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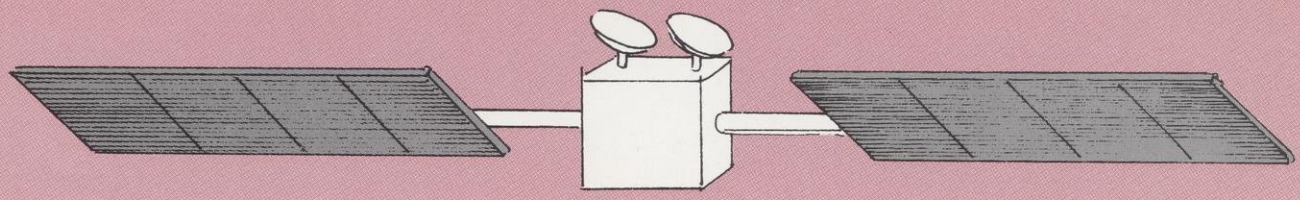
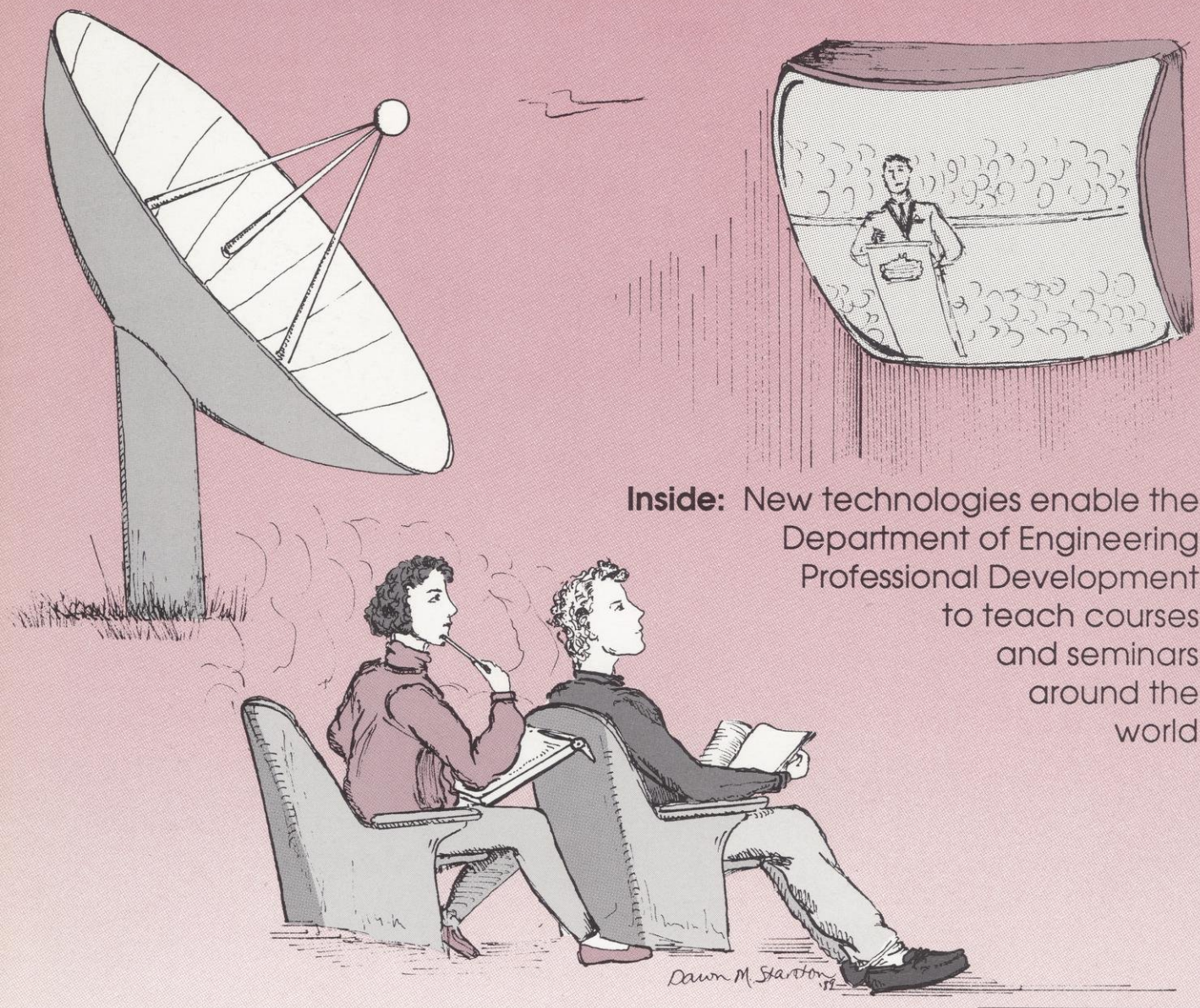
Volume 94, No. 2

Special EPD Issue, December 1989

wisconsin engineer



LIFE -LONG LEARNING: THE ROLE OF UW-MADISON'S DEPARTMENT OF ENGINEERING PROFESSIONAL DEVELOPMENT



Inside: New technologies enable the Department of Engineering Professional Development to teach courses and seminars around the world

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Senior Transportation Engineer

Green Bay Location

Candidates should have a B.S.degree in Civil Engineering, M.S. degree is preferred. A P.E. in the State of Wisconsin is required. Extensive experience and knowledge (10 years +) of the Wisconsin Department of Transportation system, design and plan review is a must. Actual work experience with the Wisconsin Department of Transportation is highly desired. Duties include: leadership direction for our Transportation Section; senior design responsibilities for transportation projects including highways; interchanges; bridges and planning areas. Other responsibilities include marketing and sales related activities for state, county and local authorities.

Senior Project Manager/Environmental Process Engineering

Green Bay and Milwaukee Location

Candidates must have a B.S. and/or M.S. in Environmental/Sanitary Engineering with a minimum of 15 years experience in municipal and/or industrial wastewater treatment projects as well as excellent communication and presentation skills. Position responsibilities will include leadership in expanding our client and market base, municipal and/or industrial project management and client responsibilities, a P.E. registration or ability to attain is required.

Project Manager/Environmental Process Engineering

Multiple Locations

Candidates must have a B.S. and/or M.S. in Environmental/Sanitary Engineering with a minimum of 7-10 years experience in wastewater design, project management and possess strong communication and presentation skills. Position responsibilities will include municipal/industrial project management, wastewater/feasibility studies, coordination of project designs and client management. Involvement in sales and marketing efforts may be included.

Combustion Process Engineer

Green Bay and Milwaukee Location

Candidates must have a B.S. and/or M.S. in Mechanical Engineering with a minimum of five years experience in combustion engineering. Responsibilities include: process design of combustion systems, energy systems, etc.; project engineering responsibility for combustion projects; mechanical engineering for a variety of projects, including wastewater treatment plants; and client contact with some sales responsibility.

Process Systems Section Manager

Green Bay Location

Candidates should have a B.S. degree in Chemical Engineering or related field with 10+ years experience in manufacturing engineering/management. Additional experience desired in food processing, paper making or pulping, energy or recovery. Position responsibilities include: management and expansion of our Process Systems Section; management of key projects; assistance in business development.

Architects

Green Bay/Madison/Milwaukee Locations

Candidates must have a B.S. degree in architecture, planning, education with at least 8-10 years experience in design/planning and project management. Candidates must have a proven track record in education project management and/or planning and design. Must be able to demonstrate thorough working knowledge of design process and planning programming for K-12 school systems in the midwest with reference being Wisconsin experience.

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PUBLISHED BY THE STUDENTS OF THE UNIVERSITY OF WISCONSIN-MADISON, DECEMBER 1989

TABLE OF CONTENTS

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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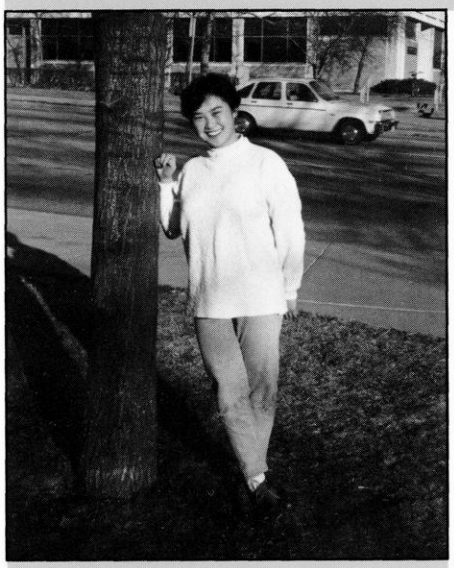
EDITORIAL



Sharon Chen, Co-Editor
Wisconsin Engineer

When I was in high school, I worked as a lifeguard. Part of my job was to help beginners learn how to swim. Most of these classes consisted of high school freshmen who were petrified of the water. There was one boy I remember particularily well. Jack (not his real name) was a muscular and very lean runner who had an intense fear of touching the water with his face. He did rather well in the beginning. You could tell that he was still afraid, but he didn't let his fear conquer him and he progressed with the rest of the class. It was when the class started to learn how to float that problems developed. Floating in water requires a certain amount of body fat, and Jack had close to none on his body. He sank like a cement block. We tried to get over this by surpassing floating and going straight to the arm/leg movement stage. It didn't work. He was so tense and stiff that he would sink while he was moving forward, and eventually, he'd be at the bottom of the pool—still trying to propel himself forward. After an immense amount of hard work, from both him and me, Jack learned how to swim. We never could get him to float, but Jack learned the essence of floating, and from this he was able to use that knowledge to his advantage.

Jack had trouble in the course because without the basics, which in this case was floating, it's very difficult to get ahead. He hadn't physically learned what he needed to know in the beginning, so he had difficulty later. It wasn't until he understood the principles behind swimming that he learned how to swim. This is true with just about anything, even the engineering curriculum.

There have been times when I've felt like quitting, especially when I was particularily frustrated in a class that I didn't believe was necessary. I'm sure I'm not alone. The question, "Why do I have to take this *stupid* class?" has probably entered everyone's mind at least once during their college career, and it's a question that deserves an answer.

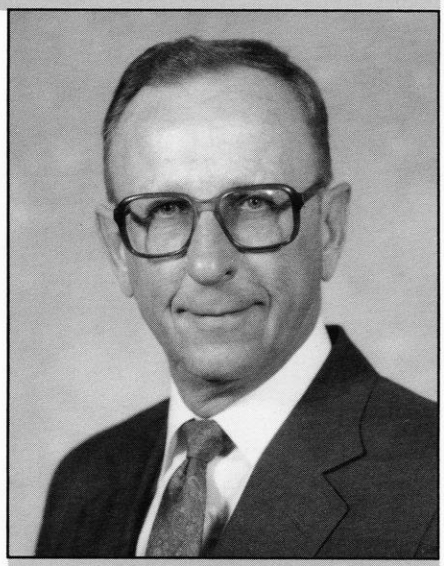
The truth is, no class is stupid. Sure, fifteen years down the line, state-of-the-art as we know it will be "that old thing", and most of the extraneous knowledge we've been gathering will be outdated. But we'll be glad we attended a university, and not a technical school. Why? Because the best engineers are those with a strong and broad *base* of knowledge.

Many of Jack's classmates learned how to swim relatively easily and quickly once they mastered floating. Metaphorically this applies to engineering too. Physics, calculus, and chemistry are the core of every engineering education, like floating and breathing are the core of swimming. Their basic principles are universal. Knowing and understanding them thoroughly will not only make higher level courses much easier, but they will also serve as a base for future knowledge. Think about it, the basic axioms, theorems and laws have been around for decades, even centuries. CDs might go out of style, but F=ma won't.

I've just stated that chemistry, physics, and calculus are important, but what about those other classes—you know, the ones that seem totally meaningless? These classes are important too. Remember Jack? He never could do the breast stroke, but he knew enough technique to get across the pool. He'll never win an Olympic medal in swimming, but he'll be able to apply the skills that he learned in that class to other situations. For example, if he ever falls out of a boat, he'll be prepared. In a way, that's what the other meaningless classes are for, to serve as a broadening tool for our foundation of knowledge. They're our catchall. Not everything we learn in those classes is going to be pertinent, but the underlying thought processes that go into that knowledge are. With them, we'll be able to apply what we have learned to what we will learn in the future.

It's the understanding of what we're learning, and why we're learning it, not necessarily regurgitation of the material that is most important. It's this understanding that will one day aid us at our jobs, or when we take refresher courses through programs like EPD. The education we get in the next four, five, or six years, will be the best investment we could ever make for the future. Invest in it wisely! ■

DEAN'S CORNER



C. Allen Wortley
Associate Dean for Research

The educational philosophy behind the "Wisconsin Idea" was first espoused in 1905 by University of Wisconsin President Charles Van Hise. Simply stated, it has come to mean, "The boundaries of the campus are the boundaries of the state." In these final decades of the twentieth century, telecommunications may now have amended that phrase slightly to state, "The boundaries of the University are the boundaries of the state–*and beyond.*"

In 1988, the University of Wisconsin System (Telecommunications Task Force) recommended the following:

"The State of Wisconsin, in conjunction with the University of Wisconsin System, other public educational agencies and the private sector, has a responsibility to develop, fund and construct a reliable, high-capacity, flexible and cost-effective telecommunications system to link all University of Wisconsin System institutions in order to stimulate delivery of high quality instructional programs, advance research and scholarly endeavor, broaden outreach and public service capabilities and access, and facilitate more efficient, productive organizational interaction."

The Task Force's recommendations include developing and implementing a telecommunications network plan over a five-year period. The total estimated cost is approximately $16 million. The UW System is endeavoring to include the network plan in its biennial budget request to the Wisconsin Legislature for consideration.

Fine, you say to all of this, but just what is telecommunications and what does it have to do with me?

"Tele" is a combining form meaning "having to do with operating over long distances," and "communication" is a noun meaning "the act or fact of passing along, transfer." Nowadays, the noun "telecommunications" normally means "the electronic transmission of messages."

Technologies used for electronic transmission include satellites, telephony, video and compact disks, video and audio tapes and cassettes, broadcast and cable television, microwaves, fiber optics, computer networks, and communications bridges.

As a college on the Madison campus, we in engineering have a unique land-grant status mission to serve the people in Wisconsin (and elsewhere as well). As a campus resource, we provide instruction, conduct scholarly inquiries, and transfer technology. Our tripartite mission is teaching, research and public service.

Part of this overall mission is termed "outreach." Outreach is our public service responsibility to instruct, inform and transfer technology. Outreach has become an important, identifiable and often-referred-to activity.

All engineering departments, centers, programs, consortia, etc. have outreach missions. Although our Department of Engineering Professional Development has the unique responsibility to organize and conduct non-credit continuing engineering education programs on a self-supporting basis, all college units have broad outreach responsibilities. As a college, we should be able to: simultaneously teach students on campus and off; link campus resources to all students and faculty, including industry; and receive and transmit information worldwide.

You students may have seen some evidence of these activities already. As you will read about elsewhere in this special *Wisconsin Engineer* issue on EPD, we have been teaching off-campus sections for some of our graduate and upper level courses by using microwave transmissions, satellite distribution, and other technology.

Our satellite downlink receiver dish is located on the Wendt Library terrace; and our uplink dish, to send signals to satellites, is located across from the University arboretum.

You have heard that we are moving toward the "information" age. I believe it is true. Your training and education now are but beginnings to your future professional practice in the information age. You are already well-versed with computers and microcomputers. Watch for more telecommunications to follow which will impact you even more.

I visualize the day when courses will be team-taught by outstanding faculty from several schools; when schools will share one another's courses; when students may learn in a variety of locations beyond their normal classrooms (for example, in dormitories or libraries or at home); when faculty will no longer primarily focus on the preparation and delivery of lectures to groups of students meeting on campus, but rather will be focused on communicating with students in a more personal way that will be tutorial in nature; when on-campus classrooms will be enriched by the comments and experiences of older off-campus engineers taking the same courses; and on and on.

If you would like more information on telecommunications and our outreach efforts, please drop by my office in 266 Mechanical Engineering. I would be happy to talk with you. A particularly intriguing book about the information future is *The Media Lab: Inventing the Future at MIT*, by Stephen Brand. Check it out!

ASSISTANT PROFESSOR PATRICIA ROBINSON

As you walk along the west side of the General Engineering building and peek in the window, almost any morning you are likely to see an erect, well-dressed dark-haired woman teaching engineering students the way teaching was meant to be done: direct, focused, thorough, engrossing. Even the less communicative students—the guys with the baseball caps pulled low over their eyes—get involved as the professor guides the class to an intuitive understanding of writing strategies.

If you listen closely, you might hear her distinctive voice: flawless diction, unerring word choice, seamless continuity. No props, no overhead transparencies, no smoke or mirrors; just compelling, logical lecture interspersed with leading questions and enlightening comments.

"...I get two or three calls a month from companies looking for technical writers. They are always looking for someone with a sound technical background."

That dark-haired woman turns out to be not only a good teacher but also an interesting person. She is Patricia Robinson, Adjunct Assistant Professor in the Department of Engineering Professional Development.

With a bachelor of arts in Religion from Oberlin, and a master of arts and Ph.D in Hebrew and Semitic Studies from UW-Madison, Professor Robinson is not someone you would expect to be an engineering professor. There is much more about her that is remarkable besides her eclectic background. The breadth and depth of her accomplishments are also noteworthy.

She has been with the College of Engineering since 1978. Before that, she was a teaching assistant in Integrated Liberal Studies (ILS) while she was writing her Ph.D thesis on the effects of the Greeks on the Hebrew language and culture. ILS Professor Gretchen Schoff, who was then working on strengthening engineering's technical writing program, recognized Robinson's potential as a teacher.

"People who are good teachers don't learn it; they have it in their bones. I recognized that in her immediately," says Schoff. "She was superbly educated, so she has a wealth of knowledge to draw on. Part of that was she had seen good teaching in her own family, her own father and brother being UW professors. Most importantly, she loves to see the light bulb go on over a student's head."

Schoff, a long-time English teacher, also noticed Robinson's incisive writing style as one that lends itself well to technical subjects.

Together Schoff and Robinson guided the growth of the college's technical writing program, which now resides in Engineering Professional Development. Robinson's first step was to produce a workbook that made learning technical writing a workshop activity. That material evolved into the highly successful *Fundamentals of Technical Writing* published by McGraw-Hill. She has also co-authored a text on writing user manuals and another book on fundamentals of writing for practicing engineers.

Writing and teaching are apparently not enough to keep her busy, however. Since coming to the university, she has totally renovated two houses (including wiring, plumbing and drywall) and served on the board of directors of Operation Fresh Start, a private, non-profit agency that provides youth with employment and training through building projects. "I like to see concrete results. That's why I like building," says Robinson. "Sometimes in teaching, even if you are doing a good job, you don't always see the results. Working on constructing things is a good counterpoint. It's very clear when you've done it right, because it works." She has also found time for hobbies, most notably fishing. "In the last few years, I've taken up fly fishing, which is a great way to spend money, accumulate gadgets, and travel."

Academically, she has continued to achieve as well. She recently completed a master of science degree in Water Resources to complement her liberal education. As part of her M.S. she

helped complete a lengthy report to a state agency interested in the growing problem of pesticides in groundwater. She also had the opportunity to take several engineering courses, including Sanitary Engineering, (Civil Engineering 320), which was her favorite. "I drove friends and relations crazy telling them more than they wanted to know about how water softeners and wastewater treatment plants work."

Her responsibilities on campus have continued to grow through the years. Formerly head of the Technical Communications Certificate program, she now has a new title: Manager of Campus Courses in Engineering Professional Development. She oversees a whole new mission for the former extension department, that of teaching for-credit undergraduate courses. She sees exciting challenges in her new position.

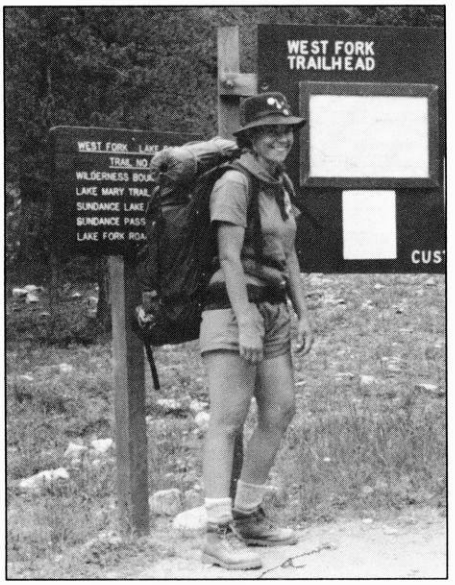
According to Professor Robinson, "Our new mission opens up interesting opportunities for cooperation with other departments in the college. We also can offer different sorts of courses and give our undergraduates the chance to interact with professionals who come to Madison for EPD's short courses."

"...Most importantly, she loves to see the light bulb go on over a student's head."

She also hopes to build an even stronger technical communication program. "So far our responses from industry have been very encouraging. Industry is increasingly in need of engineers who can communicate effectively. The field of technical writing is growing rapidly, too. I get two or three calls a month from companies looking for technical writers. They are always looking for someone with a sound technical background."

Her special scholarly interest is owner and operator manuals, especially the legal and safety issues that make these documents so important. She recently served as an expert witness in a product liability case in which a company was being sued over the adequacy of the instructions and warnings it created for one of its products . "I'm interested in helping companies create instructions and warnings that will help protect them against legal problems and protect the users from harm."

If you are a student who would like to know more about these issues, and about one of the college's most interesting professors, register for EPD 392, "Writing Operator Manuals and Software Documentation." ■



Professor Robinson pauses at a trail head in the Montana wilderness (she is relentless in her search for fish that will bite on her homemade trout flies).

AUTHOR

Liz Roberts holds a B.S. degree in English and is currently working for her Technical Communications Certificate.

THE EMPLOYMENT GAME
(OR "NEVER LET THEM SEE YOU SWEAT")

START

As you sit back with your fifteenth bottle of Ol' Swill, drunkenly grumbling after your most recent midterm/idiotic-lab-write-up, just remember: all this will come to an end someday. While a few will break, (either turning into Education or Psych majors or rampaging about the Engineering Campus with an assault rifle and LOTS of explosives) most budding engineers blossom into bitter and disgruntled, albeit employable, professionals. This is the start of a new era in your life: The Employment Game!

Square One: Each Player Draws One Card...

In order to play The Employment Game, you must have what is known as a resume. "Resume" is an old French word for "list of children's breakfast cereal ingredients" which has been modified over the years to mean "amusing pack of lies." You can pay someone to make you a resume and most people will accept money to write amusing lies about you. The problem is that most of these amusing lies will no doubt involve Elvis Presley, and though the King was quite an entertainer, he was not known for his engineering ability. In this case you may wish to write your own resume. The earliest resumes were massive stone blocks with the words 'Gimme a johb ur i wil krush yew wif thiz big stoan blok!' carved on them. Today's resume is much simpler; a sheet of paper detailing your educational and employment achievements with the words "Gimme a johb ur i wil giv yew menny nastey paypur kutz wif thiz peas uv paypur!" laser-printed in 12-point Helvetica across the bottom of it. You are now ready to start.

$$$$$

Luxury Tax: Each Player Selects A Token...

Now you must look the part. Pick up a copy of "Young Execudroid" magazine to see how young execudroids, er, professionals are supposed to dress. It is important to dress in a serious and professional manner, so leave your bunny slippers at home. Young women are expected to wear a conservative dress or suit while men have their options limited to just the suit. In addition, men will be expected to wear 'ties'. Ties were invented by the French (go figure...) and consist of thin lengths of ugly cloth designed to attract food stains and get caught in rotating machinery. Both men and women must wear expensive leather shoes that are both uncomfortable and completely without traction. This may come as a shock to many men, but women are accustomed to this since they have been wearing expensive and uncomfortable shoes for some time now. In addition, men will be expected to wear white socks with their suits in order to further amuse the interviewer.

Typo on your resume– Lose a turn

You Missed an interview because your car got towed. (Are you kidding? There is no such thing as Free Parking on **this** campus.) Go back two spaces.

Free Parking: Roll Seven, Eleven, or Doubles...

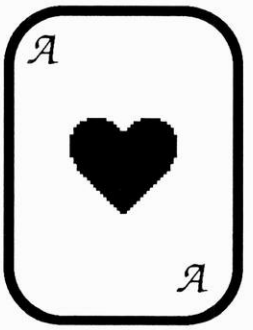
That wasn't so tough, now was it? This part of the game involves patience and lots of it. It's your turn to sit near the mailbox for days and days waiting for a letter to arrive.

Chance: Pick a card, any card...

The Job Interview. This is your big chance to show a company that you are a talented professional, an asset to their firm, and a motivated and directed individual dedicated to the highest ideals of engineering. It may also be a big chance to show them that you are an illiterate antisocial drunken lugnut. This is where you must put your best foot forward, so make sure your shoes are polished. The Interviewer will ask you a series of questions that may seem irrelevant and stupid. These questions have a dual purpose; they are asked to help determine your interests and aptitudes as well as to help keep the Interviewer from giggling at your resume. Some standard questions are:

- What did you enjoy most about college?
- Why did you go to college when you could have got married and worked your entire life at a dead-end job in your home town just like everybody else you know from high school?
- Where did you get that tie... Fleet Farm?

Be prepared to answer these questions and many more just like them.



Free Spin: Roll the Dice and Move Your Mice...

Choose the company you wish to work for. This is not as hard as the previous two steps and, in most cases, it does not involve the French. Selecting companies to work for can be done easily enough in your spare time, such as when you are watching TV or drinking beer. Late at night, drink some beer and watch offbeat cable channels such as C-SPAN, ESPN or the Home Cable Value American Consumer Bargain Shopper Network Channel for interesting advertisements. Remember: each one of the zillions of zany and wacky products advertised on TV were designed by drunken, insomniac engineers such as yourself. You too could be gainfully employed as a skilled artisan, plying your trade in the corporate world. Your invention could be the next In-The-Shell Egg Scrambler, Chia-Pet, or Bacon-Flavored Pressurized Cheeze Goop In A Can™...

Company cancelled interviews– Advance one space

Lose a Turn: Go Directly to Jail! Do Not Pass GO! Do Not Collect $200...

Many times you will receive a rejection, or 'dink' letter that goes a little like this:

Dear Whoeveryouare,
I really enjoyed meeting with you during your recent campus interview. Boy, did we ever get a good laugh from your resume! And that tie! Man, you crack me up! Too bad we don't have a job to offer you.

Good Luck (You'll need it!),
Somebody Who Already Has A Job

Cheer up. It isn't so bad. Eventually someone will invite you out to their plant so that the whole company can laugh at your resume.

Spin Again: Take a Ride on the Reading...

Now you get to travel around the U.S. at your potential employer's expense. A week ago you were swilling beer and eating mac'n cheeze but now, you're a swinging jet-setter, alive and kicking in the world of rental cars and hotel rooms. There are some important rules to remember, so pay careful attention. Always label your luggage clearly so that you can find it quickly as it whisks by you at 150 miles per hour on that little conveyor belt your parents always told you not to play on. A clear label on your luggage also makes it easier for airline workers to identify as they send it to Saskatchewan, Boise, or Jupiter. Many companies will not be located near big cities so you may have to fly in a 'commuter' aircraft. Don't worry if the commuter flight is a bit bumpier than normal flights. This is due to the smaller size of the airplane. You are perfectly safe; commuter pilots are highly trained individuals that have a lot of experience flying planes into hillsides.

When you arrive at the plant, you will be given a tour of the facilities. This is to familiarize you with the company and its operations, as well as to see if you will get your tie caught in some rotating machinery. You will then be introduced to your prospective co-workers. They will tell you more about the company and ask you many questions about yourself such as "Who wrote your resume... Steve Martin?" and "Does that tie glow in the dark?".

Boardwalk: We Have A Winner...

Within several days/months your lucky letter will arrive and you will be offered a job and all your hard work will have paid off. But the game isn't over yet. Two more obstacles must be overcome. First, you must pass a drug test. This involves... well, suffice to say, if you can't hit the little cup then you're probably on drugs and you won't get the job. Next, you must *actually* graduate. This can be tricky especially if you've been celebrating your job offer for any length of time. You may feel like telling your lab instructor what to do with his or her steam turbine but remember, this person controls your grade. Also, he or she is probably still in graduate school which means that he or she probably didn't get any job offers and will be VERY likely to make your life miserable for the rest of your college career. So be nice to them.

Putting Your Toys Away

Now it is time to say goodbye to your friends, relatives, classmates and creditors as you pack up all your worldly possessions and move off into the Great Beyond (or Pittsburgh, as the case may be). This is a time for reflection. This is a time to look forward and to look back. This is a time to hide from the Wisconsin Alumni Association. This is a time for tearful goodbyes. It is also a good time to get rid of that tie...

Creator

Bob Apthorpe is a senior in Nuclear Engineering and will graduate in May. The staff heartfully hopes that Bob has received a job offer ***before*** *this issue hits the stands!*

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So you always thought IBMers were a bunch of blue striped suits with buttoned down minds. Nothing could be further from the truth.

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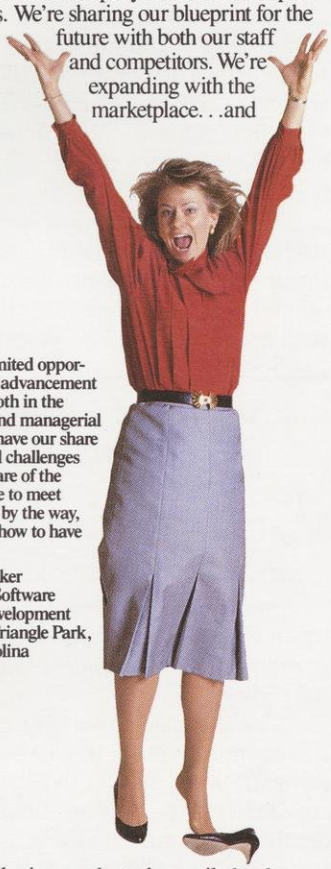
This is not a company that rests on its past successes. We're sharing our blueprint for the future with both our staff and competitors. We're expanding with the marketplace. . .and even developing products that easily hook up with systems outside the IBM environment.



"I see unlimited opportunities for advancement at IBM—both in the technical and managerial ranks. We have our share of technical challenges and our share of the right people to meet them. And by the way, they know how to have fun, too."

Alisa B. Eaker
Manager, Software Design/Development
Research Triangle Park, North Carolina

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Ana Cruz Gonzalez
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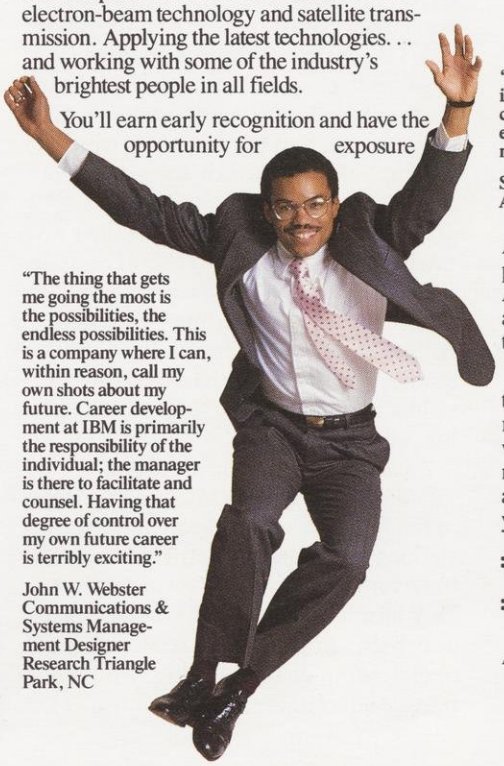
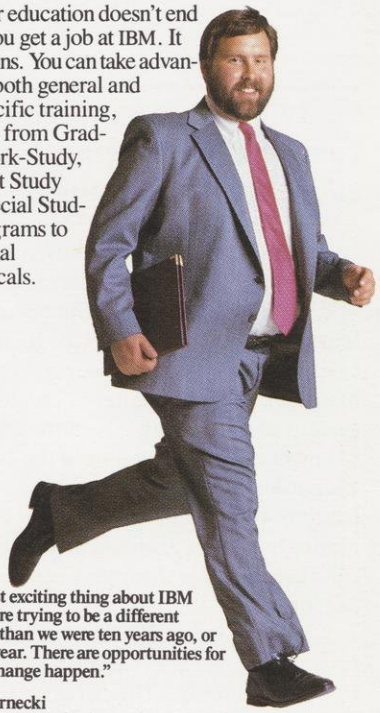


"The thing that gets me going the most is the possibilities, the endless possibilities. This is a company where I can, within reason, call my own shots about my future. Career development at IBM is primarily the responsibility of the individual; the manager is there to facilitate and counsel. Having that degree of control over my own future career is terribly exciting."

John W. Webster
Communications & Systems Management Designer
Research Triangle Park, NC

Your education doesn't end when you get a job at IBM. It just begins. You can take advantage of both general and job-specific training, ranging from Graduate Work-Study, Resident Study and Special Studies Programs to Technical Sabbaticals.



"The most exciting thing about IBM is that we're trying to be a different company than we were ten years ago, or even last year. There are opportunities for making change happen."

Steve Czarnecki
Advisory Systems Engineer, Owego, NY

And there's more. IBM encourages its family of professionals to exceed their own expectations. At all levels, IBMers may receive recognition and financial awards for outstanding contributions, innovation and technical achievement.

Never has there been a more exciting time to join IBM in development, programming, research, manufacturing or marketing. If you want to experience that sense of accomplishment and self-fulfillment that sparks new ideas and keeps you growing, step into IBM. You and your career will never stand still.

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DISTANCE LEARNING: UW-MADISON'S EPD JOINS NTU

With the current technology of our world rapidly and continually changing, there is a growing demand for continuing education, especially in the engineering profession.

Competition and growth make it necessary for industry to continually update and inform its engineers of the latest changes in technology. In an effort to expedite this process, several companies have joined together to create a system of continuing education for engineers. The formation of the National Technological University (NTU) was the result of this combination. NTU is a graduate degree granting school that conducts courses through the use of telecommunications systems.

Established in 1984 as a non-profit corporation, NTU is based in Fort Collins, Colorado. The NTU network is composed of 25 schools from across the country, and over 60 companies in industry. Participating schools include such prominent institutions as Colorado State University, Iowa State University, Purdue University, Renssalaer Polytechnic Institute, the University of Minnesota, and the University of Wisconsin-Madison.

NTU offers two main types of programs: credit courses for students pursuing graduate degrees and short courses and seminars for professional engineers seeking updates on current technology. The academic programs offered by NTU draw upon approved course offerings from the 25 participating universities.

Presently, NTU offers a master of science degree in seven areas: Computer Engineering, Computer Science, Electrical Engineering, Engineering Management, Manufacturing Systems Engineering, Management of Technology, and Materials Science and Engineering.

Each participating university offers different courses in these areas depending on the individual strengths and specialties. UW-Madison's contribution to NTU consists of courses on Power Systems in electrical engineering. Each university independently produces its own courses, and those schools which own uplinks can directly transmit their courses nationwide through NTU's satellite band. Schools without their own satellite uplinks film the courses on videotape and then send the tapes directly to NTU in Colorado, or to another school with an uplink, to be transmitted. UW-Madison recently purchased its own uplink and has already transmitted two live seminars.

NTU's distribution system is satellite-based using a satellite operation in the 12/14GHz band. Satellite uplink stations are located at participating universities, and a network of receive-only terminals are at each company site of participating graduate students. NTU operates four channels using two transponders and transmits courses 24 hours a day, seven days a week. Most transmitted credit courses are recorded on videotape at the students' work places for later viewing.

When short courses and seminars are transmitted live, students have the opportunity to communicate directly with the instructors as well as other students participating across the country via different forms of telecommunications, including telephone, electronic mail, and FAX machines.

During live transmissions, some students actually attend the seminars at the university where the course is being offered. Transmission is coordinated in such a way that lectures, discussions, and lunch breaks are conducted as if all participants were actually at the hosting university.

...distance education provides the opportunity and feasibility for companies to allow more employees to participate in the seminars.

The alternative to live broadcasts of these seminars is the transmission of pre-recorded videotapes of the course conducted at the host university. NTU's credit courses are usually transmitted in this manner. Videotapes of the course conducted at an individual university are produced and then broadcasted later. For these credit courses, necessary materials such as text books, lecture

notes, written assignments, and supplementary materials are mailed to students enrolled in the course before instruction begins. Professors hold office hours on the host campus, and students are encouraged to contact them for questions and comments as well as for submitting written course assignments through various forms of communications, including telephones, FAX, electronic mail, U.S. mail, express mail, or computer conferencing.

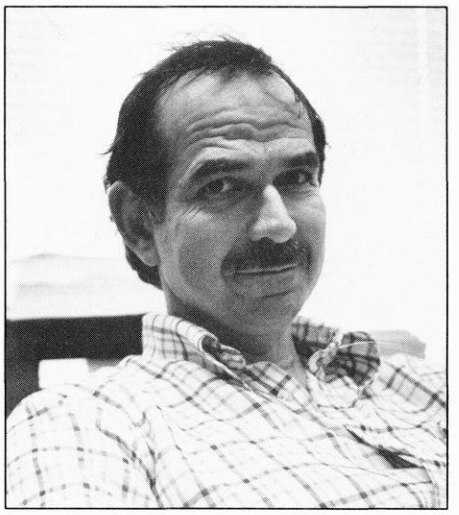
"Years of extensive research have proven that, if well-designed, distance learning is just as effective as the traditional classroom education."

At UW-Madison, teaching assistants grade the written assignments just as they would if the students were on campus. Examinations are administered at the company sites by designated proctors. At the end of the course term grade transcripts are sent from the host university to NTU where a complete set of records is kept for each degree-seeking student.

At UW-Madison this semester two electrical and computer engineering graduate credit courses are being videotaped for later broadcast. This videotaping is performed in the Kurt F. Wendt Engineering Library under the direction of Robert Perras, audio visual director for the College of Engineering. Live broadcasts from UW-Madison are usually taped at the WHA-TV studio in Vilas Communications Hall. UW-Madison transmits live about one short course per month. Perras explains that courses most frequently taped and broadcasted deal with electrical and material science engineering. According to Perras, "Those are the areas that seem to have the most demand for continuing education."

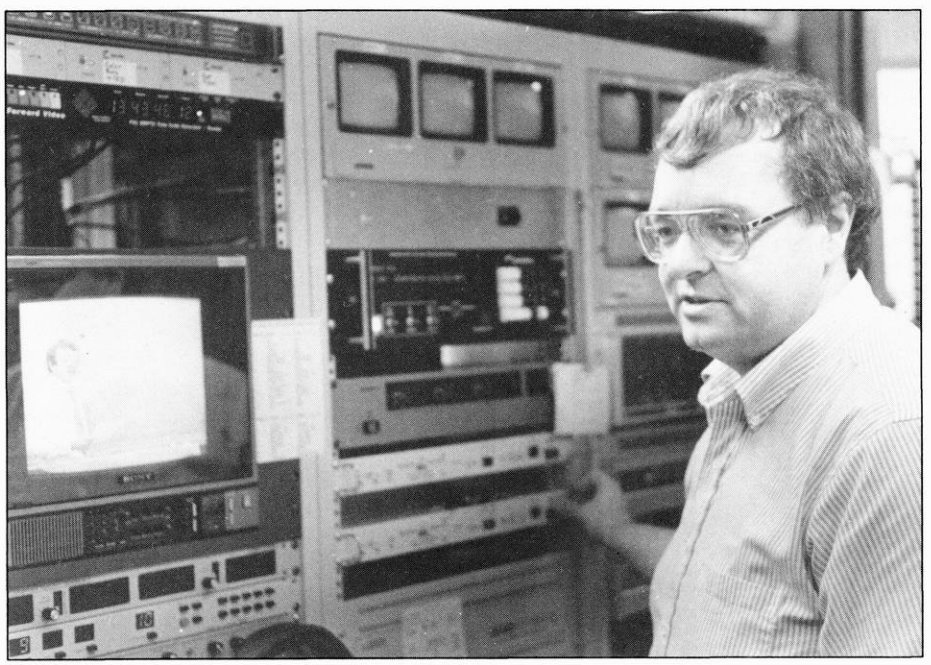
Thomas Smith, the director of Telecommunications Programming in the Department of Engineering Professional Development, works to coordinate various means of distance learning and helps to select, design, and market courses on the distance education system.

Smith notes several advantages to distance learning over traditional classroom education, "Obviously, not everyone can come to Madison." He explains that the considerable cost factor sustained by companies who send employees to universities is much greater than that of distance learning. In an attempt to minimize such expenses, companies must often limit the number of employees sent to a particular seminar. According to Smith, distance education provides the opportunity and feasibility for companies to allow more employees to participate in the seminars.



Thomas Smith is the director of Telecommunications Programming in the Department of Engineering Professional Development.

In addition, this type of education allows students, who are most often experienced, established professionals, to remain close to their families while enrolled in a course. As for the effectiveness of distance education, Smith ascertains,"Years of extensive research have proven that, if well-designed, distance learning is just as effective as the traditional classroom education." ■



Robert Perras displays video equipment used for taping courses at UW-Madison.

AUTHOR

Nancy Hromadka is a sophomore in electrical and computer engineering. The staff is proud of Nancy's accomplishments during her first semester as co-editor of the Wisconsin Engineer.

Photos by Kelly Weisheipl of the Wisconsin Engineer

THE PROFESSIONAL DEVELOPMENT DEGREE IN ENGINEERING

When the Department of Engineering Professional Development at the University of Wisconsin-Madison was founded in the late 1940's, a professional degree was granted to engineers for experience they had accumulated in their engineering careers. No specific scholastic work was required for that degree. However, in the early 1970's, the need for a more structured program was recognized, and the Professional Development (P.D.) degree program was developed. Since then, the P.D. degree program has matured into a respectable advanced degree opportunity available to engineers around the world.

The P.D. Degree

The Professional Development degree in Engineering allows practicing engineers to earn an advanced engineering degree while continuing to work full-time. The P.D. program allows the engineer to update and advance technical knowledge as well as to freshen up fundamental skills. It can be utilized to investigate new horizons of interest, or to re-focus engineering education. The degree provides an excellent opportunity for engineers to prepare for additional managerial and technical responsibilities they may be facing at a particular point in their careers.

The P.D. program is designed for flexibility. Each candidate's course of study is planned by the candidate and geared toward his or her individual goals and career objectives. The program's most eminent flexibility is in the various course formats that are allowed. Candidates complete degree requirements by designing a program of study that may include short courses, seminars, correspondence and videotape courses, and/or campus courses. Since all requirements for the degree can be completed through independent study or on candidates' local campuses, the candidate does not need to reside in Madison while pursuing his or her degree. Consequently, the P.D. degree can be earned without interfering with the candidate's career or family life.

Each candidate's course of study is planned by the candidate and geared toward his or her individual goals and career objectives.

In addition to various seminars, short courses, and correspondence courses, P.D. candidates may now complete Graduate Outreach videotape courses as part of their program. With this course format, instructional videotapes in courses such as Advanced Digital Processing, Basic Engineering Writing, or Advanced Electrochemical Engineering are sent to the candidate. With numerous course formats, P.D. candidates have a wide variety of choices for their total learning experience.

To be a candidate for the Professional Development Degree, one must be a practicing engineer who has been out of school for a minimum of three years. P.D. Associate Director and Counselor Cheri McKently states, "The P.D. degree will have more meaning to the candidate if he [or she] waits. Most have been out of school at least four years before beginning their programs."

The typical candidate for the P.D. degree is an engineer with a bachelor of science degree who desires an advanced degree, as well as the engineer with an

P.D. Associate Director and Counselor Cheri McKently works with a P.D. candidate.

advanced degree who would like to become certified in additional areas of engineering expertise.

Specific qualifications dictate acceptance of applicants into the program. All candidates must have a bachelor of science degree from an ABET (Accreditation Board for Engineering and Technology) accredited institution or a B.S. in a related area, and either a Professional Engineer license obtained through examination or 100 credits similar to those required for a B.S. in Engineering at UW-Madison, plus at least four years of professional experience. Previous college grade point averages are not taken into consideration. Currently, 70% of the P.D. candidates have their first degree, while 30% possess an M.S., M.A., or other graduate degree.

Benefits of the P.D. Degree

The P.D. degree reaps marvelous benefits for its holder. An advanced degree in engineering is proof of incentive to employers and supervisors. It shows that the engineer is willing to put forth extra effort to keep up with changing technology. Earning a P.D. degree is also an excellent way to prepare oneself to take on more job responsibilities. The P.D. degree allows the engineer to earn an advanced degree from the University of Wisconsin-Madison without going back to school full-time. This means a minimum amount of time is lost from work and home.

For some engineers, the Professional Development degree may be a more attractive goal than a master of science degree. Flexibility is the main distinction. McKently states, "Many candidates are in a period of their lives where it's very difficult to take two years off to return to campus. There's just no way they could earn a traditional engineering degree." And unlike the M.S. degree, the P.D. degree boasts a program tailored to fit each individual candidate. What's more, the P.D. degree allows candidates to backtrack and take some undergraduate coursework. This permits them to include professional electives in business and management. While a master's degree is very focused, the P.D. degree allows some diversity of coursework to provide candidates with a broader educational experience.

The P.D. degree is an external degree, and can be earned without coming to Madison. This provides an opportunity to earn an advanced degree through the University of Wisconsin-Madison from anywhere in the world. In fact, 16% of the current candidates are from countries outside the U.S.

Candidates in the P.D. program have the option of working through other quality institutions convenient to them. Although one-half of the degree requirements must be completed through the University of Wisconsin-Madison, the remainder can be completed at colleges of the candidate's choice.

In terms of finance and completion time, graduate school would have been difficult, so the P.D. program was the perfect alternative.

The Engineering Professional Development Degree is also attractive to industry and is perceived with respect. Most companies pay for continuing education, and, according to McKently, they want "on the spot progress—dollars and cents, now." Many respectable companies on the leading edge of technology boast P.D. graduates: IBM, General Motors, Rockwell International, and numerous others. The most important benefit to the employer is the advancement in the knowledge of their employees. In addition, P.D. candidates typically concentrate their required independent study project on areas that pertain to their companies. The P.D. program is a program that reduces

employee time away from the job. Consequently, the company does not have to sacrifice production for the sake of advancement.

P.D. Course Requirements

To earn a Professional Development degree in Engineering, each candidate must complete 120 Continuing Education Units. One-hundred of the required 120 CEU's must come from evaluated coursework in which candidates must receive a passing letter grade. Of the 120 CEU's, thirty-six must come from coursework that advances the candidate technically. The remaining may come from a combination of professional electives, review courses, and outside interest electives.

Candidates must also complete a 20-CEU independent study project which represents 200 hours of work. The topic for the project is up to the candidate. Usually, the candidate will complete a few courses, see how the learning relates to his or her work, and then draw up a proposal for his independent study project. The proposal must be approved by the P.D. Director before the candidate begins work on the project. The average independent study project is completed in six months to a year.

For some engineers, the Professional Development degree may be a more attractive goal than a master of science degree.

Professional Development Degree candidates also have the option to concentrate on one of six specific focus areas. Presently, five focus programs are available to candidates: Manufacturing Engineering, Energy Management, Value Engineering, Disaster Management, and Electrical Engineering. An additional focus in Public Works is being developed, and will be available by the end of 1991. The candidate completes a specific number of CEU's in courses of his or her choice in the focus area, and then completes the remaining CEU's

The Professional Development Degree at Work

The P.D. program has many benefits, but ultimately its worth can be best expressed on the individual level by those who participate in it. Anna Burwash was a P.D. program graduate in 1981, and is currently employed at the Ontario Ministry of Community and Social Service.

Burwash decided on the P.D. program for many reasons. It provided an "option to getting post-graduate education." In terms of finance and completion time, graduate school would have been difficult, so the P.D. program was the perfect alternative.

Going back to school posed quite a challenge for Burwash, who had waited some time to begin the P.D. program after receiving her undergraduate degree. Most of her courses were completed through correspondence with a few management courses taken here on campus. Initially, as with any schooling, time management became a factor to consider, but overall Burwash believes the program was very convenient and flexible concerning the students' needs.

She finds that at work many personal benefits have come from participation in the program. Better understanding of technical matters, prioritizing, and management skills are among the many benefits she cites. In a time when most employers expect their employees to continue their technical education, Burwash feels the P.D. program gives her an extra edge. For example, she was able to take French through the elective course requirement. This helps her at her workplace in Ontario, Canada where many people are both English and French speakers.

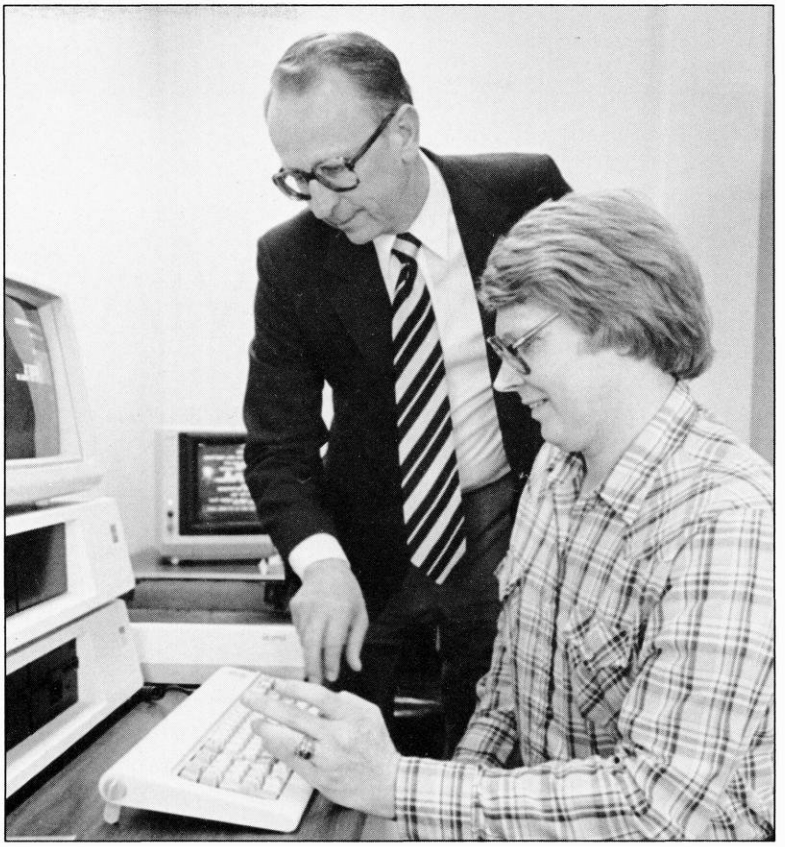
As a whole, Burwash recommends and mentions many positive qualities of the program. "It was flexible enough to set my learning objectives." Though a correspondence student, Burwash found the staff very supportive. One of the best advantages she found in the P.D. Program was "not having to quit her job to continue her education."

- by Deniz Ayaz

toward the P.D. degree. For example, a candidate who focuses in Disaster Management, earns 60 CEU's in coursework directly pertaining to Disaster Management. After completing this portion of the coursework, the candidate receives a diploma in Disaster Management. The remaining CEU's can be in additional Disaster Management courses or in other areas of study.

There are currently 120 candidates enrolled in the P.D. program. To date, 99 engineers have received Professional Development degrees from the University of Wisconsin-Madison. Each candidate has seven years to complete the required coursework, but the majority finish in five years or less.

The Professional Development in Engineering degree is an excellent way for practicing engineers to continue their education without disrupting their careers or home lives. For more information on the P.D. degree, engineers may contact Cheri McKently, P.D. Associate Director at (608) 262-0133, toll-free (800) 362-3020, or (800) 262-6243 (in WI). Written inquiries may be mailed to: *Cheri McKently, Counselor, Professional Development Degree Program, University of Wisconsin-Madison, 432 North Lake Street, Madison, WI 53706.*



Associate Dean for Outreach C. Allen Wortley (standing) looks at computer application with a P.D. candidate.

AUTHOR

Amy Damrow is a freshman who wants to major in civil engineering. This is Amy's first semester on staff and already her second contribution to the Wisconsin Engineer.

DISASTER MANAGEMENT: THE DEGREE THAT HELPS THE WORLD

"From the Caribbean to the Carolinas, Hurricane Hugo's Path of Destruction marks it as One of the Fiercest Storms of the Decade."

This *Time magazine* headline describes a natural disaster at its worst. But what happens when the storm is over? How can the damage be rectified? Something is being done right here at UW-Madison to help.

Don Schramm, architect in Engineering Professional Development(EPD), is co-founder of the Disaster Management Center on campus. He and friend, Paul Thompson, also a Madison architect, formed the Center in 1982.

Although a major incident like a hurricane or an earthquake is destructive, a disaster can have positive ramifications.

Schramm recalls how the idea originated. "[Paul] and I sat down over a period of time and came up with the idea of using the expertise that we have and that the University of Wisconsin has in continuing education. . .to put together a program to help train and educate people around the world–outside the United States—in disaster management."

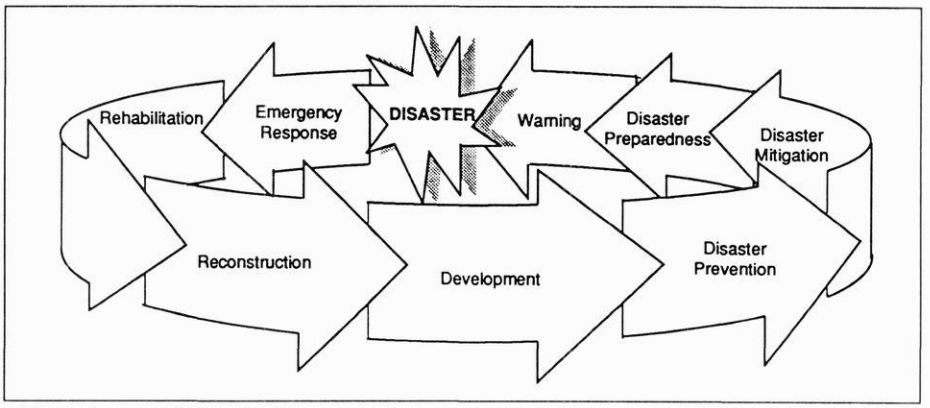
Coincidentally, Thompson has been periodically working in Puerto Rico helping to deal with the aftereffects of Hurricane Hugo.

Schramm explains that disaster management includes not only the immediate response to a disaster such as the recent earthquake that devastated San Francisco but also long-term rehabilitation and reconstruction stemming from such a disaster. Additional aspects of managing natural hazards involve "looking at ways to mitigate against the impacts of disasters in the future," says Schramm.

Although a major incident like a hurricane or an earthquake is destructive, a disaster can have positive ramifications. "Disasters can, in fact, accelerate the development of a country or a region that has been affected by a disaster, so it may end up being better off than when it started," Schramm says.

An objective of the Disaster Management Center is training disaster management workers, from executives to field directors, to deal with various aspects of disaster management.

The major focus of the program involves distance education. This includes any educational tools ranging from textbooks to video and radio. It is important to inform and educate people in a clear, concise manner, yet many people in need of this information have uncompromising schedules or live too far away to attend regular classes.



Aim and scope of Disaster Management

Thus Schramm and Thompson, assisted by an advisory board of international experts, developed the idea of a self-study program in 1982. Earning a degree in disaster management is similar to other diplomas that engineering students earn in EPD. A person enrolled in classes receives books and course materials via Air Mail or Federal Express. The student learns material on his/her own, and upon completion of the material, writes an exam under the guidance of a proctor. After passing the exam, the student gains continuing education units (CEUs) in a particular disaster management subject area.

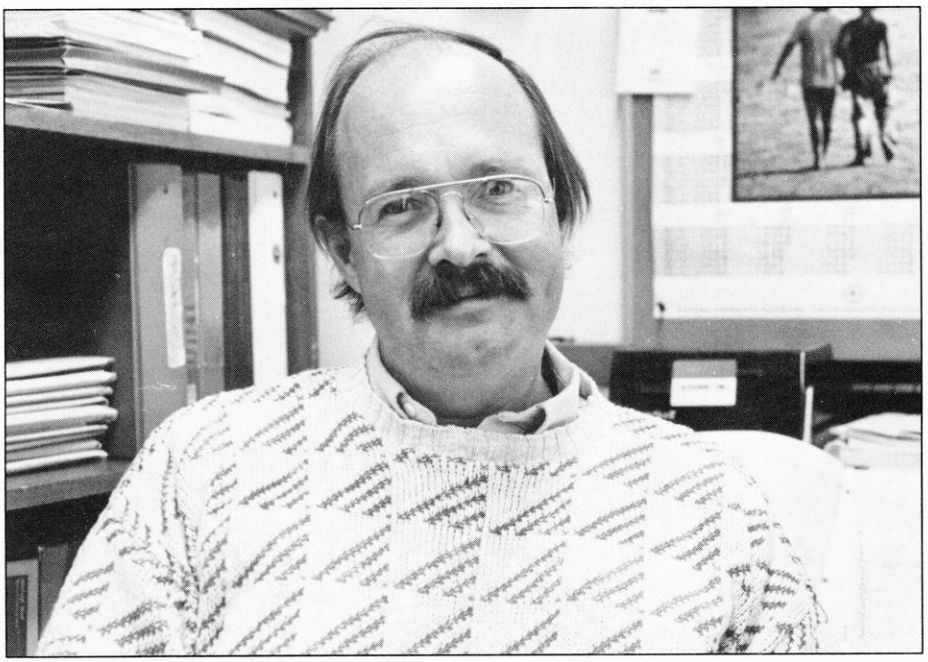
"The idea was to create a collection of courses that people could take, either individually to learn about a particular topic, or eventually to be able to use these courses and other continuing education to earn a Professional Development diploma in disaster management or emergency management," Schramm says.

"We were the first college of engineering to get into the business of providing continuing education and are still, I think, the biggest and the best in the country."

Schramm says the program envisions a clientele encompassing private volunteer organizations such as CARE, Red Cross and Save the Children. People working for United Nations (UN) as well as governmental workers in disaster-afflicted countries are also likely candidates for a self-study program. Another audience would be professionals without previous experience with disasters who wish to broaden their knowledge in their own area of expertise.

The workshops and books are in several languages. Since 1985 the program has conducted twenty-one workshops all around the world. In places like Zaire, the workshop is in French, in Honduras and Costa Rica, Spanish. The Disaster Management Center has also held workshops in such faraway places as Zimbabwe, Ethiopia, Kenya, Malawi, and most recently Bangkok, Thailand, where Schramm taught at a two-week conference.

Schramm emphasizes that the people who benefit from these programs



Don Schramm, an architect with Engineering Professional Development, is co-founder of the Disaster Management Center.

need not have obtained a college degree. "We didn't want to limit enrollment in the courses to people who had a higher education," since this is not the norm in many countries, Schramm says.

An important tangent to the idea of disaster management involves working with refugees. Schramm explains that

...millions of refugees exist, and their situation must be viewed like an emergency equal to any natural disaster.

millions of refugees exist, and their situation must be viewed like an emergency equal to any natural disaster.

"The idea of being a refugee is almost like a personal disaster because you are a person without a country," Schramm says. He cites Africa, Asia and Latin America as specific problematic areas. He says organizations like UN, private organizations and governments work to take care of these refugees.

Participants learn how to analyze social and cultural aspects of refugees, for example. Logistics of getting food and medicine to the site of the disaster are involved. Dealing with health and nutrition issues, donor organizations, and the press are all likely subjects for group simulations. In this sort of team project, each participant assumes a role as if assisting in an actual refugee emergency.

Very often these workshops focus on contingency planning and early warning signs, Schramm says. It is also important to know how to evaluate real needs in an emergency.

In October, Schramm presented a five-day course called, "Fundamentals of Energy Auditing." Each day focused on a different aspect of energy analysis. During Day One, for example, "How Buildings Use Energy" was a general discussion topic. Day Two addressed, "Lighting Systems Basics." On Day Three topics such as "Electrical Systems Operations and Controls" and "Energy Conservation Opportunities Analysis" were discussed, and Day Four dealt with "Computers in Energy Auditing." Day Five concluded with Fieldwork/ Workshop exercises. This particular work shop will be offered again February 19-23, 1990.

Natural disasters and regular emergencies only account for a part of Schramm's work in EPD, however. Although he sometimes teaches in workshops like others in EPD, Schramm is mainly responsible for conceiving, developing and coordinating programs in continuing education. He brings in experts from industry, government, and other universities. Schramm includes experts from UW-Madison whenever possible.

Schramm says of UW-Madison, "We were the first college of engineering to get into the business of providing continuing education and are still, I think, the biggest and the best in the country." ■

AUTHOR

Kelly Weisheipl is a senior English major specifically interested in writing. She very much looks forward to her second semester working for the Wisconsin Engineering magazine.

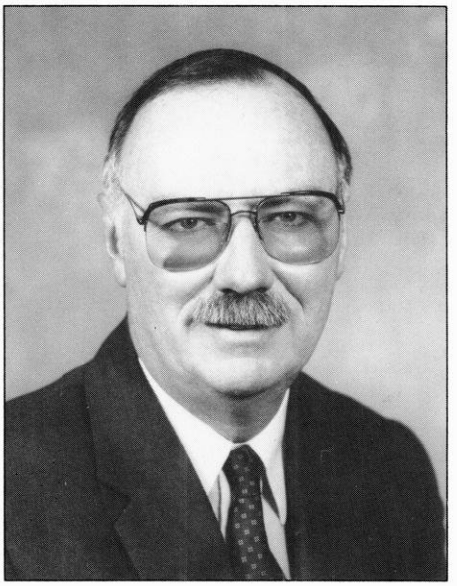
Photos by Kelly Weisheipl of the Wisconsin Engineer

ONE HUNDRED YEARS OF SERVICE

Imagine that you have graduated in engineering and have been working at your job between one and five years. Your supervisor gives you a project in an area that you either did not study or did not study in depth. What can you do in order to complete your assignment? One answer is to enroll in a course or program in that area offered by the Department of Engineering Professional Development (EPD). The EPD department is concerned with continuing education in engineering and technology. In the words of John Quigley, Department Chairman, "We (EPD) are a small team of individuals, each working in our own professional area, to identify the needs of practitioners, and to create educational experience to meet those needs." This department has been doing this officially and unofficially since 1889.

The first recorded effort by the College of Engineering to offer an engineering outreach or extension course was in 1889. C.D. Mark, professor of civil engineering, held an experimental Mechanics Institute in Racine, Wisconsin and arranged for other such institutes in Milwaukee, Beloit, and Janesville, Wisconsin. These institutes were designed to help artisans do their work better by incorporating new skills. In 1891, the University of Wisconsin Regents adopted a resolution that made Extension an official part of the University of Wisconsin. Eight programs serving 120 people formally marked the inauguration of engineerin ginstitutes in 1949-50. In 1985, the University Extension Division became an official department within the College of Engineering and was renamed the Department of Engineering Professional Development. Presently , EPD offers approximately 400 one-to-five day continuing education programs, serving more than 15,000 professional practitioners from all over the world. This is all done by 15 faculty members, 15 faculty associates, five or six professional support staff (graphics, editors), and 20 program assistants. As Patricia Robinson, Manager of Campus Courses says, "It's an exciting group of people doing something important."

The two unique features of the EPD are that its instructors are often actual practitioners and that it operates on a cost-recovery basis. The programs (2-3 days) and short courses (3-5 days) are taught by "state-of-the-art" practitioners. These instructors are people in the particular industry, professors in the field, and researchers. The faculty and staff of the EPD department rely heavily on contacts and have a strong networking system so they can contact the most qualified people to instruct the programs.



John Quigley, Chairman of Engineering Professional Development

From its origin, the EPD has operated on a cost recovery basis and has been self-funded. Fees for the various programs can range from $150-300 per day. The department is almost entirely supported by registration fees. The fees are determined by the cost of creating the program, cost of the support services (food, books, speaker fees), and the number of participants. Last year, the budget was $8 million.

Quigley says that the education that engineers receive may become outdated after graduation because there are always new products, information, and research.

Quigley welcomes UW students to attend the programs and short courses on a space-available basis at no charge with the exception of books or lunch. Philip O'Leary, Assistant Department Chairman says, "The students can learn specialized information, see day-to-day problems that people working in the field are facing, and make contacts for future employment." O'Leary adds that students should check with the program directors to see if space is available.

The following questions are often directed to the Engineering Professional Development Department.

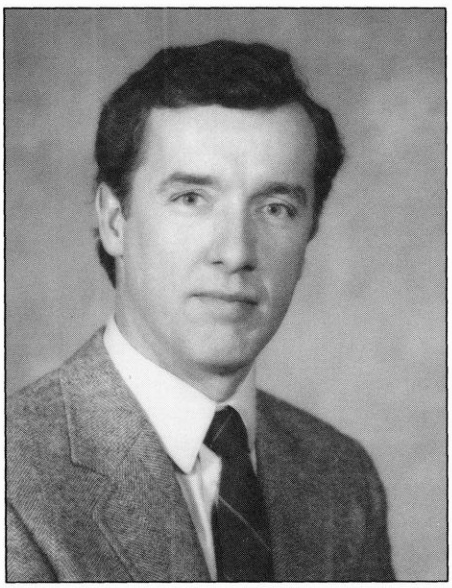
What programs and courses are offered?

Programs and short courses have covered such areas as building design and construction, environmental engineering, disaster management, and manufacturing. All the programs and short courses are listed in a bulletin. New programs and courses are being continually added as other programs and courses become dated or obsolete. The EPD anticipates changes and promotes programs that allow their participants to keep up-to-date about future changes. In addition, the program evaluations completed by all participants ask for new program needs. Quigley says that there is an "open door" for new ideas.

Can I receive credits by taking these programs or short courses?

The programs and short courses are usually non-credit courses. The Continuing Education Unit or CEU , invented and published by Paul J. Grogan of the EPD staff and presently used nationally, is offered to participants in the programs and short courses. The CEU is a measure of educational achievement. One CEU represents 10 hours of learning time. Typically, a 2 day course is valued at 1.2 CEU, or a three day course is valued at 1.8 CEU.

...EPD offers approximately 400 one day to five day continuing education programs, serving more than 15,000 professional practitioners from all over the world.



Philip O'Leary, Assistant Chairman of Engineering Professional Development

Is independent study available?

Independent study by correspondence began in 1891. The University of Wisconsin-Extension offers over 450 university credit, continuing education, high school, and vocational and technical courses that you can study at your own pace. Of the 450 courses offered, 60 are engineering-related correspondence courses. These courses are listed in a separate bulletin and include such courses as Introduction to Value Analysis and Engineering, Dynamics, Industrial Safety, and Disaster Preparedness. The cost for these classes varies with credit and CEU.

..."The students can learn specialized information, see day-to-day problems that people working in the field are facing, and make contacts for future employment."

Can I receive a degree?

If you have a Bachelor's of Science in engineering or a related science, you can qualify for the Engineering Professional Development degree (P.D. degree) in engineering. This degree is an excellent way for people to continue their education and continue working on their job. The P.D. degree is a unique degree and is an alternative to the traditional M.S., M.B.A., and Ph.D. The programs and short courses of the EPD, traditional undergraduate and graduate courses, and correspondence classes can be used to complete the requirements. The University of Wisconsin-Madison, Board of Regents awards this degree.

In order to stay abreast of the latest technology, the EPD Department is the answer. For all students and practicing engineers, EPD offers "state-of-the-art" courses and programs in a variety of subject areas that you can take advantage of now or in the future. As simply stated by O'Leary, "We feel that we are the best at what we do." ■

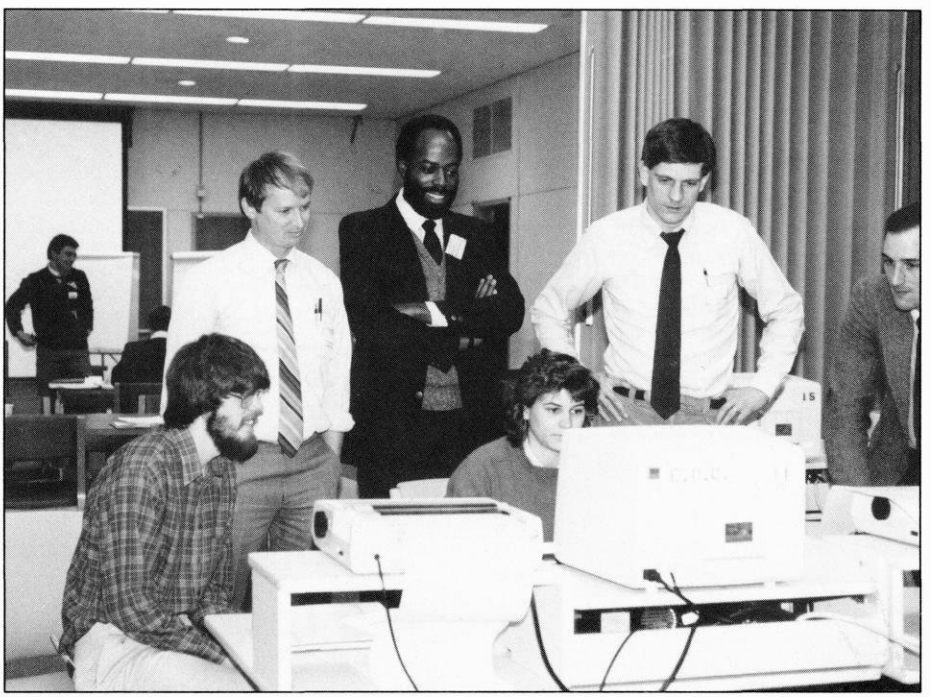
Thomas Snodgrass, an instructor in value engineering, assists participants of an EPD program.

For more information or bulletin information, contact:
Engineering Professional Development
432 N. Lake Street
Madison, WI 53706
(608)262-2061(in Madison)
(800)362-3020 (inside WI)
(800)262-6243 (outside WI)

AUTHOR

Stefanie Smith is a senior in Chemical Engineering and will graduate this year. Stefanie was featured as a Fascinating Engineer in the April, 1988 issue of the Wisconsin Engineer.

Photographs by UW Photo Media and Janice Czyscon and courtesy of EPD.



Participants in a typical EPD course work on computer applications.

A First Hand Look at an EPD Program

Last spring a great opportunity came my way. I have been a licensed plumber for a while and thus, have been interested in the design and installation of out-of-the-ordinary septic systems. While on campus, I decided to find out more. I talked to Professor Jim Converse to see if there was anything new happening within this subject area. He mentioned that he would be lecturing a module within a course for Engineering Professional Development, and told me to contact the EPD staff for further information. Upon contacting EPD, I was able to sit in on the course when I was not busy with my other university classes.

Although the course was diverse and informative, the material was presented in a concise and productive manner easily understood by students.

Small Community Wastewater Design was a four and a half day course that covered many different topics related to Wastewater Treatment. A few of the many topics covered on the first day of the course were hydrogeological considerations, site identification, soil chemisty and plant interactions, and microbiology considerations. Although the course was diverse and informative, the material was presented in a concise and productive manner easily understood by students.

The course had many speakers that were experts in their fields. These speakers were predominately from Wisconsin and involved with UW-Madison, state agencies or private consulting firms. There were also speakers from Minnesota and Michigan. Since the speakers were so diverse in their backgrounds, theoretical and practical processes could be combined to find optimal solutions. Teaching aids employed by the speakers included overhead projectors, slide presentations, films, problem solutions, and statistical histories.

Many different subjects relating to small community wastewater designs were covered. Instructors explained the different views that need to be considered when working to achieve an optimal solution. The material came from many areas and was integrated within the course to provide the students with the main concerns when proposing solutions. The students present came from different backgrounds and offered various reasons for attending the course. Some students came for particular problems that they were trying to deal with, while others wanted general information that they could possibly use in the future. For example, a student from Central Wisconsin wanted to know more about the general subject area, while a student from Jamaica wanted to find out how to treat sewage without the use of soil.

The course was stimulating. It provided many different thoughts on the same problems.

There was one student who worked for a state agency in charge of parks and recreational areas. He wanted to know more about the different wastewater treatment processes that could be used in remote areas. Another student from New Mexico worked for a federal agency that provided assistance to Indian Reservations. He wanted to apply new techniques from the course to the many

different reservations located throughout the United States.

Some topics helped students to recognize the need for specialized consultants and the techniques used for choosing them. Students were able to talk to each other during breaks and lunch to discuss the many different concepts and techniques that were employed by others to determine solutions to problems. This interaction acted as a large think-tank for various problems.

An important idea that prevailed throughout the course was that although many students had common background basics, they could still learn something new from each topic and speaker whether they had any background in that particular area or not.

There were four and a half days of information presented during the course. Each speaker included additional information and references that went into greater detail about processes and techniques for solving many varied problems.

The course was stimulating. It provided many different thoughts on the same problems. Everyone who attended had a common background in certain areas and could provide experience and insight as to what the real problems and possible solutions could be. The speakers encouraged discussion and lent them selves to the students needs.

Through this short course, I was able to learn more about the many different aspects of wastewater design and management. I look forward to attending additional Engineering Professional Development courses to learn more about the many subject areas surrounding this topic. Hopefully, this will allow me to keep abreast with the many changes in my field and to make sound, updated decisions as an engineer. ■

AUTHOR

Frederick Hegeman, a senior in civil engineering, concentrates on issues that affect the environment.

Co-op Application Deadline

Get a jump on your career! Pick up your application materials for summer or fall placement at the Co-op Office (407 Wendt Library) from December 11th until December 23rd. Applications must be completed and returned to the Co-op Office no later than January 31st. For further information, call Marion Beachley at 262-8883.

New Faculty

The Mechanical Engineering and Civil Engineering departments have announced the additions of five new faculty members. Please welcome Christoper J. Rutland, Rolf D. Reitz, and Tim A. Osswald to the ME staff and Teresa Adams and Craig Benson to the CE staff.

ENGINEERING BRIEFS

by Dan Miller

Did you Know...

...that only 6% of the undergraduate degrees obtained in the United States are engineering related, while the same figures for West Germany and Japan are 37% and 20% respectively? The Electrical and Computer Engineering Department is currently addressing our nation's technology shortage. In addition to pursuing a requirement that all University undergraduate students complete a course in contemporary technology, Department Chairman J. Leon Shohet is seeking to develop two new undergraduate degrees: a Bachelor of Arts in Electrical Engineering and a Bachelor of Arts in Engineering. Students and faculty with questions or suggestions are urged to call Professor Shohet at 262-1191.

Attention Spring Co-ops

A pre-employment informational session for spring semester Co-op students will be held at 4:30 p.m. on Thursday, December 14th at Union South. Important information on the Co-op term paper, employer evaluation form, and job expectations will be discussed. See TITU for room details, and for further information, call Marion Beachley at 262-8883.

NEEP Professor Recieves Award

John R. Conrad has been designated Wisconsin Distinguished Professor of Nuclear Engineering and Engineering Physics in honor of his development of the Plasma Source Ion Implantation (PSII) process.

His research has also covered a broad range of problems in basic plasma physics, heating and confinement of fusion plasmas, high current ion and neutral particle beams, and plasma-wall interactions.

If you would like more information on Professor Conrad's research and the PSII process, contact him at rm. 341 Engineering Research Building, or call 263-1609.

Rube Goldberg Machine Contest

Show off your engineering skills and win prize money! Theta Tau is sponsoring the campus Rube Goldberg Machine Contest in February. The winning team will be selected to compete in the national contest at Purdue University. If you would like to create your own machine or join the Theta Tau Rube Goldberg team, call Jeff Verdegan at 257-7206 for more details.

UW FOUNDATION RECEIVES $250,000 GRANT

UW-Madison Chemical Engineering students will have an updated laboratory thanks to a $250,000 grant to the UW Foundation from the Dow Chemical Company Foundation of Midland, MI. The UW Foundation will distribute a large portion of the grant to the Chemical Engineering Department for the purchase of new instruments, mini-computers, and computer workstations. Other portions will be used to meet the greatest educational needs of Chemical Engineering students. Dow Chemical has donated over $750,000 to the University of Wisconsin since 1981.

OOPS!

The *Wisconsin Engineer* apologizes for an error in the October, 1989 issue. In *Ladies, Women, and Engineers: A Brief History of Women in the UW-Madison College of Engineering* , we wrote that Emily Jackson Mclean was the first woman to receive a Distinguished Service Citation. Her correct name is Elizabeth Jackson McLean.

The Engineering Counseling Service

The College of Engineering Counseling Service was instituted in 1975 as the need for readily available guidance for engineering students arose. It seemed that an increasing number of students in the College of Engineering resulted in an increasing amounts of stress. While other schools at UW-Madison watched their students wait in long lines for University counseling, the College of Engineering set up a counseling office, fully equipped with a counseling intern who was ready and willing to assist any engineering student.

Today, fourteen years later, Engineering Counseling Service is going strong. Linda Schilling, the Service's third counselor since its birth in 1975, has the knowledge and expertise to help guide even the most distraught and desperate engineering student back on the road to success.

Schilling is an excellent source of support for the engineering student. She can help a student sort out personal problems, evaluate drug and alcohol problems, deal with stress, or cope with emotional crises. In general, she can assist in putting an end to many personal dilemmas that interfere with a healthy college career.

A visit to Counseling Services may also help calm some students' anxieties about career decisions. Modern testing and computer programs designed to analyze skills and abilities and match them with career possibilities are available through counseling services. Schilling can also help students with valuable skills needed for decision-making and long-term planning.

The Counseling Service may also be used for solving academic problems. Although Schilling does no course advising (except for some pre-engineers), she is an excellent support person who can help a student understand the system and course requirements. She can also recognize academic weaknesses, and can recommend valuable resources for improving study skills.

If an engineering student is having problems in his or her academic or personal life, or is experiencing anxiety about a career, he or she is urged to visit the College of Engineering Counseling Service in Room 22 General Engineering. This service is confidential and free to any engineering student. Appointments are preferred, but not required. ■

Linda Schilling is the counselor for the College of Engineering.

The College of Engineering
Counseling Service
Room 22, General Engineering
Hours: Monday-Friday
8:00 am-12:00 noon, 1:00 pm-4:30 pm
Phone: 262-2473 or 262-3507

AUTHOR

Amy Damrow is a freshman in civil engineering. She believes that, "The only truly ignorant are those who refuse to be otherwise." But we know that she isn't that way.

VOYAGER 2 REDISCOVERS NEPTUNE

Last summer while most people were out catching rays from the sun, scientists at the Jet Propulsion Laboratory in Pasadena, California were catching some rays from Neptune. These scientists were examining the data they were receiving from the Voyager 2 spacecraft as it flew by Neptune.

Neptune, which is about 2.8 billion miles from earth, is the fourth planet Voyager 2 has flown by. Neptune has a 10,000 mile diameter rocky core covered by frozen water and methane (natural gas). Its atmosphere is made up of hydrogen and helium with some methane and ethane. It takes almost 165 years for Neptune to orbit the sun.

Voyager 2 discovered new things at Neptune. It found six new moons which range in size from about two miles in diameter to 400 miles in diameter. Voyager 2 also found five rings around Neptune. These rings range from a few rocky chunks in the outer ring to an almost solid inner ring. A new indicator of an active atmosphere is the "Great Dark Spot," which is a hurricane-like storm that moves through Neptune's atmosphere. This shows that Neptune has some sort of internal heat source that powers the atmosphere. One theory is that the energy of the planet is created through the separation of the methane molecules into hydrogen and carbon, with the hydrogen forming hydrogen gas and the carbons joining together to form solid carbon. Because of the extreme temperature and pressure of Neptune's atmosphere, the center of Neptune may actually be a 10,000 mile diameter diamond.

The most interesting thing that Voyager 2 found involves its largest moon, Triton. Many scientists believe that Triton may have once been a planet because it has two features that had previously been found on only planets: an atmosphere and a magnetic field. Its axial orbit is also opposite that of Neptune's. This supports the theory that Triton was once orbiting the sun and it got caught in the gravitational field of Neptune and became Neptune's largest moon.

What do these new discoveries mean for everyone on earth? First, studying the atmospheric patterns on other planets will help us understand the patterns on earth. Also, the data received from the "Great Dark Spot" may help in forecasting hurricanes. As many of earth's minerals decrease, it may be necessary to go to other planets to get these minerals. Missions such as Voyager may be the key to finding these minerals. The Voyager missions also paved the way for several current and upcoming missions. It may help us find out how our solar system was created, so we can look for these signs on other stars. The discoveries of Voyager 2 are helping to satisfy our own curiosities about what is really out there. ■

AUTHOR

Steve Peters is a freshman who intends to major in electrical engineering. This is Steve's first semester as a writer for the Wisconsin Engineer.

Just One More

Mysterious Santa Appearance Baffles Authorities

This is the scene that greeted UW students and faculty this morning. Officials are clueless.

Inside:

Where is Abe?

Authorities Want Concrete Clues

No Suspects Yet

Tell Santa What *You* Want for Christmas

Madison, WI - Students and faculty of the University of Wisconsin are questioning the disappearance late last night of their treasured Abe Lincoln statue. Abe sat high on Bascom Hill and kept a watchful eye over Library Mall.

In Abe's place sits a larger than life Santa Claus. University officials suspect foul play.

Bob Holiday, a professor in environmental studies theorizes that strange mineral deposits from bus fumes and "Bascom Hall hot air" could have accumulated on Abe, and coincidentally represented Santa's beard. "It doesn't look much like Santa," he explained. "People let the imagination run wild at this time of the year."

It seems that University Police received many reports of a strange red light zipping through the fog that hung over Bascom last night. The light, explained an insider, was a small, round red glow. It moved swiftly and often was accompanied by clicking sounds. The police deny any UFO sightings, and say that the theory of aliens snatching Abe and replacing him with Santa is "absurd."

Just One More spoke with an informer in the Chancellor's office. Sources close to Chancellor Donna Shalala say that she believes the light was Rudolph.*

We're Looking For Engineers Who Want A Career — Not Just A Job!

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Engineers throughout the company are involved with electronics, refrigeration, heat processes, waste and water treatment, power plant operation, architecture, machine design, and sophisticated processing and packaging.

Oscar Mayer established a formal program in 1975 to train new engineers in the company's philosophies, practices, and objectives. The Engineering Management Development Program takes new engineers through a variety of challenging positions to polish their skills and build their leadership abilities.

Candidates for Oscar Mayer's Engineering Management Development Program should have a bachelor's degree in one of the following engineering disciplines: mechanical, chemical, electrical, civil, industrial, or industrial technology/plant engineering.

If you feel ready to be challenged and to grow in your career, and want more information about Oscar Mayer and its Engineering Management Development Program, please write to:

Mr. K. S. Salter
Human Resource Selection - EMDP
Oscar Mayer Foods Corporation
P.O. Box 7188
Madison, Wisconsin 53707-7188

Cindy Mouton keeps looking for trouble.

As a new member of GE's Field Engineering Program, Cindy Mouton trouble-shoots equipment in some pretty wild places. Like the day she spent dangling six stories above the Mississippi River, trying to fix a crane.

Cindy's also gone trouble-shooting at chemical plants, paper mills and steel mills. She's been called on to repair everything from a vintage 1930's motor to the newest programmable controllers.

Field Engineering is not a job for the timid. You need the confidence—and broad-based knowledge—to walk day after day into new situations where you face the unknown.

If, like Cindy, you've got a sense of adventure, then Field Engineering could be the field for you.

In fact, if you're gutsy, outgoing, and capable, GE has opportunities for you no matter what field you're in.

So while you're out there looking around, take a good look at GE.

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