technical writing is and whether it would interest you, EPD 201 is a good place to find out.

EPD 275
Technical Presentations
Students apply the principles of effective presentation to several projects. They deliver a demonstration and an informative or sales presentation, enhanced by use of overhead and slide projectors and computer-generated graphics and slides. Students also practice verbal skills in group discussions and interviews, and critique two technical presentations.

EPD 395
Computer-Aided Publications
An introduction to word processing, desktop publishing and design of technical publications. Please see "CAP," next page.

EPD 397
Technical Writing
Required course. Several projects help students develop the technical communication skills they'll need for engineering or technical communication careers. Major assignments include a job letter and resume, a proposal for research funding, a progress report and final report, and two oral presentations.

EPD 398
Technical Communications Internship
Required course. Students gain practical experience working as a technical writer for a local company. Please see "On the Job," next page.

ME 159
Graphical Analysis and Design in Engineering
Required course. Students learn to apply graphical analysis and design, including Maxwell diagrams and computer graphics, to engineering problems.

ECE 350
Professional Expression
Available as an elective for TCC students. The course addresses typical communicative problems of the professional engineer: schedules, job specifications, equipment performance specifications, step-by-step directions, presentation of data, professional articles, abstracts, technical proposals, oral presentations and reports.

On the Job with TCC Internships

The Technical Communication Certificate Internship Program, a required part of the TCC curriculum, matches participating students with local firms and agencies. During their semester-long internship, students learn to use their new communication skills in the workplace. According to internship coordinator Sandy Courter, "The internship provides the practical experience that needs to be a part of any certificate program."

According to Courter, it wasn't difficult to find work for the interns. "We have more requests for students than we have students to place," she says. "With about 10 interns participating each semester and 35 to 40 requests, students have a wide variety of jobs to choose from."

Many engineering firms, such as Nicolet, Siemens and Tracor Northern, employ interns; government and campus offices like the Department of Natural Resources and the Engine Research Center also participate. Two students this semester are working for a private non-engineering firm, Physicians' Insurance Company of Wisconsin, which handles lawsuits for physicians. "We try to revolve intern placements from semester to semester and give many companies a chance to get involved," says Courter.

"Employers know how important the verbal aspect of communication is, and like to see students develop these skills."

At the beginning of the semester, the student and the employer get together and draw up a learning agreement: a list of their objectives for the internship. Most employers provide projects that students can finish in a semester, ranging from quality assurance manuals to statistical analysis procedures to publicity brochures. "In addition to having the internship on their resume," says Courter, "the project gives students something substantial to show potential employers."

Participating companies have reacted enthusiastically to the program. According to Mike Wolfe of Ray-O-Vac, "We were very pleased with our intern. He did a great job updating a manual for calibration and test procedures." David Gilreath of Tracor Northern cites the benefits for both parties: "The intern gets the experience of producing a technical document under 'front line' conditions; we get a useable document."

Students in the internship program spend about five hours a week at their company and keep a log book of what they have accomplished. They also give one oral presentation. "Employers know how important the verbal aspect of communication is," says Courter, "and like to see students develop these skills." For example, students may give a progress report on their project to members of their team at work or talk to other departments about the internship. Occasionally, students give presentations to campus engineering organizations.

The internship students meet for a class every other week to discuss topics like time management, leadership, interpersonal skills and ethics. "Students also take this time to share frustrations and positive points of their internships," says Courter.

What do students receive for all this hard work? "One credit," says Courter. "But they also gain valuable experience that can help them get a job later on. The academic part of the Technical Communication Certificate program would not be complete without practical experience."

Computer-Aided Publishing

Computer-aided publishing, sometimes known as "desktop publishing," has joined the growing list of innovative courses taught in the TCC program. In EPD 395: *Elements of Computer-Aided Publishing*, instructor Gisela Kutzbach teaches students to combine text and graphics on the computer screen into an attractive page design.

The class takes good advantage of the beautiful new facilities in the Computer Aided Engineering Center. On classroom computers, students learn the basics of word processing and write the text for their projects.

They also learn to draw pictures, charts, and logos for their publications with computer graphics programs. Once these are complete, the graphics are combined with the text right on the computer screen. Writers can experiment with different page layouts until they find a look that communicates their message effectively.

Students apply all the skills they learn in a major semester project. Projects last semester included a software manual, articles and an organizational handbook for the Wisconsin Engineer magazine, and a TCC newsletter.

If you'd like to register for EPD 395, plan ahead–to provide students with plenty of personal attention, enrollment is limited to 16 students.

AUTHOR

Lisa Peschel graduated in May with a degree in English after beginning her academic career in engineering. This article was taken from Lisa's EPD 395 semester project, a newsletter called the TCC Clipboard. Lisa recently won second place at the Engineering Colleges Magazines Associated convention for Best Pure Science Article (see Astrobotics, December 1988). Lisa was also Editor of the Wisconsin Engineer in 1986-1987, before she studied abroad and worked as an intern at IBM-Rochester. The Wisconsin Engineer will miss Lisa's superior writing and her great guidance, and we thank her for her contributions.

The Engineering Summer Program

For most high-school students, summer vacation means a part-time job, afternoons at the beach, and a lot of long days with nothing to do. But for 24 minority high-school students, summer vacation has just taken on a very different meaning.

These students recently completed the 1989 Engineering Summer Program (ESP) at the University of Wisconsin-Madison College of Engineering. ESP is a pre-college study program that offers high-school students and graduates an opportunity to explore the field of engineering. The program runs in conjunction with the university's eight week general session, though classes are independent from general session classes.

ESP began at the UW in 1973 as one of twelve similar programs throughout the country. People in industry and education looked at demographics and realized the future would bring a greater need for minorities in engineering. Twelve universities developed a consortium, chaired by then UW-Madison College of Engineering Dean W. Robert Marshall, and funded by the National Science Foundation, to sponsor Engineering Summer Programs.

Today, UW-Madison has the only program that still follows the academically based program of fifteen years ago. ESP is now funded by the College of Engineering, industrial contributions, and the Department of Public Instruction.

Most of the ESP students come from large urban areas. Some attend very good high schools, while others are not as fortunate. Naomi Walton-Winfield, ESP's director, explains that many high schools offer the necessary pre-college courses, but the courses have no substance. Often, students receive top grades at such schools, but really are not learning to their potential. The goal of ESP is to bridge the gap between what students learn in high school and what they really need to know to be successful in college, especially in an engineering program.

One look at the daily schedule could make a college graduate shudder

The program concentrates on math and science skills, which many minority students lack when they begin college. The students study courses like Applied Math and Physical Science; Calculus or Pre-calculus; college level Chemistry, where students participate in lab; Engineering Mechanics; Computer Science, which teaches BASIC and elements of FORTRAN; Study Skills; and Technical Writing.

Other highlights of ESP include faculty and industrial demonstrations and seminars. Participants this summer took field trips to John Deere and Company and Woodward Governor. Industrial representatives from Mobil, Dow, and Procter & Gamble described the roles of engineers at their companies, as well as what their companies offer engineering students, such as scholarships and co-op experience.

The scope of the students' studies should not be taken lightly. One look at the daily schedule could make a college graduate shudder. The day begins at 8:00 a.m. with two hours of math, which are followed by two hours of science. The students regroup at noon for an hour long lunch, then spend the next three hours rotating through Computer Science, Study Skills, and Technical Writing. The day offers one and a half hours of free time. Evenings (6:30-10:00) are required study periods, with math and science tutorials. Exams are given on Saturday mornings.

Students also adhere to specific guidelines. They must participate in and be on time for all activities, abide by a

10:00 p.m. curfew (11:00 on Friday and Saturday), and follow classroom dress codes. Discipline, if necessary, usually means loss of the already limited free time.

But Mrs. Winfield attributes the success of the program to its rigorous schedule and strict rules. "It's like boot camp," she states. The program builds a routine and makes studying and attending classes habitual. The students have no time to question what they do, they just do it.

"People always tell me 'You can't do that', 'You can't **make** the students study','You can't enforce those rules'," explains Mrs. Winfield. "And I say 'Yes I can, and I'm going to'. And you know what? It works. The students do it, and it works."

Winfield recruits most of the ESP participants through contacts nationwide and in Puerto Rico. School administrators recommend students who have the potential to learn more than what they learn in high school. Winfield meets other students when she recruits for the College of Engineering Minorities Program. She adds that many of the students hear about the program through friends who attended, and gave it a very high recommendation.

The ESP students live in Gilman House, part of a university residence hall, with program counselors who provide supervision. The students move in the day before classes begin, giving them little time to adjust to the surroundings and people they must live with for eight weeks. At first, most students are skeptical and afraid. "They come in looking angry," Winfield describes. "It's a defense mechanism. If you look angry, nobody bothers you." The students are quickly swept into the routine and forget their initial fears.

ESP students concentrate on Technical Writing instructor, Carol Cohen, as she discusses resumes and cover letters.

Pride beams from Winfield when she discusses the benefits of ESP. The students who begin college immediately after the program already have the basic study skills, attitudes, and ambitions that most college freshmen struggle to find. They will take a moderate schedule, usually fifteen to eighteen credits the first semester. Winfield says that other students in the College of Engineering Minorities Program who did not attend ESP often find difficulties adjusting to college life. They take fewer credits but are not motivated to get the work done. Winfield adds, "They learn that people tend to get more done when they have less time to do it."

...they are 100 percent more eager to return to school and show the world what they have become

The younger students return to high school and an easier pace, but use their new skills to their advantage. Grade point averages soar and the students further develop their learning potential, even beyond the capabilities of the high school. These students also boast of higher scores on placement tests and college exams like the SAT and ACT.

Winfield estimates that only 20 percent of her ESP students attend UW-Madison for college, but states that this statistic is misleading because the students choose other universities. She explains that the academic success and high test scores attract many universities and many excellent scholarship offers. Though she is disappointed that her students choose other schools, Winfield is happy to say, "At least they go to college. That makes my program a success."

At the end of the program, students complete an evaluation. Winfield says the students complain a little about the schedule and lack of free time, but that they know they have learned very valuable skills, and they are 100 percent more eager to return to school and show the world what they have become. ■

AUTHOR

Shelly Hoffland is a junior in mechanical engineering. She has been on the editorial staff of the Wisconsin Engineer for the last year and is very eager to pass her knowledge on to others who might want her job. Any takers?

Bradley receives NSF award

Assistant Professor Fred J. Bradley, Materials Science and Engineering, has been awarded a $70,000 Research Initiation Award from the National Science Foundation.

The award will help to fund Bradley's work in the computer-aided design (CAD) of metal castings. His work represents a novel approach to modeling the solidification behavior of ductile iron. Using data gathered in the foundry during thermal analysis of a sample, Bradley has developed a computer program to predict the "freezing," or solidification, behavior of the sample.

"One of the novel aspects of this process is that it provides a direct link between CAD and thermal analysis-based process control," Bradley says. Industry will benefit by optimizing the design to production cycle, in particular by reducing scrap rates associated with shrinkage defects, he adds.

Bradley is working with a number of Wisconsin companies in connection with this research, including the Neenah Foundry and the Grede Foundry in Reedsburg.

Interested in joining the staff of the **wisconsin engineer**? Call our advisor, Don Woolston, at (608) 262-0684 or 262-3494.

Electrical and Computer Engineering Professor Wins Young Investigator Award

Barry Van Veen, assistant professor of electrical and computer engineering, has been named a winner of a National Science Foundation Presidential Young Investigator Award. He is one of eight UW-Madison faculty members among 197 faculty nationwide to receive the prestigious NSF award, and the 11th college faculty member to receive the award since its inception in 1984.

The award is based on excellence in both teaching and research. Each winner can receive up to $100,000 per year for five years in federal and matching grants from industry.

Van Veen, a specialists in signal processing, joined the electrical and computer engineering faculty in 1987. His research focuses on algorithms for processing data collected at sensor arrays, adaptive filtering and spectrum estimation. In the spring semester he taught a course on advanced digital signal processing.

Engineering Briefs

Wiley Appointed Graduate School Dean

John D. Wiley, the College's Associate Dean for Research, was named Dean of UW-Madison's Graduate School Friday, May 5, by Chancellor Donna E. Shalala.

He assumed his new post July 1. Shalala said Wiley brings a wealth of experience, insight and energy to the critical job of piloting the University's $255 million annual research undertaking.

"John Wiley has long been one of the University's outstanding leaders, " Shalala said. "We're confident he'll use our past success as a foundation to build on and that he'll prepare the research enterprise of the institution for the challenges of the next century."

Numerous research centers and institutes on the Madison campus fall under the purview of the Graduate School and it is the administrative center responsible for some 10,000 graduate students.

Wiley is well-known as a leader of the university's push to develop the next generation of computer chips through X-ray lithography, a technique that promises smaller and more powerful integrated circuits.

He is also one of the architects of the college's Materials Science Center, a center he headed for four years and helped build into an internationally-known training program for material scientists.

He obtained his master's and doctoral degrees in physics from UW-Madison. He joined the college faculty in 1975 as an assistant professor in the Department of Electrical and Computer Engineering after spending seven years on the technical staff at Bell laboratories in Murray Hill, New Jersey.

Moses Named Research Dean

Gregory A. Moses, professor of nuclear engineering and engineering physics, has been named Associate Dean for Research at the College of Engineering.

With this post, Moses assumes leadership of the College's $33 million annual research effort. His appointment began July 1. He replaces John D. Wiley, who now serves as Dean of UW-Madison's Graduate School.

"The college is at the forefront of research encompassing the diversity of engineering, from lasers to microelectronics to technological aids for the handicapped," Moses said. " Research activity has been growing steadily. My two main goals as Associate Dean will be to help our faculty compete successfully for grants to support their work and to maintain an environment dedicated to scholarly excellence.

"Graduate students participate in all of our research, and fulfilling these two goals is critical to our ability to attract top students."

Moses received his PhD in nuclear engineering from the University of Michigan in 1976. He joined the college faculty as an assistant professor in 1976. he was promoted to Associate Professor in 1980, and full Professor in 1984. His research interests include inertial confinement fusion technology, computer simulation of fission powerplant dynamics, and supercomputing applications.

wisconsin engineer

SUMMER'89

Pi Tau Sigma Awards

Professor John J. Mowska, mechanical engineering, and James J. Berbee, a staff member who teaches thermodynamics, have been presented with distinguished Teaching Awards by Pi Tau Sigma, the mechanical engineering honor society. They were chosen for the honor by student vote.

Sematech Center of Excellence Funded

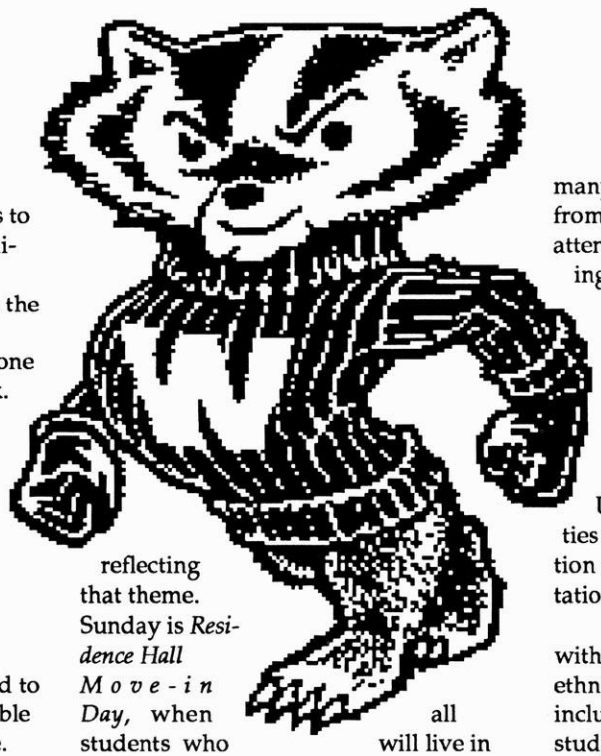
Sematech, a national consortium of microelectronics companies, has announced the formal creation and funding of a Sematech Center of Excellence on X-ray lithography at UW-Madison.

Sematech had announced its intention to fund the center last May, but the full contract agreement and level of funding were not set until April, according to John Wiley, associate dean for research in the college. The funding level for Wisconsin's Sematech Center will be $703,000 for the balance of 1989, with the expectation that the center will be funded at aproximately $1 million per year for at least five more years.

Research will focus on X-ray lithography, a technology for making electronic chips that are smaller, more economical, and have greater power and speed than those in use today, according to electrical and computer engineering Professor Franco Cerrina, who will direct the new center. (See Wisconsin Engineer, July 1988)

Other key college faculty involved in the research are Professors Henry Guckel, director of the Wisconsin Center for Applied Microelectronics; David Huber, director of the Synchrotron Radiation Center; and James Taylor, director of the Materials Science Center.

WISCONSIN WELCOME WEEK



The start of the 1989-90 school year marks the switch for all students to touchtone registration, therefore eliminating the need for *Registration Week*. Traditionally, Registration Week was the week before classes started when students registered by classification, one level on each of the days of that week. This week also provided students with the time to make the transition from home to school. The students were able to become familiar with the campus and services provided by the school. Also, this week gave students time to settle into their new dorm room, apartment or house. However, with the beginning of touchone registration, there is no need to be on campus to register as it is possible to register from any touchtone phone.

With this in mind and realizing the importance of the transition period especially for new students, the University has developed *Wisconsin Welcome Week* through the Center for New Student Development. Wisconsin Welcome Week replaces Registration Week as the week before classes begin. The week is designed to provide activities for all students on campus, not just new students, explains Cathy Prochaska of the Center for New Student Development.

Each day of Welcome Week (August 27 - September 1) has a different theme, with the activities scheduled for that day reflecting that theme. Sunday is *Residence Hall Move-in Day*, when all students who will live in the residence halls on campus can move in. Meetings for both parents and residents are scheduled throughout the week through the individual residence halls.

Monday's theme is *Making the Academic Transition*. The day's events consist of open academic advising by the different schools or colleges on campus and guided tours of the campus and Memorial and College Libraries. In the evening there is Wisconsin Welcome held at Camp Randall Stadium where the students meet the Chancellor and are introduced to the campus and school life. After Wisconsin Welcome, there are many alternatives for students to enjoy from listening to live jazz music to attending student organizational meetings to free films.

Tuesday is *Student Organizations Day*. This day includes orientation for students who missed summer orientation, a scavenger hunt for new students, a student organizations fair and band festival, and free ice cream floats on Memorial Union Terrace. The evening activities include an air hockey single elimination tournament and Multicultural Orientation Reception.

Wednesday is *Celebrate Diversity Day* with food service around campus serving ethnic foods all day long. Activities include a recreational sports showcase, a study abroad slide show and booth, an Ethnic Food Fest, Multicultural Center Open House, and McBurney Resource Center Presentation and Open House. Late afternoon/evening activities include Minority Student Mentor Social, International Student Welcome Reception, Open MIC with student entertainers, Diversions Nightclub DJ'd dance, and a free movie, *Coming to America*, shown outdoors on Cole Residence Hall Beach.

Thursday is *Survival Skills Day*. This day provides students with important introductions to student services such as the Student Health Service, UW Police and Security, and Self Defense. Also scheduled are presentations and discus-

sions about dilemmas commonly faced by freshmen when making the transition to college life. Thursday night will kick-off the free aerobics classes offered throughout the year by having the "largest aerobics class on Earth" at Camp Randall Stadium.

Friday is *Anything Can Happen Day.* Campus bike tours and tours of the McClain Center for indoor training will be conducted. Free canoeing and sailboat rides will be offered through Hoofers at memorial Union all day long. The evening begins with a tailgate party with the Badger Coaches, Bucky Badger, and the UW Band and cheerleaders. Following the tailgate party is the Women's Volleyball game in the Field House. Then, free first run movies will be shown in Camp Randall Stadium against the Field House.

The Center for New Student Development has scheduled the week's events in order to give new students time to become oriented to their new surroundings and just to have fun. They also have specific orientation sessions geared towards new students throughout the rest of the year. The staff of the Center for New Student Development is available to answer any questions that new students may have or to direct them to the correct place to get the answer throughout the year. ■■

Center for New Student Development
905 University Ave. 263-0367

Madison is a city of views. This is the State Capitol from the Memorial Library Mall at the end of State Street.

AUTHOR

Elizabeth Roberts holds a Bachelor's of Science degree in English (yes, a BS in English). She is currently pursuing her Technical Communications Certificate through the Department of Engineering Professional Development while working as a technical writer for an independent products testing laboratory.

THE CAREER PLANNING AND PLACEMENT OFFICE

How many incoming engineering freshmen, or engineering underclassmen for that matter, know where to go for information about career planning? Well, most colleges have placement offices where career counselors work with students and companies to help students find jobs after graduation. The University of Wisconsin is no different, except that different departments and colleges work through various placement offices. The Career Planning and Placement Office (CPPO), located in 1150 Engineering Building, is where engineers go. The CPPO offers a wide range of services to UW-Madison engineering students and alumni.

Campus Interviews

Each semester, over 200 companies use the CPPO to interview Madison's graduating engineers. The companies, such as IBM, Amoco, Ford, Oscar Mayer, and Kimberly Clark, schedule interview dates one year in advance for Fall and Spring recruiting seasons.

Students who interview must be graduating during that school year, and must be registered with the CPPO. Most students register through a program called Pre-Selection in the spring of the year before graduation. This program allows students to complete a standardized resume using a national software database. The resumes are then distributed to companies with interview dates. Some companies invite students to sign up for a campus interview on a priority basis, thus being "pre-selected." Other students can then sign up on an open schedule on a first-come, first-served basis.

Students who miss the Pre-Selection deadline can still register with the CPPO, but they cannot be preselected unless they contact company recruiters through their own efforts.

Resources

The CPPO offers an extensive company literature library. The companies that recruit on campus, as well as smaller Wisconsin companies, provide brochures and informational packets that describe the product or service of the company, the type of industry, or the role an engineer plays in that company. This literature is an excellent resource for students who feel unsure of what field of engineering they want to pursue. The literature is available for students to keep.

The resource library includes books and packets about resumes, cover letters, and interviewing skills, as well as collections of company profiles and corporate reviews. For example, *The 100 Best Companies to Work for in America*, a study of the human condition inside companies, presents a unique review of corporate conditions.

The directors of the CPPO offer a variety of career planning workshops. Recent topics have included Interviewing Skills and Job Hunting Tactics Outside the CPPO.

Each year, the directors of the CPPO also offer a Career Orientation course that targets students in their junior year. The course focuses on guest speakers who present topics from the engineering work environment to insights on the recruiters perspective. The course also provides information on interviewing skills, writing resumes, and graduate school.

Sandra Arnn, Director of Career Planning and Placement

Alumni

The Alumni Placement Service (APS) is a free service provided to alumni who are looking for career changes and recent graduates who have not accepted employment. Alumni keep resumes on file with the CPPO. Recruiters often refer to these resumes to find candidates with specific experience. The APS includes a bimonthly Alumni Job Bulletin that publicizes employment opportunities throughout the country

Engineering students do not have to wait until their junior or senior year to begin the job hunt. The resources in the CPPO provide excellent information about the engineering profession. Any student can discover what engineers do at specific companies, as well as learn how to enhance an engineer's hireability. ■

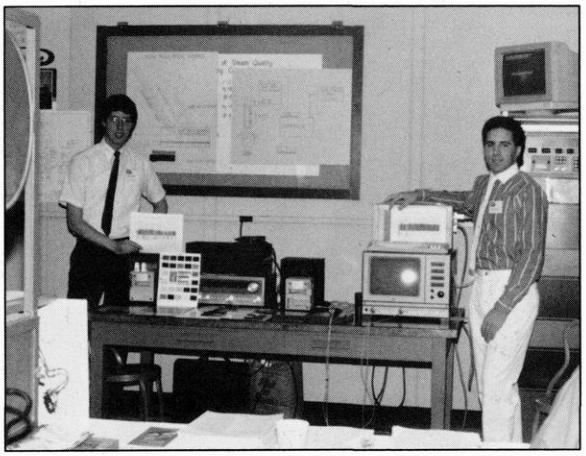
This article was compiled from information provided by the CPPO.

THE ENGINEERING CO-OP PROGRAM

"So , what are you planning to do when you graduate from high school?" is the typical adult question to each high school student met. The answer, "I'm going to major in engineering at the University of Wisconsin-Madison," usually satisfies the questioner. Once off the hook, the student proceeds to wonder what engineering is really about, and whether it will be a good fit. That is where the Engineering Co-op Program is important. The program helps students learn where they fit in the world of engineering.

It is difficult to get a good summer job. How often do your hear, "We only hire people with experience." It boils down to the fact that **you need experience to get a job,** but **you need a job to get experience!** Co-op Program to the rescue!!

One co-op engineer at McDonnell Douglas summed up her co-op experience when she said, "They pay us a salary and let us play life." In the process she was learning what it might be like to be an engineer at McDonnell Douglas.



At Expo 89, co-op students display a project they worked on at Pierce Manufacturing.

Besides the experience, new friends, and new confidence, co-ops also earn money to help with school expenses. Al Ludwig, a U.W.-Madison co-op asks, "When else can you go to a new city, start a new job, meet a whole new group of people and quit four months later to return to your safe secure college life?" He goes on to say, "Out of this time at work you gain more than just money. The contacts you make are irreplaceable. Not only the people in your immediate work group, but those in other groups with whom you interface, will come to know your quality of work. Many full-time job prospects can be made this way."

"In a changing world, when technology is taking leaps and bounds, experience is a never-ending part of the learning process," says a U.W. Madison student at Webex, Inc. He goes on to say that , "Students like myself would have a hard time landing a first job without any experience in the field, but with co-op, I've got it made!"

A co-op with Caterpillar is enthused. "I've gained experience working with other people and realized areas I need work in...I plan to continue in the Co-op Program, not just because of the valuable experience, but also because of the overall enjoyment of the program."

A co-op with IBM puts it this way; "I believe that I will be much more marketable when I begin interviewing for a permanent job this fall, and I believe that I will be much more valuable to the company that hires me."

Many students comment that it is really great to look forward to a change of location and activity. Al Ludwig comments that, "The friendships formed in these four month periods are unlike any other. It's somewhat like being at camp. Everyone knows they have only a limited time together, so they want to make the most of it. The atmosphere of having money to spend, and time to spend it in, without homework to do, facilitates this."

The Co-op student is a full-time student most of the time, but chooses to take an engineering co-op position with an employer like Kimberly-Clark, Hewlett Packard, NASA, Wisconsin Electric, S&C Electric and many others, for one semester or one summer. Upon return to campus, the student is greeted by the Co-op Association Kick-Off Meeting and meets the new co-op candidates and other returning co-ops.

Once admitted to the major department, a student is eligible. Sign-up is in 407 Wendt Library. This falls deadline is September 13. Start-up jobs would begin in January 1990 and could lead to next summer's job!! ■■

This article was cheerfully contributed by Marion Beachley, Director of Engineering Co-op.

ETHICS AND SOCIAL RESPONSIBILITY

A CLASS FOR THE ENGINEER

Whoever thought that Engineering courses were limited to **Steel Structures**, **Hydrodynamics**, or **Linear Active Circuits**, did not reckon with Professor Dick Moll, and his course on *Ethics and Social Responsibility*.

Ethics and Social Responsibility, offered this fall at the University of Wisconsin-Madison, is a one-time, one credit, offering in celebration of the College of Engineering's 100th Anniversary.

"The purpose of the course is not to make up anyone's mind, but to open minds, and to make the agony of decision making so intense that you can only escape by thinking." The course will begin on Wednesday, September 6 and continue for seven consecutive Wednesdays, from 6:00 - 8:00 PM in the auditorium of the State Historical Society.

During the first hour of each class, students will view a videotape from the Public Broadcasting System's highly acclaimed series "Ethics in America." The tapes feature nationally known personalities such as former Surgeon General C. Everett Koop, Jeanne Kirkpatrick, Peter Jennings, and Geraldine Ferraro. (See box for a summary of the tapes).

After viewing the tape, the second hour will give students a chance to interact with nationally known figures from the Madison area who will offer their brief viewpoint of the tapes and participate in a question/answer session. Resource people agreeing to participate as of this writing are former Wisconsin Governors Patrick Lucey and Tony Earl; Madison Mayor Paul Soglin; Judge Angela Bartell; Dr. Paul Carbone, one of the world's leading Oncologists; and other recognized faculty. Moll said he was not surprised at the overwhelming response by very busy people. "It's an opportunity to reach out to 300 future leaders and encourage them to take risks to do what's right for them and society."

When John Bollinger, the Dean of the College of Engineering, first asked Moll to create the fall course, Moll was enthusiastic. But when Bollinger also added his desire to "do something on ethics," Moll admitted to being apprehensive. He wondered how he could excite students with topics such as; *don't cheat, be a good engineer, don't forget your mother on Mother's Day*, and *pay your taxes*.

Then one Sunday, in his weekly routine of scanning the Wisconsin State Journal's TV Week for good programs, Moll spotted a PBS program on Ethics in America. The program turned out to be one of twelve one-hour video tapes on a variety of contemporary "ethics" issues. Moll chose the seven best, and with the enthusiastic support of his resource people, he stopped worrying.

Do Unto Others

Should we turn in someone who cheated on the SAT because she/he could not afford preparation kits?

Should we give a dollar to a begging person on the street?

Should we ask the police to remove a beggar who lives behind our apartment building?

Private Interest, Public Trust

If a public official commits a crime, should the colleagues tell?

Should the president be required to inform the public or the press about another official's crime?

Should the press be responsible for verifying stories that could destroy an innocent person's career?

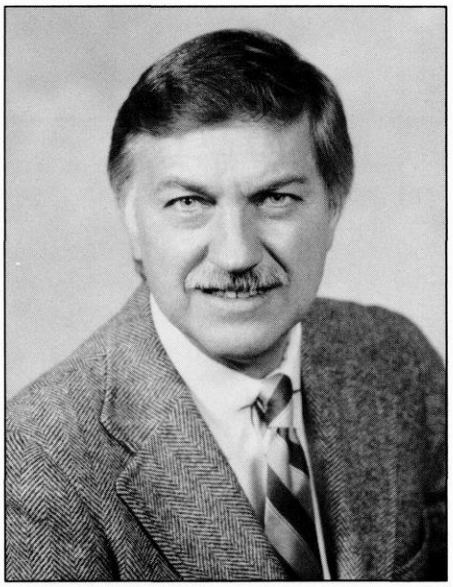
Does Doctor Know Best?

Who's autonomy should the doctor choose–does he act on the patient's desires or on the required medical care?

Anatomy of a Corporate Takeover

Is it inside trading if people know that a strategic man is ill and then begin to buy or sell stock?

When inefficient factories are left open because thousands of jobs are on the line, is the board of directors acting in the best interest of the business, or contributing to charity?



Professor Dick Moll, Instructor for Ethics and Social Responsibility

Truth on Trial

If quality control specialists determine that space heaters cause fires, what should the manufacturer do?

Should the manufacturer recall the product even though the lawsuits would be cheaper in the long run?

Does the justice system work?

The Human Experiment

Is it ethical to risk the life of one patient today to save others tomorrow?

Should a patient be able to volunteer for experiments without knowing the possible outcome?

Politics, Privacy, and the Press

Should a reporter hide, snoop, and spy to get information?

Should a candidate who makes a slight but unethical error be forced to resign because of the press? Is this ethical on the behalf of the press?

What should the press print? Do public officials have any privacy?

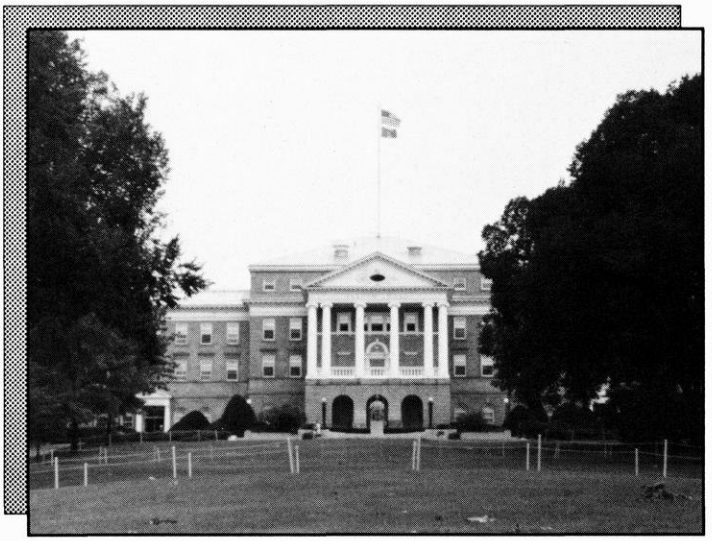
Should an editor print information if the writer cannot show proof?

Ellen Ventura has assisted Professor Moll with the Ethics and Social Responsibility course. Ellen viewed the tapes to provide these descriptions.

An ethics seminar will be held on Engineer's Day, October 20, from 2:00 until 5:00 PM in the State Historical Society auditorium. The seminar will feature Dr. R. David Pittle, Technical Director of Consumers Union, who will discuss Product Safety/Ethical Decision Making. Also attending will be Professor Alta Charo, of the UW Law School, discussing Clinical Experimentation Therapy and Human Subject Research, and Dr. Vivian Weil, Director of the Center for the Study of Ethics in the Professions at the Illinois Institute of Technology, on Ethics in Engineering Practice.

AUTHOR

Christine Dorean Moll is a senior majoring in Journalism. She recently spent her junior year in Bologna, Italy. As for the future, Christine is considering a graduate major of Law Journalism.

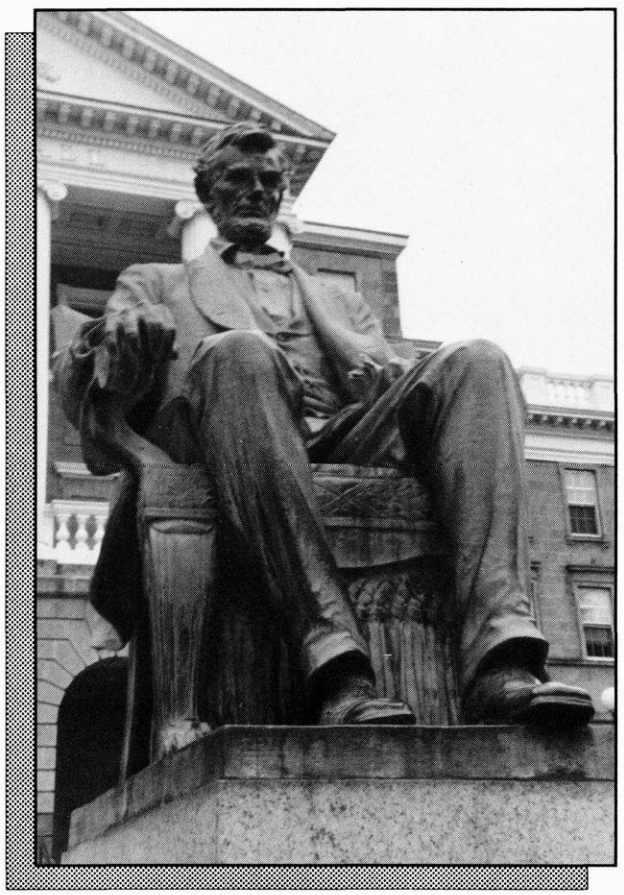


This is Bascom Hall as seen from Bascom Hill. Engineers might get into Bascom for an exam, or maybe even an English class.

The University of Wisconsin boasts one of the nation's largest and most beautiful campuses. Engineers, however, seem to be situated at the "unscenic" end. Sure, we have Camp Randall, but L&S has Bascom Hill. Now and then, engineers get some time to venture down to the "other end" of campus. When they do, this is what they see.

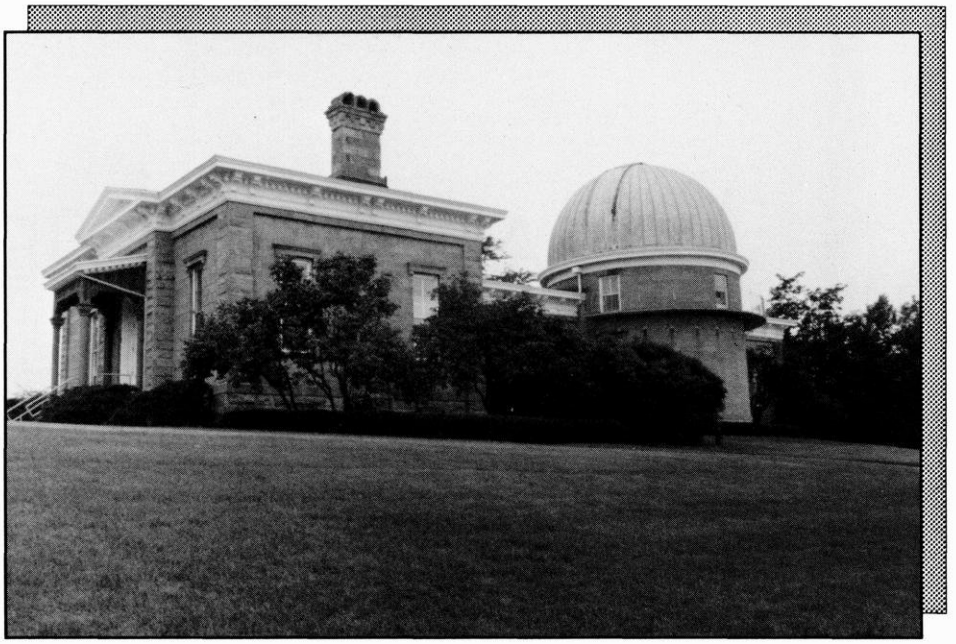
- by Shelly Hoffland

WELCOME TO CAMPUS



Abe Lincoln stearnly overlooks Bascom Hill and the State Street Mall.

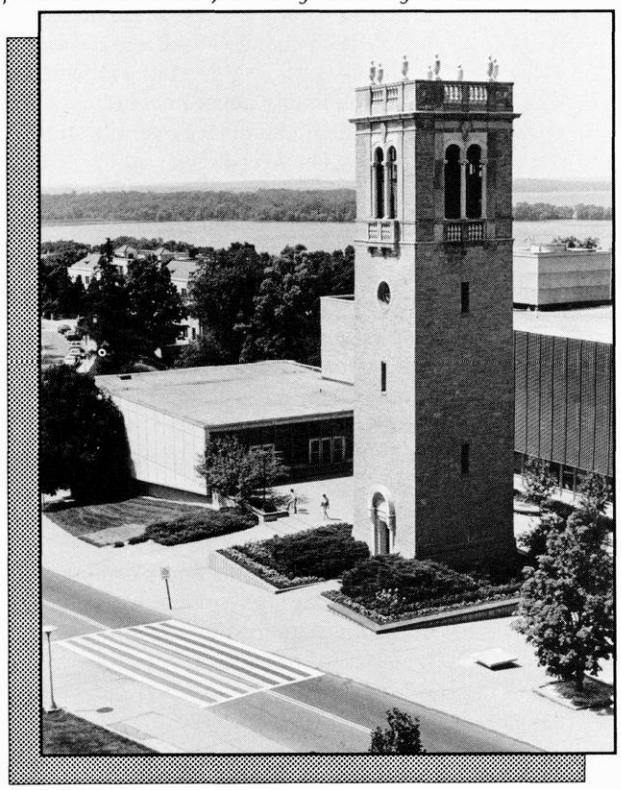
The Memorial Union Terrace is a great gathering place on weekend nights. On nice nights a band might be playing outside. Not many people were here on a rainy Saturday afternoon in July.

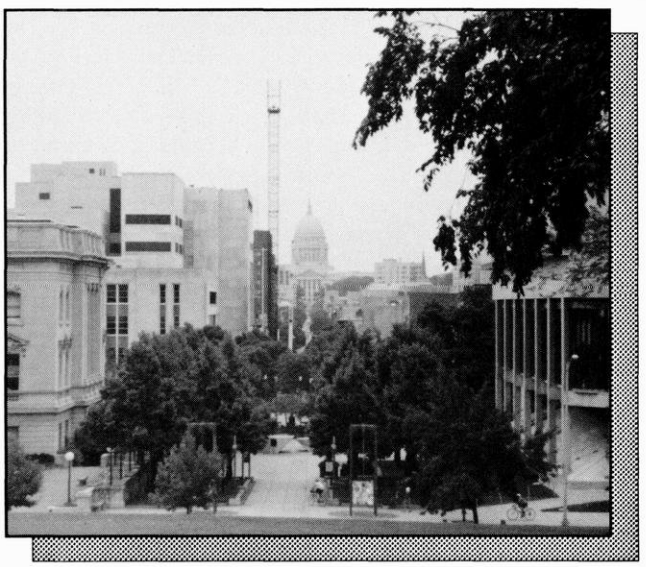


The Observatory sits high on Observatory Hill. A path behind it leads around Van Hise and Ag Hall. I haven't seen many students up there, but it really is a nice place to take a walk.

This is Lake Mendota from Observatory Drive. Lake Mendota is the largest of Madison's five lakes.

The Carillon Tower stands in front of the Social Science building. The bells inside chime every half hour. This photo is courtesy of Engineering Publications.





Bascom Hill offers a great view up State Street to the State Capitol. The scaffolding is part of construction on Memorial Library. There has been controversy about the addition to the library blocking Abe's view of the Capitol.

WHAT HAPPENED TO GENERAL ENGINEERING?

Secretary (answering phone): "Good morning—Mechanical Engineering Graphics/Engineering Professional Development/Technical Communications Certificate Program. May I help you?"

UW-Madison Engineering Student: *"Wh-...What was all that? I was trying to call General Engineering, but maybe you can help me. I just got the fall timetable, but I can't find the General Engineering courses listed. What's going on?"*

Secretary: *"You can't find the General Engineering courses in the timetable because the General Engineering Department doesn't exist any more."*

Student: *"Really? Are you sure? Is there someone else that can help me? Are those courses still being offered?"*

Secretary: *"The answers are yes, yes, no and yes. I used to be the secretary for General Engineering, so I am really sure that the department is really gone. And no, no one else can help you bring back the department, because the engineering faculty, the Chancellor, Board of Regents, President of the System and everyone else have agreed with the decision to eliminate it. But you don't have to worry, because, yes, the courses are still being offered. If you are looking for an engineering graphics course like Descriptive Geometry or Civil Engineering Graphics, look under Mechanical Engineering. If you are looking for technical writing, technical Japanese, or freshman orientation courses, look under Engineering Professional Development, which is a new timetable category.*

Student: *"Interesting. I know all about Mechanical Engineering, but what the heck is Engineering Professional Development? Is that a new department, or just a new name for an old department? Is that what used to be General Engineering?"*

Secretary: *"No, it isn't that simple. Engineering Professional Development (EPD) is the department in the College of Engineering that used to be Engineering Extension. Now it is a department in the college. It still conducts shortcourses and workshops for practicing engineers, but it now has the new mission of teaching undergraduates. So a lot of faculty who used to be part of General Engineering are now part of EPD, even though their offices haven't moved. The others—those that teach graphics— are still in their old offices here in the General Engineering Building, but they are now part of the Mechanical Engineering faculty.*

Student: *"Thanks for the explanation. You've been very helpful...I think the new chancellor really is making progress in creating a more user-friendly campus. With what you've told me, I'll be able to finish my touchtone registration today."*

Students returning to Madison this fall see the familiar tree-shaded, one-story General Engineering Building just west of Mechanical Engineering looking much the same as it did when they left last spring. Just as in years past, the building bulges with engineering undergraduates taking courses in graphics and technical communication and stopping by to see advisors in the Pre-Engineering and Engineering Minority Affairs offices. If the timetable hadn't been changed to delete the entries under General Engineering, students would probably never know that a major change had taken place over the summer. But things have changed.

As of July 1, the General Engineering Department ceased to exist as an administrative unit. Two years of negotiations and planning took place to ensure a smooth transition of the General Engineering teaching functions to two other College of Engineering departments: Mechanical Engineering and Engineering Professional Development. Committees from the departments drew up elaborate documents to specify terms of the transfer, right down to transfer of office space and equipment.

That negotiating and planning wrote the last paragraph of what has to be one of the more interesting department histories in the college. Most interesting is how changes in the department over the last forty years have reflected national trends.

This 1958 photo shows the Drawing and Descriptive Geometry Department. Professor Ernie Manner (second from left in row1) and Professor Dean Jensen (fifth from left in row 1) still teach, now for the Mechanical Engineering Department.

The Post-War Era

In the 1950's, the College of Engineering was swamped by veterans who looked for degrees in the classic engineering disciplines: mechanical, civil, electrical, and to some extent metallurgical engineering. The curricula were long on drawing-board design work, and relatively short on theory and science. As a result, graphics courses formed a substantial core of each curriculum: Mechanical Engineering required 9 semester credits in descriptive geometry and graphics. (Incidentally, these requirements were in addition to two required semesters of American history, four semesters of military science, and two semesters of physical education). The emphasis on graphics entailed a separate department—the direct ancestor of General Engineering–which in those days was called the Department of Drawing and Descriptive Geometry.

The Swinging Sixties and Seventies

As the Baby Boom generation members matured (or at least were scheduled to mature), engineering education bottomed out. Slide rules and calculations didn't mix with the Woodstock ideals of dropping out, hanging around, and doping up. Engineering enrollment plummeted, hitting a post-war low in 1972. At UW-Madison, the bust cycle meant cutbacks in graphics faculty. It also meant intense activity to make engineering more "relevant." The Department of Drawing and Descriptive Geometry became the Department of General Engineering to reflect the addition of courses in engineering that were indeed very general: for example, courses such as the History of Technology; Issues in the History of Science, Technology and Theology; and Engineering Concepts in Societal Decision Making. In 1972, Mechanical Engineering only required four credits of graphics, and military science was definitely not required.

The Eighties

The economic upswing of the 1980's and the advent of the Information Age once again made engineering attractive to high school graduates. Enrollment in the college hit record highs in 1983 through 1985, and the General Engineering faculty started growing again. Computers that brought about the Information Age led to a revolution in the way engineers did design. The General Engineering Department, under the leadership of Professor James J. McNeary, kept pace with that revolution by incorporating computers into every graphics course. In addition, technical communications became a major focus of the department, as industry nagged the college to produce better communicators. Engineering students gave up typewriters and turned to word processing as the writing tool of choice.

In spite of these modernizations, the department was being swept downstream by an even stronger current: the increased role of research and graduate education in the college was making an undergraduate teaching department unjustifiable. A thorough evaluation of the department by an ad hoc committee in 1985 led to the conclusion that while the department was doing a good job of its teaching mission, General Engineering could never become a research-oriented, degree-granting department. Since the college still needed the graphics and technical writing courses (including the new Technical Communication Certificate courses–see page 7), the functions and faculty had to be retained, but the department itself had to disband to streamline the administration of the college.

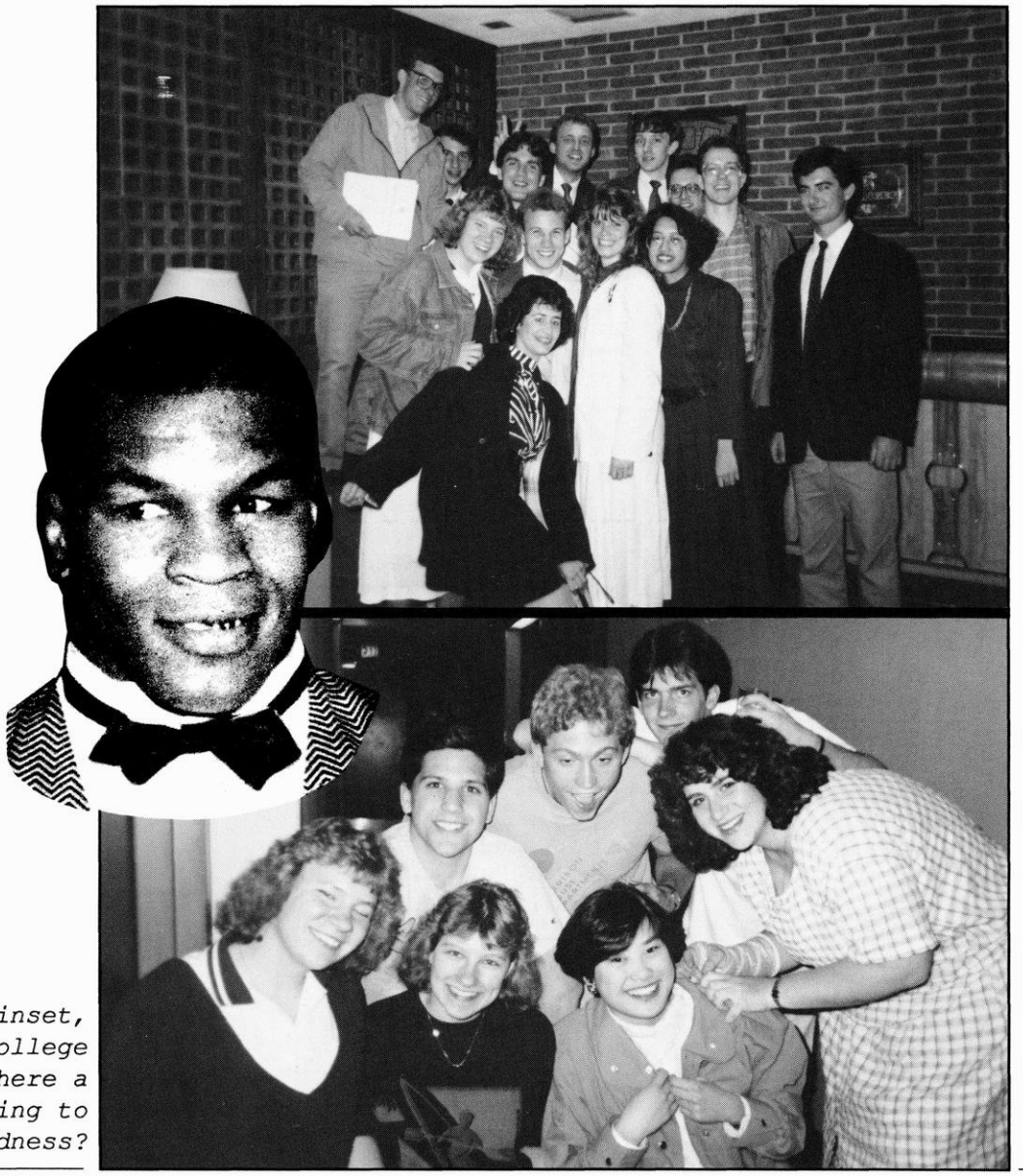
Conclusion

This short history leaves out a lot, but it answers the question of why General Engineering is no longer in the timetable, but the building is still there with its occupants still teaching graphics and technical communication classes. Left unanswered is how the secretary in the General Engineering building should answer the phone. Any suggestions? ■

This article was written by Liz Roberts, with assistance from Wisconsin Engineer Advisor Donald Woolston.

Just One More

STUDENTS CELEBRATE TYSON DAY!



Mike Tyson, inset, and eager college fans. Is there a hidden meaning to this madness?

Washington, D.C. - Bright and optimistic college students gathered here last week for what was being called the First Annual Mike Tyson Fan Club Celebration.

Students came from most major universities, including Wisconisn, California, Virginia Tech, and Cornell. The cost of the trip was not important, as one fan explained. "We came because we like Mike."

A very excited young woman added, "Mike is everything to us."

Many of the students who attended study engineering or other technical fields. **Just One More** investigated the possibility of a *boxing/science* relationship, and found nothing obvious.

Tyson could not attend the Celebration. A close associate said Mike was still distraught over the recent break-up of his marriage.

When **Just One More** asked Tyson to comment on the situation, he replied with a brief, "Where's Mandarich?"

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