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WISCONSIN ENGINEER

NOVEMBER 1997 VOLUME 102, NUMBER 1

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Open letter

To our valued supporters,

As we begin our 102nd year, we reflect on the past few years. Three years ago you would not have recognized this magazine. With a meager staff and little to no income, the *Wisconsin Engineer* was barely surviving. Today we stand strong with a large staff, booming advertising revenues and award winning quality. A success story lies behind the *Wisconsin Engineer* you hold in your hand today.

The *Wisconsin Engineer* remains a student-run publication produced at the University of Wisconsin-Madison. It is published four times a year and has a circulation of about 4000 magazines. Currently, we have approximately 570 subscribers, with issues being sent to all the high schools in the state. The balance of the circulation is distributed free to students on campus and mailed to our many advertisers.

We have made leaps and bounds in our writing, production, advertising and web page. The staffs of each of these areas have improved their size and are constantly challenging themselves to make every issue of the magazine better and more consistent than the last. The stories in the *Wisconsin Engineer* have improved in quality and now touch on more campus events and organizations, student interests and advances in technology and engineering. The production staff has made the layout of the *Wisconsin Engineer* more appealing with a clean layout, improved pictures and graphics and exciting covers. The most dramatic improvement is the use of full color covers.

Our advertising revenue has grown from $500 in 1994-95 to over $11,000 in 1996-97. It already stands at over $12,000 after our first two issues of 1997-98. The cosmetic improvements to the magazine would not have been possible without this economic growth. The *Wisconsin Engineer* now operates under an annual budget of $25,000.

The *Wisconsin Engineer* had a very successful 1996-97 academic year in which we were named the Best All-Around Magazine by Engineering College Magazines Associated (ECMA) and also received the bid to host the 1998 ECMA National Convention. We plan on continuing this success in 1997-98 by winning back-to-back Best All-Around Magazine awards and hosting the best ECMA Convention ever.

We, the staff of the *Wisconsin Engineer*, thank you, our readers, alumni, advertisers and publisher for sticking with us through those difficult rejuvenation years. Our success can be attributed to your support. We hope to have that support continue with us as we march onward and make the 102nd volume even better than the 101st!

Wisconsin Engineer

WISCONSIN ENGINEER

Published by the Students of the University of Wisconsin-Madison

VOLUME 102, NUMBER 1 NOVEMBER 1997

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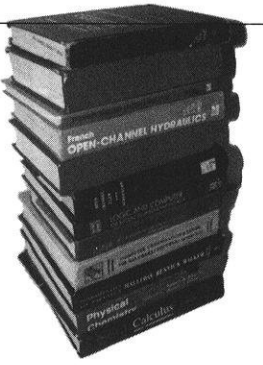

ON THE COVER

LADIES AND GENTLEMEN, START YOUR ENGINES!

The Baja car starts us on our journey into the fast paced world of engineered car racing. If that isn't enough, Formula SAE burns up the race track and Team Paradigm blows the competition away with it's advanced technologies.

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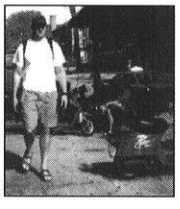

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The High Price of Technology

UW - Madison is primarily a research university. In the University's 1996-1997 budget, 35% ($423 million) of the total $1.2 billion was spent on research. Only 24% ($284 million) was spent on in struction. No other part of the budget came close to the amount spent on research.

As students, we expect the latest technology to supplement our classroom eduction. We demand the fastest and best computers and the newest software programs in our computer labs. If CAE doesn't seem to upgrade fast enough, we complain. The companies that interview us for jobs expect us to have this technology readily available to us. To maintain its status as a world-class school, the University feels pressure to keep up with the latest technology, but all this takes moneyælots of money.

Computer technology changes about every 6 months, and the useful life of a campus computer is short. CAE tries to replace computer systems on the engineering campus every four years or so. Upgrading software is a continual process, and costs are high. To avoid legal problems, every computer application must be licensed. Without gifts, UW-Madison and the College of Engineering can not possibly keep up with the latest technology.

Santa (and his helpers) left $220 million in gifts and trusts under Bucky's tree during the 1996-1997 fiscal year. UW-Madison is a public university, funded mainly by the State of Wisconsin, tuition and generous private donations. This funding mainly covers operational expenses, but no surplus exists for upgrading technology or for the construction of new buildings. The University relies on private donations and grants to supplement the budget.

Certain donations have received a lot of publicity lately. A $3 million gift given by Jere and Anne Fluno, of Lake Forest, IL, to the School of Business is intended to be used toward the construction of an executive education center. The Kohl Center will be completed in January and would not be a reality if not for private donations. Senator Herb Kohl donated $25 million. An additional $10 million was given by former all-Big Ten basketball player Albert Nicholas and his wife Nancy Johnson Nicholas.

One donation that did not receive much attention was a grant given in August 1997 by Intel Corporation for $4.8 million. Intel gave $90 million worth of computer technology to 25 universities through their *Technology for Education 2000* program. According to Intel's press release, the intent of the program is to support university research and curriculum development by donating high-speed mulitmedia computers, workstations, servers and networking hardware and software.

Intel found a unique way to support both research and teaching at the UW. It donated 200 computers to be located in computer labs on the entire campus linked by something called Condor system. Condor allows the same computer to be used for both educational applications and research. When the computer is not being used by a student, it is put to work calculating large computations for research purposes.

The Intel grant shows how technology can be used for both education and research. Everyone wins from this case. Hopefully, more companies will continue to contribute to improving technology for education and research purposes with similar grants.

Jennifer J. Schultz

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 and its management. All interested students have an equal opportunity to contribute to this publication.
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Bookstores - Where Does All the Money Go?

By Kristin Shuda

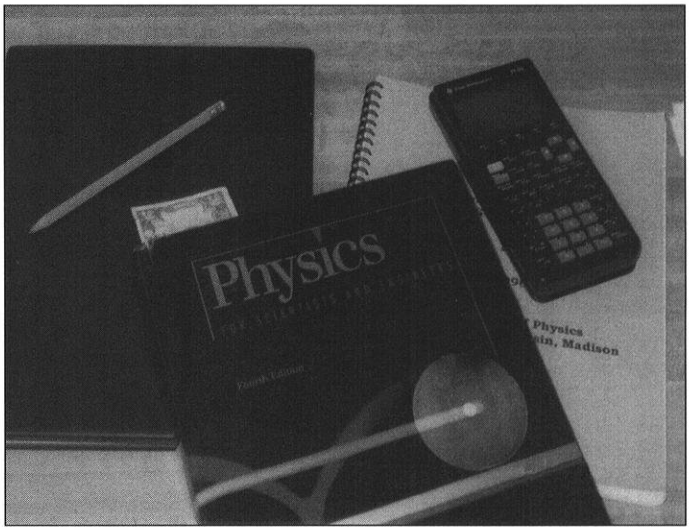
Are you being ripped - off? Imagine what you could do with $300 - pay one months rent, fly to Florida and back, indulge in a day of power shopping or rent your favorite movie 100 times. If you are an average college student, you will put aside these splurges and opt to buy a semester's worth of required textbooks.

Has the University Bookstore become a monopoly in it's own market? Most students say yes; however, the Bookstore disagrees. One thing everyone agrees on is that textbooks are expensive, and unfortunately, they are only going to continue to get more expensive each year. In order to justify the price of textbooks, the Association of American Publishers (AAP) conducted a study which lasted 20 years. They found that the price of textbooks has increased at about the same rate as anything else. During these same 20 years textbooks did not increase in price as much as the price of tuition.

If 38, 000 students each pay $280 for textbooks, over $10 million trickles through the bookstore each semester

Where does the money for a textbook go? The cost of a new $40.00 textbook is generally divided as follows. First, the publisher keeps about 66%. The author takes about 10%, and the distributing companies take another 3%. Salaries and benefits for the bookstore's employees take another 11%, and an additional 5% goes to the bookstore for operating expenses such as equipment, maintenance repairs and supplies. The final 5% is required, by law, to go to the Auxiliary Services Reserve Fund to support their programs, activities and reduction of operating expenses. Thus, the bookstore does not make that much profit on a book, or do they?

Just think about how many books are sold by the bookstore each semester. If 38,000 students each pay $280 for textbooks, over $10 million trickles through the hands of bookstore employees each semester. Bookstores report that their primary sale is textbooks; however, their primary profit is on general merchandise such as clothing, school supplies and college parafinalia.



Has the Bookstore become a monopoly? Most students have the opinion that they pay too much for books, but they feel they have no other options. These students should be informed of other options available. One option is the up-and-coming text exchange. The text exchange is a way for students to sell their books and buy books from other students on the web. The net result of this exchange is paying less and receiving more for your books. The project was started by ASME (American Society of Mechanical Engineers) member Chris Egle. Egle describes his idea as "...a means of getting more bang per buck for a book." Keep an eye open for information on using the text exchange as a means of avoiding the bookstore and saving yourself some money.

Another idea that is being tested at UCLA is a booklending program. This program, called "Students First! Booklending Program," was started by UCLA's undergraduate student government, with the hope of making an education more affordable. The idea is to loan books to about 500 students a quarter, and then reuse the books for another 500 students the next semester. The concept of booklending has also been used by the University of Wisconsin-Platville and University of Wisconsin-Eau Claire. Hopefully, this is something UW-Madison will look into soon.

A few other options faculty have chosen in order to avoid dealing with the University Bookstore is ordering from other bookstores. For example, many women studies classes require students to buy books from A Room of One's Own. Some professors choose to order books from Canterbury Books. Other professors write up their own packets to be bought from Bob's Copy Shop or display their notes on the web. Some academic departments even choose to sell packets on their own to students at minimal profit to reduce costs for students.

Overall, many options for buying books are available besides the University Bookstore. Students need to keep their eyes open if they want to save money, because, as with everything else, textbooks are not getting any cheaper.

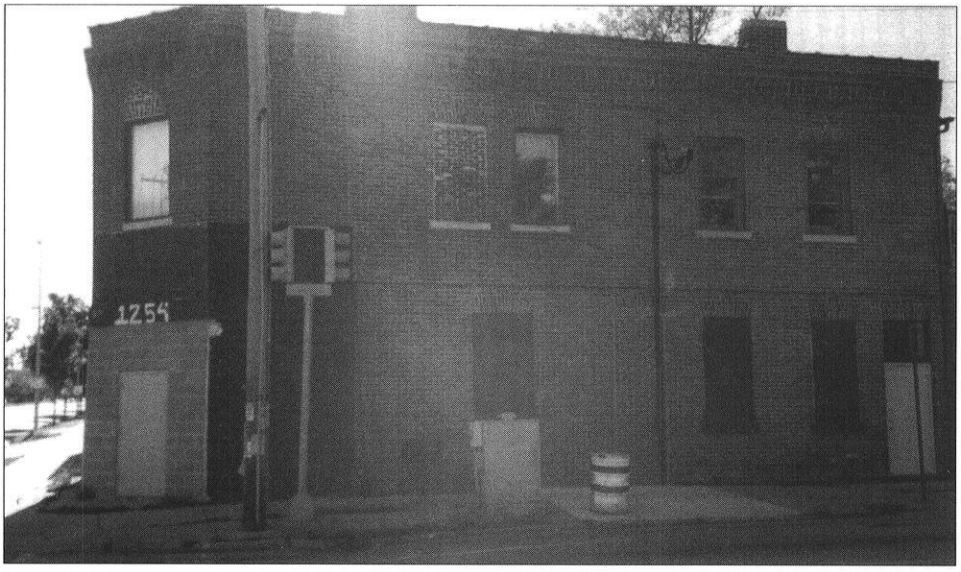
Author Bio: Kristin Shuda is a junior in industrial engineering. She feels all the bookstore needs is a little competition, because in monopoly all you have to do to get money is pass go.

Smart Studios: Madison's Best Kept Secret

By Dean Stier

Smart Studios is concealed in an unassuming brick building on the east side of Madison. Walking up to it, it's hard to imagine that breakthrough albums such as Nirvana's, *Nevermind*, and The Smashing Pumpkins, *Gish*, were recorded here. Some of the greatest music of our generation was made in this Madison studio. Butch Vig and Steve Marker founded Smart Studios in 1984, and they are also half of the Madison-based band, Garbage, along with Duke Erikson and Shirley Manson.

For many of us, music plays a large role in our everyday lives. Although we hear music several times a day, few of us know how it is actually recorded. A trip to Madison's own Smart Studios will shed some light on how music is recorded.



The low profile exterior of Smart Studios.

The process of recording an album starts with the musicians themselves. They have a general concept in mind and take that concept to a recording studio. The amount of time they can use in a studio is determined by their budget, or rather, how "big" they are. Once a band has a concept and a period of time to use the studio, they can begin to record.

"Technology is moving quickly, and it's going more digital"

At this point, Smart Studios steps in. They specialize in the recording and mixing of bands. The studio is employed with numerous producers and engineers who are responsible for bringing music into our homes. A producer is mainly concerned with the musical side of the recording process. They usually work closer with the band, and give feedback to help them achieve the sound they're looking for. The engineer, on the other hand, is responsible for the vast amount of equipment that needs to be ready at any given moment.

Instead of a chaotic work environment, the atmosphere at Smart Studios is incredibly comfortable and confident. Mike Zirkel, chief engineer at Smart Studios, explained, "The working environment is really sporadic. Sometimes there are slow times where everyone can relax, but there are also times when everyone is just working like crazy. It's always different for everyone that works here."

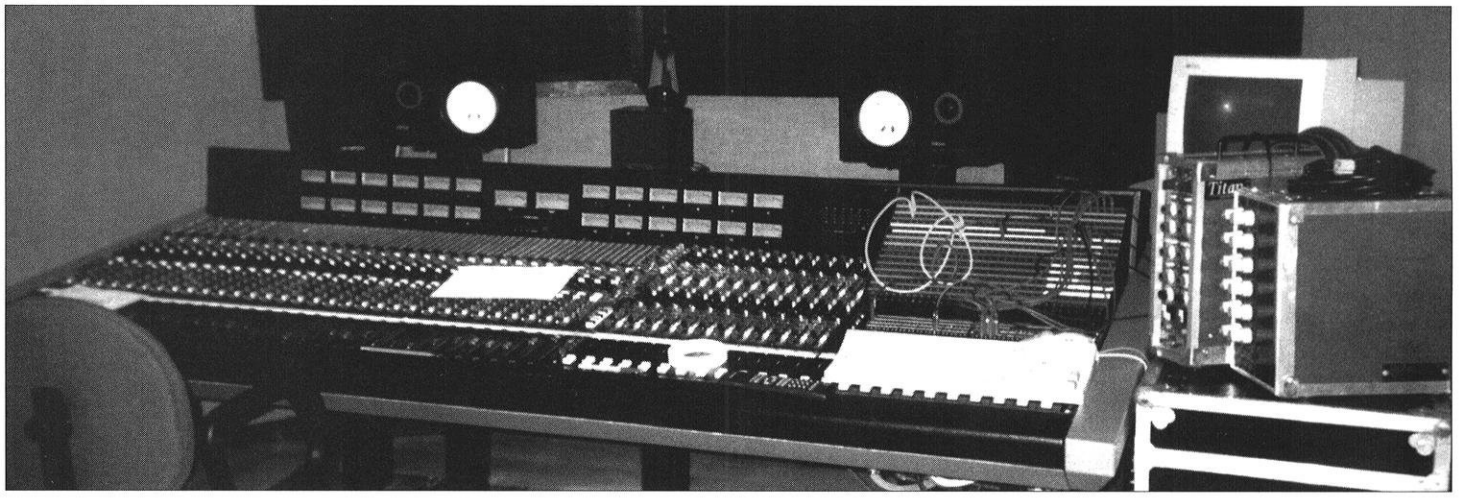
When a band first arrives, everyone sits down and discusses what needs to be accomplished. Band members usually sit with producers first to describe what kind of sound they want to achieve. Once a clear goal is in mind, the first stages of recording can begin. The initial recording is usually done in Studio A, located on the lower level at Smart Studios.

As the band plays in Studio A, producers are helping them achieve their desired sound, while engineers are making the necessary changes in the control room. The control room is adjacent to Studio A and is separated by a floor-to-ceiling, sound-proof glass. The control room is nearly filled with their Trident model 80-C / 56-input console.

The console is where engineers control every aspect of the recording. It consists of an array of control knobs and fader switches that can tweak a song any way the engineers want. Despite its confusing appearance, Zirkel ensured, "Once you learn one row of controls, you know them all."

Once the bulk of the recording is completed in Studio A, the mix-down and overdubs are recorded upstairs in the smaller Studio B. This studio is where the finer details in a song are recorded. Mixing is the process of putting all the components of a song together. Overdubs are recordings that will go on top of the original recording. An example of an overdub would be a second vocal by a lead singer to give the song an added dimension. Usually the mixing of a song or an album marks the final stage of the recording process.

Not every band records in the same fashion. Some may come in and record everything "live," which means there is little mixing and overdubs to be done. Other bands however, may do only fragments of a song and then "glue" all the pieces together later. All of again depends on how much time a band can afford to use the studio's time and equipment.



Update instrumentation is key in developing the music we all love to listen to.

Recording studios have the nearly impossible task of keeping current with the latest technology. "Technology is moving quickly, and it's going more digital," Zirkel said. A major shift from analog recording to digital recording. "Digital technology is fast and easy, but it doesn't sound as good as analog. We usually do all the editing and mixing with digital machines, but we still use analog tape to record."

Understanding the work done at Smart Studios, gives a person a new appreciation for music. These talented people begin with a spark of an idea and end with a blaze of music. Every day the team at Smart Studios puts on a production that is rarely seen, but often heard. Their devotion to music is apparent in the songs they help create.

Although the technology used in recording music is fascinating, it should not tower over the music it helped to create. Zirkel explained, "Technology is fun to play with and it makes the job easier, but it all comes down to the music. When Garbage is recording, they like to play around with different effects, but they never lose sight that they are here to make music."

Author Bio: Dean Stier would rather be a pop star.

Pictures courtesy of Smart Studio

On the Ice: Co-op in Antarctica

By Aaron Volkening

Nate Booth poses with the preferred mode of transportation in the Antarctic wilderness. How many co-op students ride a helicopter to work?

Antarctica, the most remote, desolate continent on Earth is not the typical location for a co-op. Nate Booth, a senior in civil engineering at UW-Madison, recently had the opportunity to be "on the ice," a phrase meaning to spend time in Antarctica. From October, 1996, to February, 1997, Booth participated in a Long-Term Ecological Research Program in the Dry Valleys of Antarctica. During his co-op term he learned many valuable engineering skills, as one would expect from any co-op position, but he also had some unique experiences that few other engineers will ever undergo.

Booth had helicopter access at any time he wanted it. Flying around in helicopters was a blast, he says, "...although the pilot was a little crazy"

Booth's main job was to collect field data on streamflow used in the study of the hydrology of the Dry Valleys. Many people are surprised to learn there is any flowing water in Antarctica to be studied. Antarctica is pictured most often as being totally covered in a massive sheet of ice. Indeed, more than 99% of the continent is smothered by ice that is up to three miles thick. However, small regions, known as the Dry Valleys, are free from ice and snow. These Dry Valleys are often also referred to as "oases," but that term can be misleading. They are not lush, tropical hotspots; they are desert-like areas of low precipitation and freezing temperatures. In some of these "oases," no rain has fallen in over two million years. The only life present is highly specialized algae, mosses and lichen. The terrain is an eerie, barren rocky surface. Booth described working and living in the Dry Valleys as "...being on a foreign planet." NASA must agree. The space agency has used these areas extensively for testing Mars probes, because the landscape comes closer than any other place on Earth to resembling the terrain of Mars.

Where do the streams originate? They are fed by meltwater from glaciers that are advancing down into the valley. The streams first begin to flow in November, which is the beginning of summer in Antarctica. After originating from the faces of the glaciers, they flow down into the valleys into small lakes. Yes, there are lakes in Antarctica. By March, the return of colder temperatures ends the supply of meltwater from the glaciers, and the streams soon dry up for the winter.

Why study the streams of Antarctica? Certainly, no one's thinking about dropping down a hydroelectric dam or tapping the streams for irrigation water any time soon. However, the results of research in Antarctica could be very beneficial to hydrological research all over the world. Scientists study these streams and lakes because they are very simple systems. Normally, hydrological research is complicated by the wide variety of inputs and outputs into a system. In Antarctica, there are no sudden and unpredictable rainstorms, no human-induced land use changes to affect runoff and no wells pumping water away. Scientists can work with a very simple model, obtain results that aren't complicated by a large number of variables with uncertain effects, and apply these results to systems in other parts of the world.

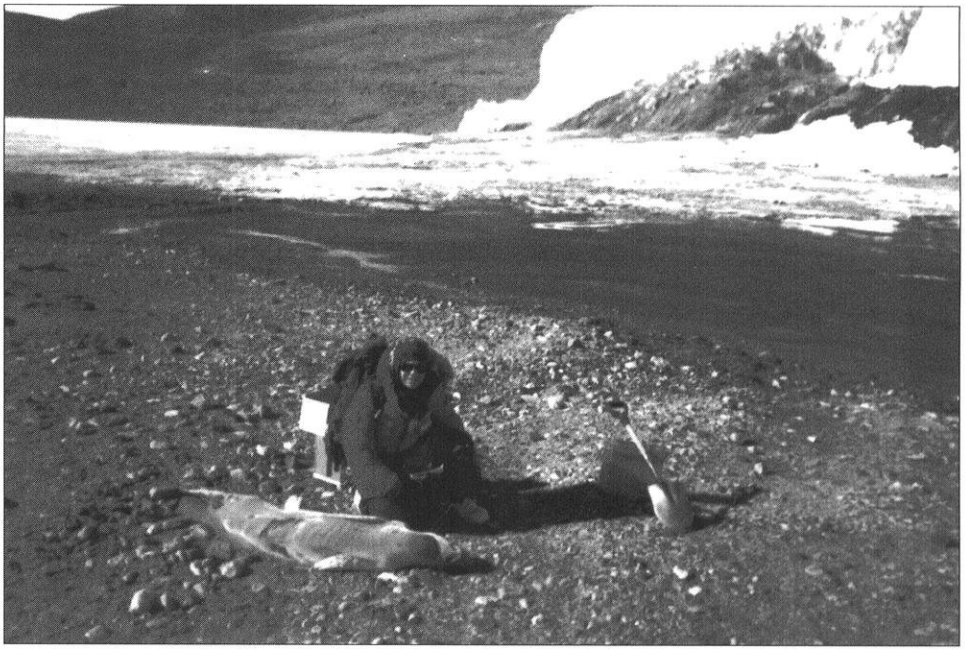
What role did Booth play in this research? Booth worked with Dave Kasmer, a recent UW-Madison engineering graduate, on the "stream team." Their primary duties were to measure the flow on the streams originating from the glaciers and collect water samples. These measurements provided other scientists with key data for their research.

Life on the stream team was very different from the typical life of a UW-Madison student. Booth was based out of Lake Hoare camp, which is the U.S.'s main camp in the McMurdo Dry Valleys. When Booth was in Lake Hoare camp, he lived in a tent pitched on the rocky ground. The maximum occupancy of the camp is about 20 people, although normally there were fewer people around. The camp is only occupied from October to February, due to the incredible severity of Antarctic winters. Booth spent much of his time out in the field, away from Lake Hoare, but the camp was a place he could call home.

Lake Hoare offered a chance to get some rest, pick up supplies and communicate with the outside world. Even at a remote camp in Antarctica, Booth had e-mail and wireless phone access to the rest of the world. Lake Hoare was also a place to get cleaned up. Showering took place every Sunday. A diesel heater was used to heat up the bath water. Each person was then allotted a coffee can full of water, to soap up and rinse with. Booth would collect the soapy runoff and use it to wash his laundry. Whatever wastewater remained could not simply be dumped on the ground. It would either have to be evaporated from a specialized device or else airlifted out by helicopter. Personnel in Antarctica try very hard to avoid having any negative impacts on the Antarctic environment.

From Lake Hoare, Booth and Kasmer would strike out to other field camps and research sites on trips that usually lasted several days. Transportation from site to site was via helicopter. Booth had helicopter access at any time he wanted it. Flying around in helicopters was a blast, he says, "...although the pilot was a little crazy." The pilot would sometimes fly down into the labyrinth of trenches and cracks that form in the ice, and weave his way through these crevices, which were sometimes only barely wider than the helicopter blades. "It was like something out of a *Star Wars* movie," Booth recalled.

The helicopter would drop them off at other remote base camps or near a gaging station. Once on the ground, their transportation consisted of all-terrain vehicles, snowmobiles or their own feet. Booth and Kasmer had to pack their own gear and supplies around, including a tent and food. In the middle of summer, midday temperatures ranged between 30 and 40 degrees Fahrenheit. Usually the sun would only disappear for an hour or two during the middle of the night. Days in the field were long and hard, but Booth says he enjoyed the solitude and the spectacular and unique scenery. The only living organisms he saw were lichen and moss. Occasionally, he would come upon a seal carcass or skeleton. Because of the cold, dry conditions and the lack of microorganisms, these carcasses were preserved for thousands of years, becoming mummified. If a bare skeleton was present, it was not bacteria that had eaten away the flesh. Instead, it was sediment carried by the wind that had actually eroded away the flesh.



Booth stands in front of one of the Antarctic streams the "stream team" collected data on. The dead seal attests to the inhospitality of this harsh environment.

One of the highlights of Booth's stay in Antarctica was his trip to collect data at a small pond adjacent to the sea. There, instead of the lifeless expanse of the Dry Valleys, he found himself treated to the sight of 5000 Adelie penguins and leopard seals frolicking on the ice

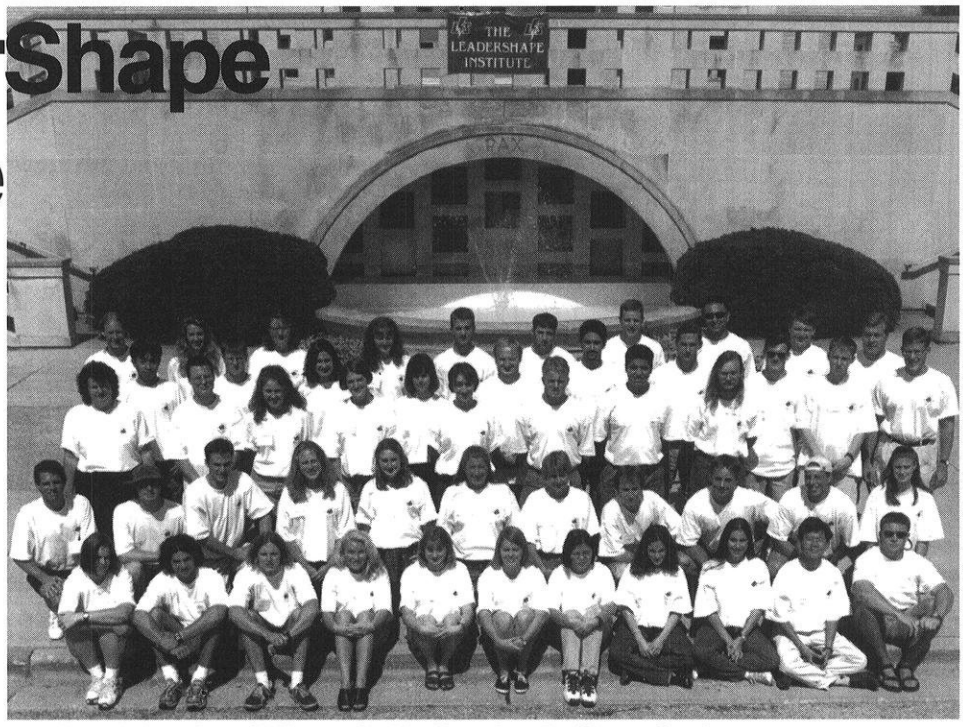
Booth did not spend the entire three and a half months in the Dry Valleys. During the first several weeks of his time in Antarctica, Booth stayed at the McMurdo Station, preparing equipment, completing training and planning for the summer research season. McMurdo is the largest "city" in Antarctica, with about 1000 residents during the summer months. Most people based in McMurdo are support staff, backing up the scientists out in the field. McMurdo has exercise facilities, movie showings, live music and even several bars. When preparations were completed in early November, Booth left McMurdo and flew out to Lake Hoare to begin the field work. Even when out in the field, he occasionally escaped from the barren desolation of the Dry Valleys. One of the highlights of Booth's stay in Antarctica was his trip to collect data at a small pond adjacent to the sea. There, instead of the lifeless expanse of the Dry Valleys, he found himself treated to the sight of 5000 Adelie penguins and leopard seals frolicking on the ice.

In early February, Booth left the Dry Valleys and returned to McMurdo. McMurdo is also one of the gateways to the rest of the world, with an airstrip built on the ocean ice that is capable of handling large jets. In February 1997, Booth found himself lifting off the Antarctica ice on a flight bound for New Zealand. He was returning to the civilized world.

"My Antarctic experience was out of this world," Booth stated to summarize his time at the bottom of the world. Like any co-op student, Booth learned valuable lessons from being out of the classroom and on the job working. However, he also had experiences that few others ever will. "Not only did I develop many relevant engineering skills," he says, "but I also learned many things about myself and how to deal with others in difficult working conditions. I now understand teamwork in ways many others never will; teamwork necessary to stay alive." Now back on the UW-Madison campus, Booth continues to study hydrology and water resources in the civil engineering department. He still loves to go out in the field and study firsthand the hydrology of lakes and streams. Booth hopes to pursue a full-time career in this area, but can't imagine he'll ever have the chance to work again in a place quite like the Dry Valleys of Antarctica.

Author Bio: Aaron Volkening is a senior who hopes to be a successful civil engineer while writing the Great American Novel in his spare time.

The LeaderShape Experience



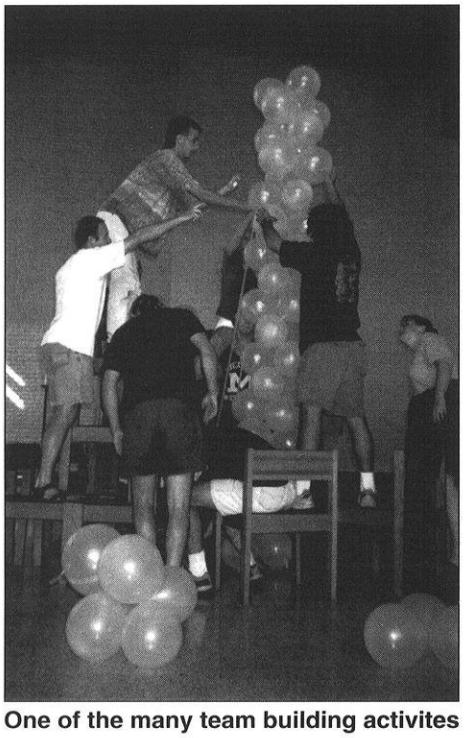
The first University of Wisconsin-Madison LeaderShape Graduates.

By Heather Wagner

To be a leader is to be a role model. To be a leader is to be not afraid of a challenge. To be a leader is to be able to put forth the extra effort to accomplish your goals, not just envision them. Throughout my life I have always thought of myself as a leader. Ever since elementary school, I have thought of myself as a role model, combating my challenges and achieving my goals, both as a valuable contributing member of a team and as a leader. This past summer, I had the opportunity to take yet another step in making myself a better leader. I was able to attend UW-Madison's first ever LeaderShape Institute, August 26-31, 1997, at the St. Benedict's Center in Madison.

What is LeaderShape?

For me, LeaderShape was an exciting, fun, motivating, intense, exhilarating, and wonderful experience. "LeaderShape is described as an intensive six-day program that exposes students to various aspects and issues relating to leadership development. LeaderShape begins with participants engaging in opportunities for self-reflection. Participants then move on to learning about forming a vision and creating powerful stretch goals. With this information, participants have the opportunity to create a powerful vision for their own organization. This is a dynamic, interactive program that affords participants the opportunity to explore personal characteristics, expand their leadership knowledge, meet and work with peers, as well as talk to current leaders from the University and surrounding community." (Wisconsin LeaderShape '97)



One of the many team building activites that LeaderShapers participated in during the six days: Balloon Towers!!

Wisconsin LeaderShape 1997

On a humid summer afternoon in August, 36 students from the College of Engineering and six students from the School of Business boarded two buses headed for the St. Benedict's Center on the north side of Lake Mendota. Established in 1966 by the sisters of St. Benedict, the 130 acres of woodlands, wetlands, and prairie provide opportunities for walking, jogging, and reflecting. The outdoor recreation facilities also included a swimming pool and volleyball, basketball, and badminton courts. The beautiful buildings and natural surroundings added even more to our overall experience at LeaderShape.

Upon arrival, we were enthusiastically greeted by Dusty Porter and Ginny Carroll, our lead facilitators from the national LeaderShape organization. Michael Alley, Shelly Reindl, Karen Dettinger, and Ron Mengel, our cluster facilitators, were not far behind.

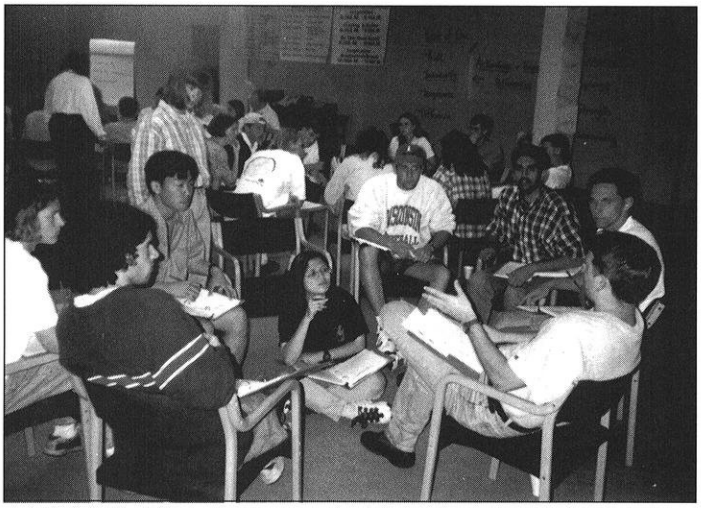
After settling into our rooms, and playing a few games of volleyball, it was time to focus on the theme for day one; Building Community. We started by going through several ice breakers to try to get to know everyone's names and learn a little bit about each person. Although we did not realize it at that time, in a matter of just a few days, each one of us in that room would know everyone else's name and be able to call them our friend.

That evening we met in our family clusters for the first time. The entire group of 50 students was divided up into four smaller groups called family clusters, each of which had a cluster facilitator. The family clusters allowed us to get to know 10 - 12 other students on a much closer level. Each cluster boasted pride in its members by thinking up a trademark name and a unique cheer to identify themselves. "The Cluster Formerly Known as the J Bunch," "Not One of Them," "Clusterphoria," and "Dynamic Dozen" were the unusual, but very creative names that the different clusters came up with. The night closed with sharing our newfound pride by singing our cheers and displaying our cluster names for the entire group.

On Wednesday morning, my alarm and my demeanor were harsh reminders of how little sleep I had actually gotten the night before. Even in my comatose state I was enthusiastic for my first full day at LeaderShape. The theme for day two, "The Value of One, The Power of All," was exemplified by the low ropes course we participated in that morning. We were all able to better learn the value of teamwork and good communication

through the various activities lead by the UW-Madison Adventure Learning Programs (ALPs) volunteers. Activities included the usual trust fall, as well as several others with the same theme of community, trust and clear communication. The rest of the day's activities included a self assessment inventory, discussion of a leadership strategy called Cog's Ladder and finally a session dealing with "The Value of One, The Power of All." That night we were able to enjoy a campfire with s'mores, surrounded by the beauty of nature and the company of our newfound friends.

On Thursday morning I noticed that after only two nights at LeaderShape, there were already fewer people at breakfast than there had been just the day before. Even though we all were fed very well, hardly anyone was willing to sacrifice that extra half hour of sleep just to get up to go to breakfast. Day three focused on "Challenging What is, Looking to What Could Be." The morning's activities challenged each participant to form a powerful vision for the group or organization that they were involved with. This powerful vision was to be, "...a compelling, bold and transforming future picture for an organization, group of people, cause or community." Several hours that morning and afternoon were spent sharing, editing and revising our visions. Each participant's vision was to be something in which they truly believed and upon which they wanted to have a positive influence on. These visions were the central focus of our participating in LeaderShape. That evening was a panel discussion with Thomas Sasman, General manager for Cargill in Dayton, Ohio; Mary Tilton, Vice President of Technology at Standish Industries; and Richard Thomas, President of RSC Consulting. Each panel member entertained questions from the audience and told their story of how they became leaders both in their personal and professional lives.



Participants discuss in a group the meaning of integrity.

"Bringing Vision to Reality" was the theme for day four. Throughout the activities planned for day four we "fine tuned" our visions and set stretch goals to achieve those visions. The three key characteristics of stretch goals are that they are aligned with the organization's vision, they are measurable and specific, including completion dates and they are big and bold. By clearly formulating our stretch goals, we made a sort of self-check by which we could measure the success of our visions. On Friday afternoon we continued to share and edit our visions, and we had a chance to listen to a presentation about "Gathering Momentum and Building Relationships." That night we all participated in a game called Star Power which was to teach us about the dynamics of power and influence. When we started this game, we had no idea of the incredible lessons we would learn from it. Unfortunately I cannot put down in words the impact this eye opening, confrontational, and extremely emotional game, had on each one of us. For those who attended LeaderShape it was surely a night we will all remember.

LeaderShapers gather together to share their visions with each other.

The overall goal of LeaderShape was to teach students to be leaders that live and lead with integrity. All of Saturday morning was spent listening to the lead facilitators develop the basis for leading a life of integrity based on core ethical values, personal values, integrity, and character-based decision making, as developed by Josephson Institute of Ethics. They explained the payoffs of integrity and the six pillars of character: trustworthiness, fairness, respect, caring, responsibility, and citizenship. Most clusters then spent most of their afternoon working on formulating a skit. Each cluster was given four quotes which they were supposed to act out, or somehow incorporate into a fifteen minute skit. This time gave each group its chance to show off some of their creativity and hone their acting skills. For an hour an a half that night, each cluster got to present its skit for the entire group. Little did we know that each skit would be funnier than the next. From scribbles written in bathroom stalls, or the Ricki Fake show, to a blossoming company called Crap Inc, and of course who could forget Saturday Night Live, each skit portrayed a unique image of what we had all learned at LeaderShape.

The last day of LeaderShape urged students to "Stay In Action." The half day on Sunday was spent attending a graduation ceremony and farewell brunch. That morning when we had the chance to reflect on all that had happened in the last six days, we stood hand-in-hand in a large circle and looked around at the faces of the strangers who we could now call our friends. In our final moments together, there were intense feelings of community, pride and enthusiasm. To those who attended LeaderShape, "Staying In Action" meant we were to stay focused on our visions and never back down. We were to realize the potential of a single individual with a dream. We were to share with others all that we had learned from our unforgettable LeaderShape experience.

Author Bio: Heather Wagner is a senior in mechanical engineering. She is also pursuing the technical communications certificate.

All pictures courtesy of Wisconsin LeaderShape Student Organization.

Digital Video Discs: Format of the Future

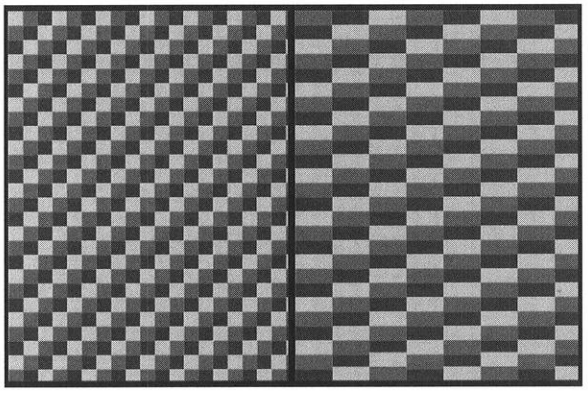
Digital Versatile Disc, Digital Video Disc, or simply, DVD is the newest and best technology has to offer for video and audio purposes. For the first time video and audio have combined onto a single format that is superior to any other format.

Two decades ago, the home-entertainment battle matched two incompatible video-recording systems, Sony's Beta and Matsushita's VHS, with VHS eventually winning. The latest challenge pitted two major electronics alliances in fierce competition to decide the next generation of entertainment technology, digital video discs (DVDs). DVDs resemble audio CDs and CD-ROMs but can hold much more information. A decision was made late last year to finally call a truce and create a single standard for this powerful new storage medium.

The world's first digital video disc players made their much-awaited debut in Japan on November 1, 1996, despite worries over the severe lack of available software and the continuing controversy over copyright laws. The electronics industry has pinned high hopes on the DVD, which it believes has the potential to replace current compact discs, laser discs, CD-ROMs and even conventional videotapes. DVDs have an enormous storage capacity and can be utilized not only for audio and video players but also for multimedia, personal computers.

The battle over new computer technologies has recently taken a global perspective. There were two competing standards for the next generation of CDs, each backed by a coalition of electronics manufacturers. These two groups announced their decision to work together to develop High Density CDs. The new alliance supporting DVDs is composed of all the major consumer electronics manufacturers including Philips, Sony, Toshiba, Matsushita, Pioneer and Hitachi. The goal was to come up with one standard that fills the needs of both the entertainment and the computer industries.

A partnership between Sony and Philips was pushing a DVD system that plays conventional compact discs and CD-ROMs as well as discs storing 135 minutes of broadcast-quality video. Toshiba and Time Warner where promoting a rival system with a storage capicity of 180 minutes. While Toshiba-Time Warner DVDs contain more data, Sony-Philips had an advantage as the dominate producers of audio CDs and CD-ROMs. Both groups were courting other electronics manufacturers as well as Hollywood studios and software companies.



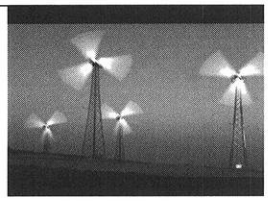
DVD Picture **720 pixels** — Standard VHS Picture **320 pixels**

per horizontal line
480 active lines of verticle resolution

Many movies are cropped by as much as one third to fit a standard, box-shaped, television screen. But with just the press of a button, a DVD Player can switch between 4:3, 4:3-letterbox and 16:9 formats. The 16:9 format is the least encoded format because it requires a 16:9 television screen.

4:3 Aspect Ratio
Standard
Television Screen

4:3 Letterbox Format
Theater-style
Screen



The DVD was initially developed by Philips Corporation and had up to 4.2 gigabytes of storage capacity. Today, DVDs encompass four disc types: single-sided or double-sided, and with one or two layers. A standard single-sided, one-layer disc can hold 4.7 gigabytes of data, approximately seven times the data capacity of a current compact disc. For greater data density, there are smaller pits on the surface of the disc, a more closely-spaced track and a shorter-wavelength red laser is used to read the data. . Pits are the tiny grooves on a disk that encode the information in binary code. The error correction scheme is also more robust than for CDs. Dual-layer DVDs can hold more than 12 times the information of a CD on a single side. So there's no need to turn the disc over. The double layer is achieved by using two layers of pits with a membrane that separates the two layers. The laser can choose which layer to focus on, thus putting two sides onto one.

The extensive data storage capability of the DVD also allows for delivery of high-quality full-length motion pictures. A single-side of a 12 centimeter disc can store a two hour, 13 minute movie, and dual-layer discs can hold movies that are more than four hours long. Sound capability is remarkable with digital audio tracks supporting 8-channel surround sound, multi-lingual sound tracks and subtitles. In fact, several different permutations of the same movie can be stored on one side of the disc: a PG-rated version, an R-rated version and a letter-box (wide screen) version. The version to be watched and heard would be chosen via selector buttons and in this way could perform parental-control functions via password protection.

These incredible storage capabilities give the DVD limitless possibilities for entertainment and computing applications. Home DVD players have already hit the market. The prices range from $399-$1,000. Sony, Toshiba and other manufactures already have several models out.

For the entertainment industry, DVDs will offer quality that surpasses today's laser video discs and store hours of music on a single disc. It will be more like watching a film than a video tape because the new format supports chroma and luminance bandwidth that rivals film. This is what Hollywood has been waiting for, a cost-effective way to deliver full-length motion pictures that is inherently difficult to duplicate or pirate.

For the computer industry, the impressive storage capability is one consideration, but data retrieval speed is the most attractive quality of the DVD. Because the discs will spin up to ten times faster than CD-ROMs, the DVD will be a practical way to create the illusion that virtual reality requires. Many titles that are still under development will have transitions between scenes that are nearly instantaneous, finally providing users with the effect that the software was designed to do. DVD players are fully backward-compatible with today's CD-ROM and audio CDs. There is single file-format standard, and most importantly, there will be forward compatibility with new, higher-density versions that are still under development. Further media enhancements will eventually allow for higher density recording.

Only a few titles hit store shelves as the hardware went on the market, but Japanese firms producing DVDs had anticipated that big Hollywood entertainment companies would offer movie software in the new format by fall 1996. Widespread release of such software is considered a key element to boost the market. But it was not until late October, of that year, that Hollywood movie makers and hardware manufacturers agreed on improved technologies to prevent piracy. As a result, no movie software was ready for release to coincide with the hardware debut.

Although the first generation of DVD machines are still play-only, we will soon see DVD recorders for computer and audio-video applications. One of the biggest stumbling blocks to their introduction has been how the proposed copy protection/encription systems affected the PC. The work still to be done includes protecting copy-righted transmission to the home, and between devices copying from analog to digital formats, and in prerecorded music. How long this will take is a question of technology, but once developed, the recordable DVD will take us into a new era of information storage.

Some DVD References on the Web:

E/Town—Home Electronics Guide:
http://e-town.myriadagency.com/dvd/

A decent page of DVD facts:
http://www.accent.net/m_mario/dvd.htm

Sony's Consumer Information about their DVD products:
http://www.sel.sony.com/SEL/consumer/dvd/

A detailed look at the Hollywood copywrite agreement:
http://www.cemacity.org/

A Technical Introduction to Digital Video:
http://www.inforamp.net/~poynton/Poynton-T-I-Digital-Video.html

Compiled from staff reports by Dean Stier and Cesar Moran.
DAS really likes DVD.
Cesar G. Moran is currently living in Okinawa, Japan.
Email: cesar@tamaru.kuee.kyoto-u.ac.jp
Homepage: http://www.tamaru.kuee.kyoto-u.ac.jp/~cesar

Noted DVD Release dates:

Columbia TriStar
Air Force One 2/10/98
Das Boot: Directors Cut 12/9/97
The Fifth Element 12/09/97
Flatliners 12/9/97

Dimension Films
Scream 12/7/97

Hollywood Pictures
The Rock 12/2/97
Tombstone 12/2/97

Live Home Video
Hoosiers 11/18/97
Platoon 11/18/97
The Running Man 11/18/97

MGM/UA
Dr. Suess's How the Grinch Stole Christmas/Horton Hears a Who 11/18/97
007: From Russia With Love 11/18/97
007: Goldfinger 11/18/97
The Good, the Bad, & the Ugly 11/18/97
Thelma & Louise 11/18/97

PolyGram Filmed Entertainment
When We Were Kings 11/18/97

Touchstone Home Video
Phenomenon 12/2/97
Ransom 12/2/97
Tim Burton's The Nightmare Before Christmas 12/2/97

Universal
Backdraft 12/9/97
Waterworld 12/9/97

Warner
Contact 12/16/97
Grumpier Old Men 11/18/97
The Hunchback of Notre Dame 11/18/97
The Secret Garden 11/18/97

There are **6 regions** or locales determined **for copy protection.**
1. Canada, U.S., U.S. Territories
2. Japan, Europe, South Africa, Middle East
3. Southeast Asia, East Asia
4. Australia, New Zealand, Pacific Islands, Central America, South America, Caribbean
5. Former USSR, Indian Subcontinent, Africa
6. China

Regional codes are entirely optional. Discs without codes will play in any country. Each player is given a code for the region in which it is sold. The player will refuse to play discs which are not allowed in that region. This means that discs bought in one country may not play on players bought in another country.

Some DVD-Video Features:
Smooth scanning at 2X, 10X and 30X forward and reverse
Freeze frame
Frame by frame advance
Title search
Chapter/track-search
Parental control
Multiple camera angles
Multiple languages
Multiple subtitles
Repeat mode

Ladies and Gentlemen, Start Your Engines!

By Steve Roberts

So you're looking for a decent student organization to join. Your mom tells you it would be good for you. Your advisors tell you it will look good on a resume. And your professors count it towards your brownie point total for the semester. So why does finding a good student organization to join sound about as much fun as finding a good dentist to give you a root canal? Well, it doesn't have to be that way!

Though there are many worthwhile student organizations on campus, some of the most dynamic and interesting ones are right under your nose here at the College of Engineering, such as Team Paradigm, Formula SAE and Baja Car. These "big three" vehicle design groups offer challenging, hands-on projects that can literally take students where they want to go. From Team Paradigm's technical Hybrid Electric Vehicle (HEV), to the speed and power of the Formula SAE project, to the dirt-busting Baja Car, there is something for just about everyone. While the main goal of each organization is to provide students with a practical learning experience, each has energetic and resourceful team members who take the bottom line very seriouslyæto produce a quality, innovative and competitive product within predefined financial and chronological constraints. So buckle-up and enjoy the ride. One of these teams could be looking for YOU.

Source: Team Paradigm

Team Paradigm drivers race down the highway during the 600 mile road rally this year.

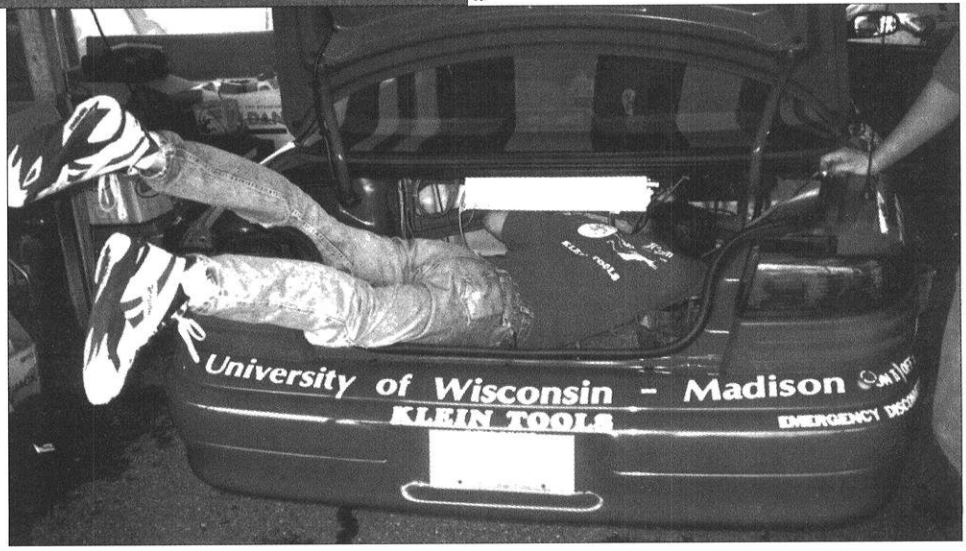
Team Paradigm

Team Paradigm, the most recent addition to the group, has been developing HEVs since 1991. HEVs are vehicles in which a combination of an internal combustion engine and an electric motor is used to produce traditional performance while getting three to four times the gas mileage. Accomplishing this objective is no small task. It takes a team of over 30 people from various disciplines and a lot of industry hardware to get the job done.

In 1995, Chrysler donated a new Dodge Intrepid to Team Paradigm for use as the basis of their design. While the vehicle looks a lot like a normal Intrepid from the outside, it is hardly that. The diesel engine is periodically assisted by a 15 hp electric motor powered by a 300 lb battery pack mounted underneath the vehicle. A dedicated purpose computer is used to control the amount and timing of the power assist to ensure the most efficient operation. Many other data acquisition tasks are performed by the computer to make sure that all aspects of the vehicle are running properly. Depending on the situation, the car can put out as much as 90 hp and reach top speeds of approximately 100 mph. This past year's design was able to travel approximately 55 miles on a single gallon of regular gasoline. This equates to 62 mpg of diesel fuel due, in part, to its energy density being higher.

So if you feel the need for speed but can't fill it with your '79 Gremlin, read on

While this gas mileage is remarkable, the goal of 80 mpg is the Holy Grail of HEV efficiency. To help achieve that goal, the team has acquired a brand new, aluminum-bodied Ford Taurus. This new body will enable



Source: Team Paradigm

This Team Paradigm member is really getting into his work.

Source: Team Paradigm

Dirt flies in the Arizona desert as this Baja Team driver embarks at this year's Mini-Baja West Competition.

the team to drop the overall weight of the vehicle from a bulky 3700 lbs down to approximately 2900 lbs. When dealing with fuel efficiency, vehicle weight is of paramount importance, and this new body will undoubtedly help the team as they try to squeeze every last foot of distance out of a gallon of gas. You could be part of the team that helps the 80 mpg dream become a reality!

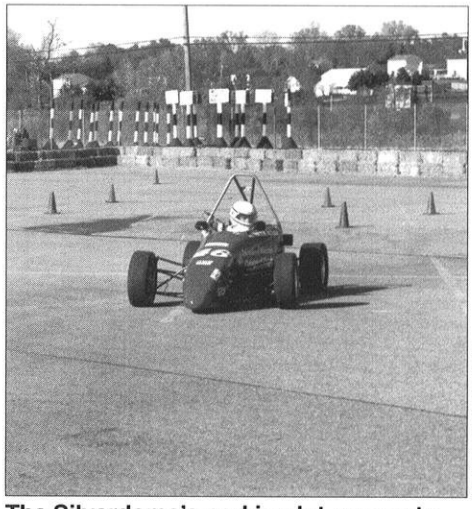
The team's goal this year is to compete in the third, and final, FutureCar Challenge. This three-year competition has challenged teams to build a mid-size vehicle that maintains current automotive standards of performance, utility, comfort, safety and price while achieving up to 80 mpg equivalent fuel economy. While at the Challenge, the car will be put through a series of both static and dynamic tests. The static tests include emissions, fuel economy and several different design categories including application of new technologies and manufacturability. The dynamic (i.e. fun) tests include an eighth-mile acceleration test, a maneuverability test and a 600 mile road rally. The UW has placed third overall out of 12 schools in each of the first two years of the competition. Way to go team! Though the next competition isn't until June of 1998, the team is already working diligently to prepare for it. This event warrants and receives nationwide attention from not only the major automobile manufacturers (Chrysler, Ford, GM) but also from the U.S. Department of Energy.

Team Paradigm offers students the ability to receive degree credit for their work (depending on the student's major and its department policies) or to simply volunteer their time. Some of the different applicable majors include mechanical engineering, electrical engineering, industrial engineering, business and communications. Business majors track the budget while communications majors are needed to help with the marketing of the team. Freshmen and sophomores can get involved but junior standing is required for the 3-credit independent study courses offered by most engineering departments. Also, a minimum GPA of 2.5 overall (or 3.0 in the last two semesters) is required. The only other pre-requisites, according to Glenn Bower, faculty advisor for Team Paradigm, are interest and self-motivation. These two elements, along with some practical training from the veteran team members, will make you a successful Team Paradigm member.

Formula SAE

So maybe you're not into all of that fancy hybrid electric vehicle stuff. Maybe you're from the old fashioned school of horsepower and handling. If so, Formula SAE is for you. SAE stands for the Society of Automotive Engineers. UW-Madison first got involved with SAE in 1983 with only three other schools. This year, SAE has over 100 school members. So if you feel the need for speed but can't fill it with your '79 Gremlin, read on.

Unlike the FutureCar project, the formula car is built from scratch. The car has a custom chassis and frame built around a customized, turbo-charged and fuel injected 400 cc motorcycle engine. At only 490 lbs, this 80 hp car really moves. It can do zero to 60 mph in approximately four seconds and has a top speed of about 110 mph. However, the emphasis is placed on handling rather than speed. Much effort is put into improving the car's chassis and suspension systems in order to take full advantage of the engine's output. Building a vehicle from scratch is a monumental challenge, but the pride felt during competition is unbeatable.



Source: Formula SAE

The Silverdome's parking lot proves to be no match for this Formula SAE driver.

Source: Formula SAE

The Formula SAE Team takes a break to show off its hard work during this year's competition in Detroit, Mi.

Each year, the 100 or so SAE member schools gather to show off their hard work in the Formula SAE Competition. Typically held near Detroit (a.k.a. Motor City, USA), this event has both static and dynamic events (much like the FutureCar competition). The emphasis with this car, however, is acceleration and handling so the dynamic tests are held on a tight, half-mile track. In past years, this event has been held in the parking lot of the Pontiac Silverdome in Detroit, MI. With auto industry moguls looking on, the cars are put through a series of tests including "skid pad" (or figure eight), acceleration, auto-cross (timed, one-lap event) and a 15-lap endurance race. UW-Madison finished 40th overall in this year's competition after experiencing some mechanical difficulties. The next competition will be held in May of 1998, and the team is already looking for hard-working members to help them reach new performance levels.

Building a vehicle from scratch is a monumental challenge, but the pride felt during competition is unbeatable

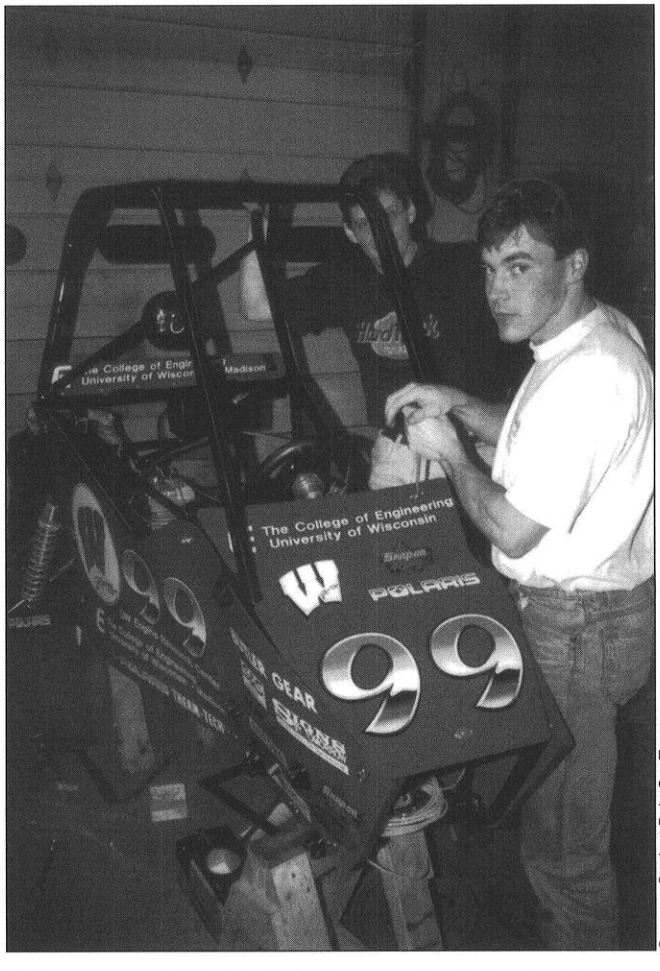
The same type of degree credits can be earned through the Formula SAE group as through Team Paradigm. As expected, the desired majors here are more related to the mechanical realm and include mechanical engineers, material science engineers and engineering mechanics majors. Some industrial and electrical engineers as well as business and communications majors are needed. The same GPA requirements hold as for Team Paradigm (those are standard requirements for all student groups), and the team will train inexperienced individuals who have a strong interest in the project and self-motivation.

Baja Car

Think back to when you were young. Did you like playing in the mud and dirt? Were you the kid that always came home so filthy that your mom had a coronary? Even today you get a little giddy when the rain falls, and you daydream of taking off your shoes and squishing your toes in a slimy patch of hydrated dirt. Dirt is truly your friend. If any of this sounds even remotely familiar, then the Baja Car group just might be for you.

The Baja Car, like the Formula SAE Car, is built completely from scratch. It is a four-wheeled, all-terrain vehicle (ATV) which utilizes an 8 hp Briggs & Stratton engine. The chassis and suspension, including the roll cage, are designed and manufactured by the team, and they are of the utmost importance when trying to maneuver the vehicle through the bumps and ruts of demanding off-road courses. Performance quotes are fairly meaningless here (32mph top speed - man, that's slow!). The main objective with this car is to finish the race.

Each year there are three SAE sponsored baja events across the country - the SAE Mini-Baja Competition East, Midwest and West. UW-Madison typically competes in only the Midwest and West events (some "minor" detail about a requirement that the vehicle floats has kept us out of the East competition). The format of these competitions is similar to that of the FutureCar and Formula events - both static and dynamic vehicle tests. In the Baja events, the static judging and design report count for one-third of the points. Another one-third go for dynamic performance based on acceleration, top speed, braking, skid-pull and maneuverability. And the granddaddy of them all, worth the final one-third, is a four-hour, survival-



Source: Student Baja Car Team

Strike a pose. Mike Christopherson (Right) and Pat Clint help put the finishing touches on this past season's baja car.

of-the-fittest endurance race. Can you imagine getting to go watch, or better yet drive, a vehicle that you helped design in a race? UW-Madison placed ninth overall out of 80 teams at this year's Midwest competition - great job Team Baja! They are now busy preparing for the 1998 Midwest competition, which will be held in nearby Waukesha, WI, in late May.

The Baja Car team is looking for a variety of skills possessed by mechanical engineers, industrial engineers, material science engineers, and the indispensable business and communications majors. As with the other teams, you can volunteer time or take independent study courses for credit (the standard minimum GPA guidelines do apply). Again, experience is not required. The team will train eager and industrious students.

So there you have it - Team Paradigm, Formula SAE and Baja Car. Three quality student organizations that will not only fill your need for speed but will make your mom proud too! Consider joining one today.

Author Bio- Steve Roberts is a lifer electrical engineering senior who will be graduating (so he's been told) in December. Will miracles never cease?! His hobbies include dropping and retaking classes, prolonging graduation by doing co-ops and any other graduation-impeding activities that he can find. When asked if he would pursue his Master's Degree right away, Steve replied, "I don't think I can handle eight more years of school at this point in my life." He is currently working with engineering department officials to remedy his impending graduation situation.

CONTACT INFORMATION

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Mike Moyer, student team leader
Home phone: (608) 238-9681
e-mail: mamoyer@students.wisc.edu

COE Organizations

This page is dedicated to the College of Engineering Student Organizations. The intent is to inform students of the many organizations that exist on this campus, what they stand for, activities they participate in/organize and the services they provide for the students.

Pi Tau Sigma

Pi Tau Sigma is an honorary Mechanical Engineering Society that originated here at the University of Wisconsin-Madison and at the University of Illinois. It was started in 1915 "with the realization that honor societies made a definite contribution to the department" and that membership is beneficial now and in the future. Its objectives are to foster high ideals in the engineering profession, promote academic and professional development and encourage leadership and citizenship.

The top one-fourth of the junior and top one-third of the senior class in ME are invited to join Pi Tau Sigma. Members are reconized for their outstanding academic performance for life and have the opportunity to develop leadership and communication skills. Activities include general meetings with a speaker from industry; student/professor activities such as volleyball match, cookout and luncheon; plant trips; and our annual spring banquet at the Prime Quarter. We also provide a free drop-in tutoring service open to all students on campus, and one on one tutors for ME students. Email Pi Tau Sigma at **pitau@cae.wisc.edu** for any questions.

The American Nuclear Society

The American Nuclear Society provides students within the university community a means for professional development, contributes toward the development of nuclear science and technology at UW-Madison through activity with other branches and with the Society, and serves as a focal point within the university community for interchange of information in the area of nuclear science and technology.

We hold monthly meetings with speakers on various topics. We speak to local schools and organizations about nuclear science and technology as well as conduct tours of our nuclear reactor facility. We also organize trips to conferences and nuclear related facilities such as recent visits to Fermilab and Byron nuclear power plant. Our Engineering Expo '97 display included samples of irradiated food and a model of one of the latest nuclear power plant designs.

Our next meeting will feature a talk by astronaut Harrison Schmitt. Come join us in 106 ERB on Tuesday, December 9 at 7pm. For more information visit our web page at ans.neep.wisc.edu/~ans/ email us at **ans@ans.neep.wisc.edu** or call us at 265-3992.

American Society of Mechanical Engineers (ASME)

The University of Wisconsin - Madison ASME Student Section's main goal is to prepare future mechanical engineers for their careers in industry and academia. ASME seeks to enrich students with experiences not available in the courses taught at UW - Madison. Some of these experiences include plant trips to Ford, Trek, John Deere, Caterpillar, and many other places. Other experiences include attending conferences in the fall, winter, and spring, and participating in leadership opportunities in any of the twenty officer positions and on committees. In addition, members can hear from speakers from industry and school at the bi-monthly meetings, and give something back to the community through volunteer activities such as High School Outreach Day on Campus and the blood drive.

The UW section is not only active locally but also regionally. The section has been rated the most active in region VI in two of the past three years. Some of the schools included in this region are MSOE, Purdue, Louisville, and several others. Also the region VI student representative is from the UW section.

For more information on the UW ASME section check: informational board in the ME lobby, call the office at 262-2973 , stop by our office at 119 Mechanical Engineering Building, email: **asme@cae.wisc.edu**, or visit our homepage: www.cae.wisc.edu/~asme/

The Institute of Industrial Engineers

Mission:
"To provide programs to enhance educational progress, facilitate industrial relationships, and increase social interaction between Industrial Engineering students."

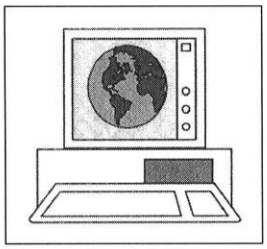
The Institute of Industrial Engineers (IIE) introduces students to many aspects of Industrial Engineering. As a member of IIE you will interact with industry on many occasions. Every month IIE brings speakers in to explain to students what an Industrial Engineer does in "the real world". This helps students decide if Industrial Engineering is right for them, and those who find a match are shown how classroom skills can be applied in industry.

IIE also has educational programs open to its members. These programs include; Students Advising Students (SAS), tutoring, and mentoring.

If you are an Industrial Engineering student and would like to become more involved, learn more about industry, or just meet more people, IIE is for you.

The next meeting will be November 19 at 6:00 pm in 159 Mechanical Engineering Building. For more information on IIE contact Mike Koplin by phone 232-7067, email **iie@caelab1.cae.wisc.edu** or visit our website at www.cae.wisc.edu/~iie

Engineers for Environment and Technology



There has been a tremendous rise in concern for the environment in the last decade. Since engineers are a vital part in the manufacturing of all consumer products, it is essential that all engineers are aware of ongoing research and development which focuses on the options available to meet consumer demand with no hazard to the environment. Engineers for Environment and Technology (EET) is a multi-disciplinary student group generally concerned with responsible application of scientific and engineering principles to the environment. Specifically, EET focuses on the technological aspects inherent in modern environmental issues in order to prepare students for the workplace.

As a group of engineers and scientists, our objectives are: To promote environmental education and awareness in the form of speakers, group discussions, and field trips. To build relationships among undergraduate students, grad. students, professors, and industry professionals. To involve members in design and research projects dealing with environmental issues. To provide a source of scientific and technological information relating to environmental concerns. To aid students in obtaining information about internships and career opportunities.

In the past we have had a number of speakers from industry come in to talk about environmental issues on the job. We have also cosponsored two panel discussions with the Federation of Environmental Technologists (FET) involving professors and also industry and governmental representatives. Our next Panel Discussion on Sustainable Development will be held November 20 at 7:00pm. Watch for the postings.

We are currently trying to recruit companies and firms to work with EET and ECS to start internship possibilites that would give environmental work experience. A team project for spring semester is also being developed to help students gain hands-on experience. If you would like more information regarding any of these projects or about EET in general, please e-mail us at **eet@cae.wisc.edu**. Thanks for your time and we hope to see you soon.

The Institute of Electrical and Electronics Engineers

What is IEEE at the University if Wisconsin-Madison?
The Institute of Electrical and Electronics Engineers (IEEE) is a group of more than 300,000 professionals and students from more than 150 countries. IEEE was founded in 1884 and is the largest professional association in the world. It is the best source of electrotechnology publications in the world and accounts for more than 30 percent of the total publications. At the local level, we are an organization of about 200 members. We have at least one plant tour a semester and plan regular meetings once a month. During the meetings, we have companies or distinguished speakers do presentations for our group. We also have social activities such as a barbecue and volleyball.

What are benefits of joining IEEE?
All IEEE members receive a personal subscription to the IEEE Spectrum magazine. With this, IEEE members gain an edge with the best technical information on electrical and computer engineering in the world. This is a monthly magazine that even UW-Madison professors have written for. IEEE is a great opportunity to network with other students and industry. It is an organization to become involved in if you want to contribute to own personal talents and skills.

Next IEEE activity is the Plexus Plant Tour on Saturday, December 6, 1997.

American Institute of Chemical Engineers

The next meeting for the American Institute of Chemical Engineers (AIChE) will be Wednesday, November 19,1997. The host companies will be Biotech Resources, Genentec, Amgen, and Promega. The topic is a panel discussion about opportinities for Chemical Engineers in the Biotechnical field. The guest professor will be Professor Cameron. The meeting will begin with pizza at 6p.m. outside of 1800 Engineering Hall and the meeting will begin at 6:30p.m.

The Badger Amateur Radio Society

The Badger Amateur Radio Society (BARS) is the UW's ham radio club. Founded in 1956, the Society's mission is to provide an amateur radio station (W9YT) for the use of students and staff who are licensed radio amateurs. We also assist others in obtaining their FCC license and encourage the social, technological, and public service aspects of the ham radio hobby.

The mainstay of amateur radio is world-wide two-way shortwave communication and providing emergency communications during disasters. Hams are also involved in developing new technology such as digital radio networks, orbiting satellites, and high-altitude balloons carrying amateur television transmitters.

For more information on BARS, see our Web Page at
http://www.cs.wisc.edu/~timc/bars/
e-mail to **w9yt@w9yt.engr.wisc.edu** or call 262-1142.

This is a selected group of organizations. For a more complete list see Volume 101, Number 4, the September 1997 issue of the *Wisconsin Engineer.* For more information on how to get your organization's announcements into the next issue of the *Wisconsin Engineer*, contact Catherine Jehring at 262-3494 or email at cjehring@students.wisc.edu.

Leah Newman: A Face You Should Know

By Shana Gadlin

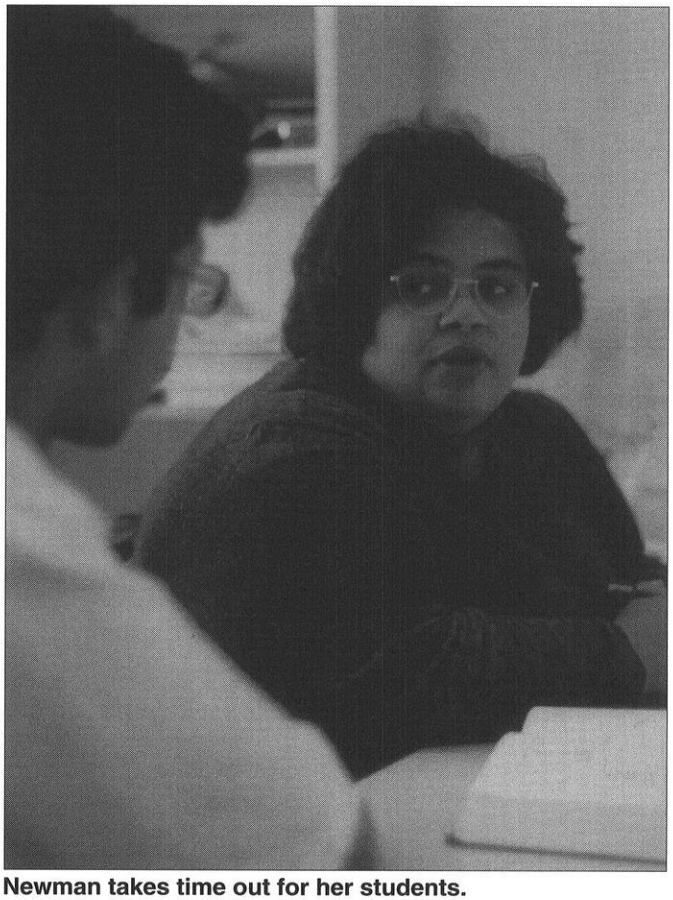
Cool, calm, collected and quite friendly was my impression of Leah Newman as she casually stepped into my Industrial Engineering (IE) 313 lecture on the first day of class. She stood professionally poised in front of us, smiled, and introduced herself not as Professor, not as Dr. Newman and not as any other formal title. She stated openly, "Just call me Leah."

Growing up in the south side of Chicago, teachers and friends told Newman that her strong math and science abilities would lead her nicely into a technological career. In high school, she was a member of the Principles Scholar Program which provided many opportunities to visit the Big Ten campuses. Without surprise, after touring the various schools, she strongly favored attending UW-Madison. "I fell in love with Madison's breathtaking campus, diversity of students and the faculty's genuine interest in the students' well being." The following fall, Newman began her first semester as a UW-Madison student.

This is your education and the rest of your life—make us teach
L. Newman

In a whirlwind of enticing fields to chose from in the College of Engineering, many engineering students hop from one to the other in search of their "field of dreams." Newman was no exception. With an initial intention to major in electrical engineering, she secured an EE winter internship with IBM. After this hands-on experience, she decided to explore another path of adventure within engineering, so she investigated the popular field of mechanical engineering and attained a ME internship with Control Data. However, the frustrating search for a field that would spark her interest continued. Realizing than her interests fell in the human element of engineering and helping others, she decided to take the class Introduction to Human Factors, IE 349, with Professor Smith. At that point, she knew her career search was over. She remarks, "Smith took me under his wing and offered much guidance and support." Newman then decided to steer her path into the field of industrial engineering. As she casually states, "The rest is history."

In the spring of 1991, Newman graduated with a B.S. in industrial engineering. Desiring a more specialized focus in her field, she decided to continue on into graduate school where she centered her studies on sociotechnical systems and safety human factors. "My research focused on community ergonomics which eventually was affiliated with my dissertation about underrepresented student populations, mostly Black and Hispanic, in the College of Engineering and how they interacted and wound their way through college." After many years of hard work, dedication to her field, continuous learning and research, Newman received her Ph.D. in the summer of 1997.



Newman takes time out for her students.

"There were many times when I felt intimidated by being a female, as well with being a black female, in engineering." She admits, "I sometimes doubted my abilities and didn't think I was good enough to be an engineer." Newman describes the industrial engineering department as extremely supportive. She mentioned that all her professors and colleagues in the IE department were open minded and more than willing to facilitate her and others' needs. Two IE professors that especially helped guide her through school are Professor Smith, her undergraduate advisor and Professor Carrion, her graduate advisor. She expresses, "They provided guidance, support and resources and they gave me opportunities to take chances." In fact, Newman's favorite class at UW-Madison, Organization and Job Design, was taught by both Carrion and Smith.

Besides the endless study hours required of engineering students, Newman made special time for extracurricular activities. Along with maintaining a job to help pay for school, she volunteered in the Minorities Engineering Office, now the Diversity Affairs office, for 12 or 13 years. The purpose of this office was to provide academic and financial support for underrepresented student populations. One of the most rewarding activities Newman participated in was working for the Minorities Engineering Summer Camp

in Madison. The eight week program drew students from all over the country with a goal to educate the students on different aspects of engineering. Newman taught some math courses and counseled the students, providing them with the proper tools to survive the arduous realm of college. This summer camp ranks number one as her favorite job experience and quite possibly consummated her desire for teaching. Newman also kept active with the Wisconsin Black Engineering Student Society (WBESS) and the National Student Society of Black Engineers (NSSBE). She served as president for WBESS and held the position as chair person in Region IV for NSSBE. Last year, during graduate school, she was the technical excellence chair person for NSSBE Alumni Chapter.

Students usually assume that their "superhuman instructor" has no fears...

Traveling is Newman's favorite leisure activity. Her most recent outing was to South Dakota where she and a friend toured several different historical sights. They visited Native American Indian reservations, saw a new monument being built for Chief Crazy Horse and took a trip to Mt. Rushmore. For her next excursion, Newman and her friend plan to follow the Trail of Tears - the trail the Cherokee Indians took from North Carolina to Oklahoma. Newman is extremely interested in history, especially ethnic history, and spends much time reading about different points in our past. Her latest research constitutes attempting to find out more about a town near Tulsa, Oklahoma, called Black Wall St., where the government destroyed a town that African Americans and Native Americans had built together.

Last spring, Newman assisted Professor Smith as a teaching assistant (TA) in the Introduction to Human Factors (IE 349) class. In fact, she won the Polygon TA of the Year Award for the industrial engineering department. Over the summer, she taught Engineering Economic Analysis (IE 313). This fall, Newman is the instructor for Engineering Economic Analysis and for Organization and Job Design (IE 653), and she is working with Professor Smith in a graduate seminar (IE 816).

"My biggest fear about teaching is that I'm not going to be good enough, and I worry that my students won't receive all that they can from me because I missed something." Students usually assume that their "superhuman" instructor has no fears and retains all known knowledge on the subject matter at hand. Newman, however, admits and reveals to her students that she does not know all the answers. This secret unveiling breaks the stone wall usually formed between teacher and student and allows the students to talk with her on a comfortable level.

"My ideal student is open minded, not afraid to speak up constructively, has a sense of humor and realizes that everyone is human and makes mistakes." Newman stresses the importance of student feedback because she realizes that hearing students' constructive criticism and positive reinforcement on her teaching skills helps her learn from mistakes and acknowledge helpful teaching techniques. Discouraging students from just sitting back, she remarks, "This is your education and the rest of your life — make us teach. I hope that students will leave my classroom wiser about the subject matter at hand or even wiser about some of the useful trivia about life I enjoy sharing with my classes."

Newman holds many aspirations that she hopes to fulfill during her lifetime. Unlike many engineers, she's not interested in working for industry. "I dream of setting up a school for young people that would talk a lot about values and morals and would encompass the entire education process to develop well-rounded kids." Her primary interest is in helping people, especially those who don't have access to certain resources and opportunities. "I want to have a positive impact on people's lives." She would like to go into inner city schools and work on developing programs that would improve, or enhance, the skills of young people. In effect, these young people would have more opportunities and be better prepared to attend college. She states, "I receive extreme joy out of what I am able to do for other people."

"My one wish in life is to have people get along and be equal. Unfortunately, I see a lot of people who miss opportunities because they don't fit a particular mold. I hope for a world where people deal with others based upon merits of man or woman."

Author Bio: Shana Gadlin is a sophomore in Industrial Engineering pursuing her Technical Communication Certificate.

Superior Sailing

By Dan Pierpont

Wind and water bombards your face as the captain screams, "Hoist the number two and reef the main." With your fingers numb and your arms exhausted, it takes your full concentration to stay aboard let alone carry out the orders. As you embark on the longest freshwater sailboat race in the world, more commonly known as the Trans-Superior, you wonder what adventures lie in store.

The Trans-Superior is run every other year in late July and generally lasts between 3 and 5 days. Beginning 28 years ago, this historic race starts in Sault Ste. Marie, Michigan, and ends some 380 miles later in Duluth, Minnesota. The original founders of the race included my grandfather, Dr. John Pierpont, and his friend, Jack Soetebier. Practically a living legend in the Lake Superior sailing community, my grandfather, his seven sons and one daughter have competed in many races on the Great Lakes. Of the seven sons, the youngest remains in charge of the family sailboat, a C&C 35 named the *Chanterelle*. The second youngest, Mark Pierpont has been in every Trans-Superior race held to date.

With such long family tradition in sailing, I set out to follow in the footsteps of my grandfather by participating in the 1997 Trans-Superior. This year's race began like all others, with the whole fleet crowding into the locks below the Sault Ste. Marie dam. The locks proceed to fill with water and float the boats up to the height of the lake. A handful of sailors shimmy up the masts of their respective boats to get a better look. Then through the mist someone begins playing bagpipes. A majestic feeling runs through each sailor as they prepare for the days that lie ahead.

The sheer size of Lake Superior is incredible. If you took all the other Great Lakes and put them together, they would still not equal the size of Lake Superior. If you took Lake Superior and dumped it over the entire continents of North and South America, water would cover the continents to a depth of one foot. When you sail on the Trans-Superior you may not see land for up to two days. The weather conditions on the "Big Lake" are subject to change within minutes. It could be sunny and hot out in the morning, but by lunch time you are fighting a driving rain and thunderstorm. After all, remember the *Edmund Fitzgerald* which sank as a result of the crazy Superior weather. With the high probability of fierce weather, a "superior" sailor always has to be ready for the improbable because it will happen on the "Big Lake."

The longest freshwater sailboat race in the world, more commonly known as the Trans-Superior, starts in Sault Ste. Marie, MI, and ends 380 mi. later in Duluth, MN.

The Chanterelle sails under full spinnaker toward the finish line.

Since the Trans-Superior generally occurs in the last week of July, one would think preparation includes a T-shirt and shorts. Fortunately, I knew from hearing countless stories that I would need much more. At some points during the race, I was wearing two shirts, a sweatshirt, a life preserver, a rainjacket and an insulated life-preserver jacket. Despite all that gear, there were still times when the cold penetrated the layers. One of my uncles has even been known to bring a snowmobile suit on the race.

Throughout the race, it constantly struck me how sailing technology has changed from when my grandfather raced across the "Big Lake." For example, we had a Global Positioning System (GPS) installed aboard the boat. It is about the size of a small calculator and determines your exact latitude and longitude, by linking with eight satellites. In addition, the GPS can relay your speed and direction. The GPS enabled the crew to know their exact location at all times during the Trans-Superior.

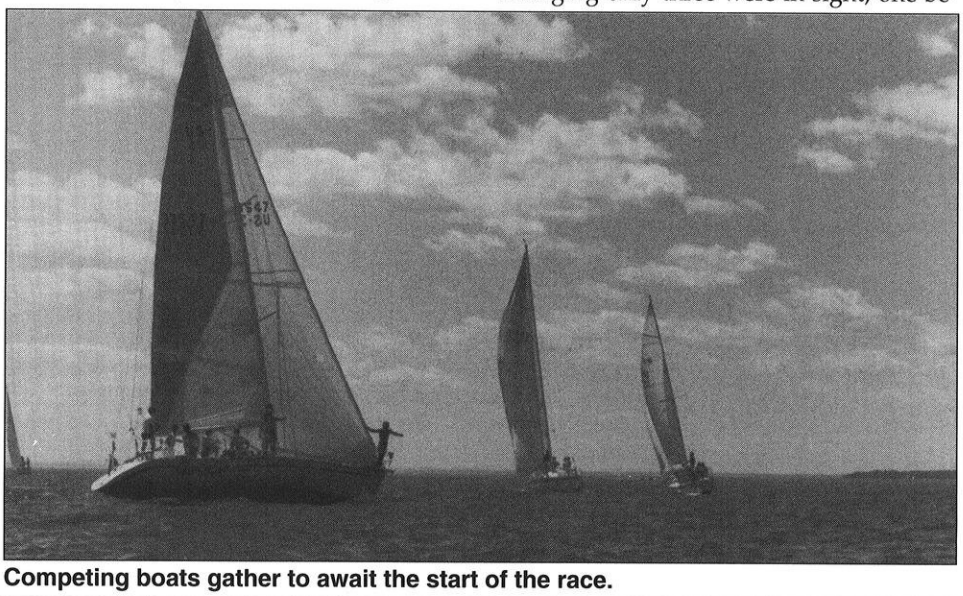
It constantly struck me how sailing technology has changed from when my grandfather raced across the "Big Lake"

Cellular phones have also added to our current technological capabilities. My uncles were able to call home to check in with their wives and kids when the sailboat was 75 miles from the nearest harbor. Some of the boats were even equipped with lap top computers. Using the computers, sailors can

check the Internet for weather information to determine what wind will be prevailing the next morning. In fact, it was argued prior to the captains' meeting whether using the Internet was a legal procedure for racing boats. A web page was established on the Internet which tracked the boats as they maneuvered across the Lake. However, since not all the boats had Internet access, it was ruled that one could not use Internet to determine the position of other competing boats. Any technological advantage could be very important in a sailboat race. The most famous sail boat race, the quest for the America's Cup, provides a case in point. The America's Cup teams are constantly looking for the newest and fastest boats by implementing the latest technology in design, construction, navigation, as well as training and execution. A sound knowledge of sailing principles is the foundation on which all sailing strategy is built. In order to win the race, one has to combine the new technology with experience, sailing skill and the savvy of the old time mariners.

For this year's race, we started out at a disadvantage to the rest of the fleet. The *Chanterelle* is 26 years old, which is ancient history in modern sailboat design. The *Chanterelle* is 35 feet long, which is about the average length of this year's fleet. Some of the larger boats measured 52 to 70 feet long. Since the larger boats are often much faster then the smaller boats, a handicap system is used make a race fair. Comparable to a golf handicap, the boats are handicapped using a complex formula that takes into account the size, sail area and other aspects of boat design. The fleet is also divided into four classes to allow competition among boats of similar ratings.

As the third day of the race began, we finally started to emerge from a dense fog which had enveloped the lake up to that point in the race. Before entering the fog, we were neck-n-neck with 20 other boats, but upon emerging only three were in sight; one behind and two ahead. We battled a light and variable wind the entire day, gradually closing in on the nearer of the two boats in front of us. With Uncle Mark at the helm, we proceeded to pass and left the boat to our stern. Upon the dawn of the forth day we found ourselves without wind and in the doldrums. We made a valiant effort to catch the lead boat for our class, but we were stalled a few miles outside the finish line. Finally crossing the finish line, on the morning of the fifth day, we were pleased to discover we had secured second place. Leaving Duluth later that day, I was filled with a great sense of accomplishment and began thinking that the next Trans-Superior race may not be as forgiving.



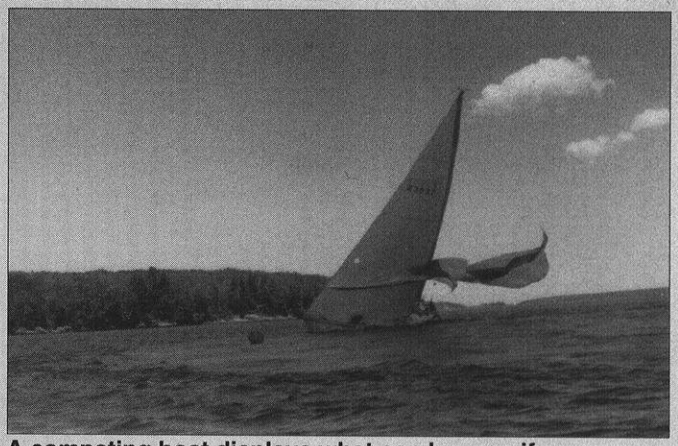
Competing boats gather to await the start of the race.

Physics of Sailing

Sailing operates on the same physical principles as an airplane wing. The sail, like an airplane wing, creates a pressure difference because it takes longer for the air to go around the outside than the inside. The pressure difference created by the sail, in the cases below, pushes a boat to the right and forward. In order to keep the boat moving in a straight line, it needs a keel. The keel prevents the boat from slipping across the top of the water.

The fastest speed for a given sailboat is 90 degrees from the wind direction. When the destination is not 90 degrees from the wind direction, the sail and rigging needs to be changed so the boat will move properly. For example, spinnakers are a type of sail used when you are sailing downwind. They are usually colorful and look somewhat like a parachute. The rigging and control of a spinnaker is very complex, especially on larger boats, and can often lead to problems during the course of the race.

Of course, a sailboat cannot go directly into the wind. In order to sail to a destination directly upwind, you must 'tack' back and forth. To accomplish this one must first go 45 degrees to the right of the target (with the wind coming over the left or "port" side of the boat), then "tack" back again 45 degrees to the left of your destination (with the wind coming over the right or "starboard" side of the boat). Thus, to traverse 380 miles measuring from Sault Ste. Marie to Duluth 'as the crow flies", the sailboat may well cover over 450 miles of water.



A competing boat displays what can happen if a spinnaker is not properly rigged.

Learning to Sail

Sailing is something that everyone can enjoy with only a little help. Getting involved is easy, especially on campus in Madison. The Hoofers Sailing Club provides an excellent opportunity to learn more about sailing with a relatively simple program that can enable even a beginner to get out and sail in minimal time. The Hoofers sailing events are enhanced by evening cookouts and other social events. For more information on Hoofers call their hotline at 262-1630.

Author Bio: Dan Pierpont is a senior in chemical engineering who thinks "life is too short—sail hard."

Photos courtesy of Dan Pierpont.

In the next issue of the *Wisconsin Engineer*:

Take Control Before the Study Monster Eats You Alive

The Washburn Observatory: 120 Years of Heralded History

The Cutting Edge of Wireless Communications

The Future of Communication Technologies

Late night at the CAE

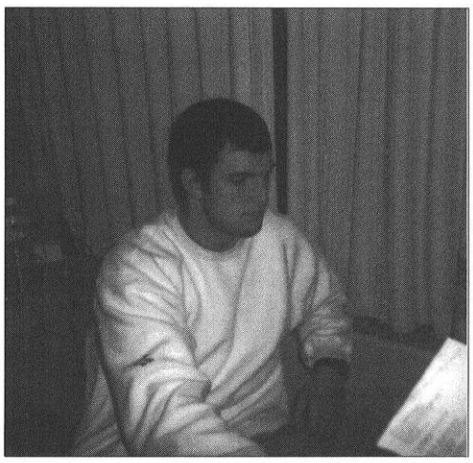
Datagration

Knowing Where the Field and Classroom Ends

By Trent Nelson

Sure there's more to life than football, but not much." It is hard to disagree with this quote as it hangs above the computer in my dorm room. The poster on which this quote appears includes Brett Favre, Reggie White and the world renowned front of Lambeau Field. As a person reads the quote and views Brett and Reggie, it becomes increasingly difficult not to agree with the poster and its bold statement. Many of the football players at UW-Madison can completely relate to this poster, yet one of their own would probably disagree with them. Sam Mueller, a sophomore defensive end and mechanical engineering student, sees beyond Camp Randall and knows that football may not always be there for him.

The son of David and Mary Mueller of Fond du Lac, Wisconsin, Sam Mueller played football and basketball at St. Mary Springs in Fond du Lac. He has a sister, older brother and younger brother. When asked about the prospects of his younger brother playing college football, Sam said with a grin that he hasn't put too much pressure on his younger sibling. Their father is doing enough of that by being a very proud parent!



Mueller spends a good portion of his free time staying caught up in his engineering classes.

Although Sam had offers from smaller schools to play both basketball and football, Sam opted for Wisconsin feeling that the educational opportunities here were second to none. He was red-shirted his freshman year but is now a second string defensive end behind John Favret. Special teams, though, is the place where Sam truly shines. He is on the first team for kick returns and extra points. Just like any other college football player, Sam dreams of entering the NFL, but at this moment, he's happy being a Badger football player and a mechanical engineering student.

One might have a hard time believing that Sam plays a sport and handles what many students and faculty believe to be the one of hardest majors on campus. After calculus and physics, I know I couldn't imagine being in a sport and taking classes like these at the same time. I asked Sam for a run down of a typical day in his life, wondering just how he balances his studies and football:

6:45 a.m. to 7:00 a.m. — Wake-up and grab a quick breakfast.
7:15 a.m. to 9:15 a.m. — Lift weights.
9:55 a.m. to 2:00 p.m. — Classes.
2:30 p.m. to 4:00 p.m. — Football team meetings.
4:00 p.m. to 6:30 p.m. — Practice.
7:00 p.m. to ? — Dinner and studying.

Sam must be doing something right, despite this rigorous schedule. He received a perfect 4.00 GPA in his first semester. Excelling in the classroom has paid off for Sam as he is already in the department of mechanical engineering, even though he's only in the first semester of his sophomore year. Balancing the stresses of both classes and football is important to Sam, because he wants to continue to excel at both. "Football practice is a great escape from class but on the other hand it's kind of nice to be able to relax in class." The football games are a different story though. Sam said, "I would rather be at the game then in the classroom."

Speaking with Sam after he had just finished practice and listening to this athlete speak intelligently was refreshing. School first, football second. To have his head on so straight is an outstanding achievement, not to mention all of Sam's other accomplishments. Sam Mueller does something that will surprise all the die hard football fans and players of the game; he proves there is much more to life than football.

Author Biography: Trent is a sophomore majoring in engineering mechanics. His favorite way of relaxing is playing golf.

More Engineering Athletes

Caroline Brandt CE W.Crew
Michele Burkholder IE W.Basketball
Rachel Clark ChE W.Crew
Brian Doherty ME M.Soccer
Hickory Foundray ME M.Crew
Edgerton Hartwell II EE Football
Brian Hertzberg ME M.Crew
David Hwang ME M.Crew
Nicholas Latona MSE M.Crew
Jeffrey Maples CE M.Crew
James Mosey ME Wrestling
Samuel Mueller ME Football
Steven Neumann IE M.Crew
Alexander Palmer CE M.Crew
Christopher Paulik ME Football
Julie Reisman ME W.Golf
Duncan Roberts ME M.Crew
Nicholis Schilling CE M.Crew
Jason Skagen ChE M.Crew
Rebecca Stuckman ME W.Crew
Karin Swanson ChE W.Crew
Rozamond Sweeney ME W.Tennis
Timothy Teske ChE M.Crew
Todd Wilson ME M.Soccer
Corinne Zancig ChE W.Crew

This list was compiled from rosters listed on the Athletic Department web page and information from the Registrar's Office. The following rosters were not listed:
M. CC, M. Golf, M. Swimming, M. Tennis, M. Track, Softball, W. Track.

JUST ONE MORE

VIRUS WARNING

If you received an e-mail with a subject line of "Badtimes," delete it immediately without reading it. This is the most dangerous E-mail virus yet. It will rewrite your hard drive. Not only that, but it will scramble any disks that are even close to your computer.

It will recalibrate your refrigerator's coolness setting so all your ice cream melts and your milk curdles. It will demagnitize the strips on all your credit cards, reprogram your ATM access code, screw up the tracking on your VCR and use subspace field harmonics to scratch any CDs you try to play.

It will give your ex-boy/girlfriend your new phone number. It will mix antifreeze into your fish tank. It will drink all your beer and leave its dirty socks on the coffee table when there's company coming over. It will hide your car keys when you are late for work and interfere with your car radio so that you hear only static while stuck in traffic.

Badtimes will make you fall in love with a hardened pedophile. It will give you nightmares about circus midgets. It will replace your shampoo with Nair and your Nair with Rogaine, all while dating your current boy/girlfriend behind your back and billing their hotel rendezvous to your Visa card.

It will seduce your grandmother. It does not matter if she is dead, such is the power of Badtimes. It reaches out beyond the grave to sully those things we hold most dear.

Badtimes will give you Dutch Elm disease. It will leave the toilet seat up and leave the hairdryer plugged in dangerously close to a full bathtub. It will not only remove the forbidden tags from your mattresses and pillows, it will refill your skim milk with whole.

It is insidious and subtle. It is dangerous and terrifying to behold. It is also a rather interesting shade of mauve. These are just a few signs.

Be afraid. Be very, very afraid.

- source unknown

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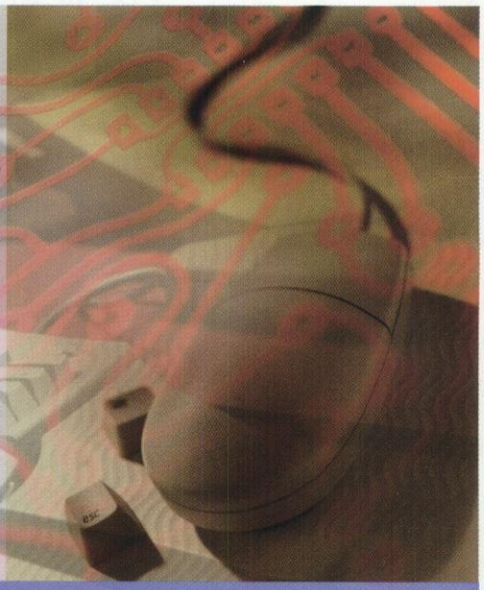

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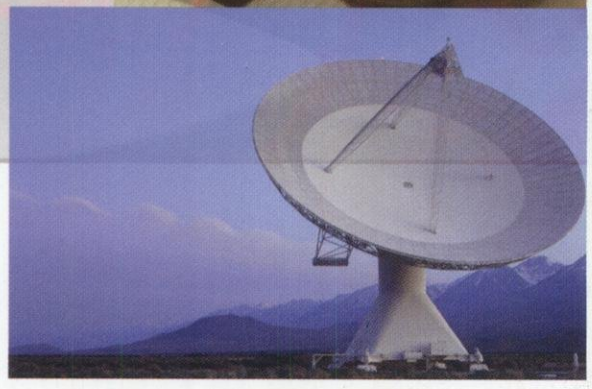

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writers

The ***Wisconsin Engineer*** is published by and for the students of the University of Wisconsin-Madison. It is distributed throughout the Engineering Campus and to specific science and math buildings. It is also mailed to our subscribers and to every high school in the state. The *Wisconsin Engineer* covers news and events, organizations, faculty, students and much more. As we enter our **102** year, we are hosting the Engineering College Magazines Associated 1998 Conference. ECMA is a national organization that provides communication and resources among similar engineering college magazines. In 1997, the *Wisconsin Engineer* was named **Best All-Around Magazine** by ECMA. We plan to continue this tradition of excellence.

We are currently seeking members for our **advertising, writing and graphic art** staff. Individuals with or without experience are welcome. Please contact the *Wisconsin Engineer* by email at **wiscengr@cae.wisc.edu** or by phone at **262-3494**. One may contribute to the *Wisconsin Engineer* as a volunteer or as a student in Engineering Professional Development. EPD 690 is a one credit course that will meet on alternate Wednesday nights during the 1997-98 Spring semester. Please don't wait till then, drop us a note or give us a call **today!** Or, please come to our next general staff meetings on November 19, December 3 and December 10, at 7 pm in General Engineering Room 1.

As always, we welcome all individuals to join our other departments, including production, web, business, circulation, photography, and history.

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