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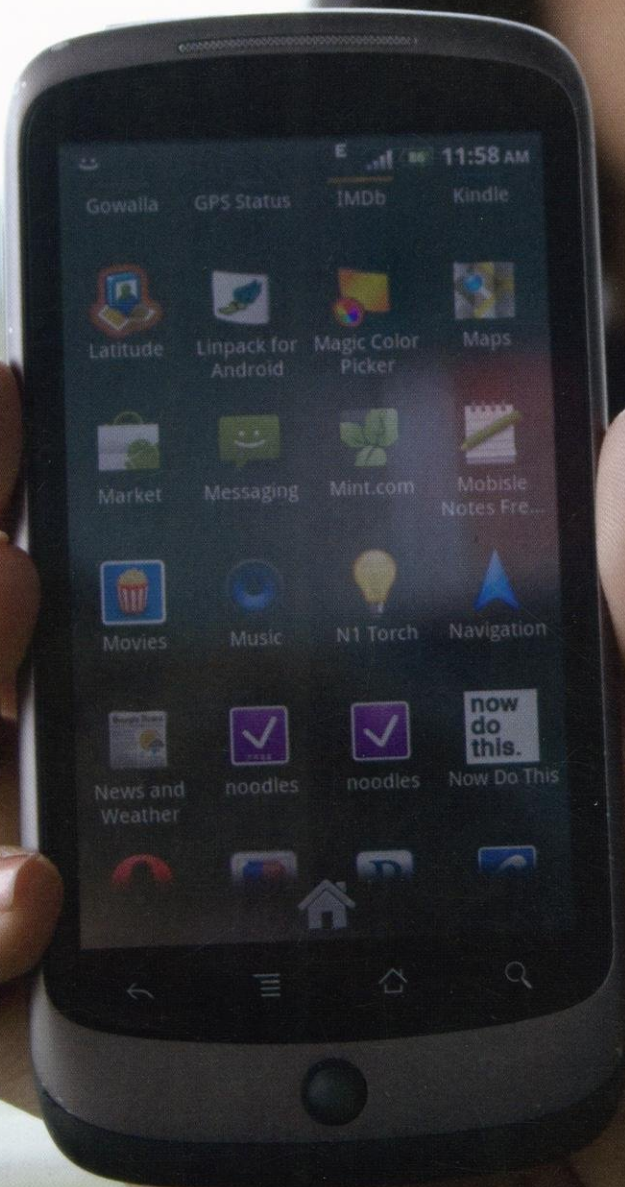
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Wisconsin engineer

SEPTEMBER 2010

VOLUME 114, NUMBER 4

**There's a
class for
that p. 10**



Also inside:
Greek life p. 4
Stimulants p. 6
Confidence 101 p. 22



Letter from the editors

This first day of class this year was marked by chilling gusts of wind that brought with them the shuddering reality that summer was over. Students flooding the streets, downtown businesses waking from hibernation and magazine business back in full blow—the juggle of classes, work and extracurriculars has returned.

Our last semester's staff worked hard to put together the stories, photos, layouts and advertisements you see within the pages of this magazine; just as important, but perhaps not as visible, were our staff's efforts in managing our business finances, circulation and website. This is not an easy accomplishment considering the demands of student life—to name a few, involvement in philanthropy (see page 4) and undergraduate research (see page 16). Late nights, forgotten meals—it becomes clear why students rely so heavily on stimulants (see page 6).

We are kicking off this new school year with a full-color issue, a feat that would not have been possible had it not been for the funds we received from the Associated Students of Madison (ASM), UW-Madison's official student government. We are excited about this opportunity, since it allows us to showcase the efforts of our staff. In the future, we hope to make full-color issues a more regular occurrence. As always, we are striving to make this magazine better each year. **WP**

Victoria Yakovleva

Nelly Piironen



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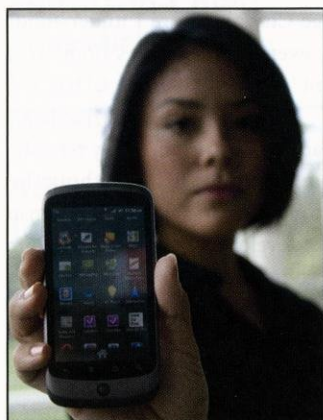
Feature

10 There's a class for that

Computer Science 638 challenges students to develop innovative and functional mobile phone software.

By Steve Nelms

General



Cover photo by Brian Mogen

4 It's all Greek to me

Members of three UW-Madison fraternities and sororities discuss camaraderie, employment opportunities and how they give back to the community.

By Zach Laporte

6 Studying with stimulants

A survey of students' use of stimulants.

By Lauren Kern

12 Portability vs performance

Is the convenience of a laptop worth sacrificing the superior performance and lower cost of a desktop computer?

By Nathan Galep & Joshua Dawson

14 Beyond the classroom

Three engineering students swap their textbook and naps for memos and coffee breaks, taking a corporate swing at education.

By Kelsey Coleman

16 Lifting the capstone

A look into one of the most notorious courses in the engineering curriculum: senior design.

By Casey Sennott & Vindhya Venkatraman

18 More than just manure

Two UW-Madison undergrads investigate E. Coli amidst mounds of poop.

By Davie Beirman & Kate Slatterly

22 Confidence 101: life lessons with Professor Park

Civil and environmental engineering Professor Jim Park makes his case for why students should be the focus of professors.

By Marcus Hawkins

Commentary

2 Editorial: Smells like home

By Carrie Boecher

24 Just one more: How to impress a prospective employer

By WE Staff



Smells like home

the deep blue expanse of Lake Mendota, enjoying the shade of a bright green tree, I had to think, how lucky are we to live here?

This is hardly an original thought. Most UW-Madison students are eager to boast about their college home, with its unique blend of nature, culture, academia and fun. But, like clean air, it can be taken for granted. In his 1974 song "San Diego Serenade," Tom Waits croons, "I never saw my hometown until I stayed away too long," and when I returned to Madison for fall semester, I understood exactly what he meant. For Madison, I'd always felt a sense of pride, but when I came back from Kansas, I had a brand new feeling: gratitude.

This isn't to say that Dodge City was a bad place (aside from the stink, of course); it worked just fine for the people who lived and labored there. Like good hosts, they, too, had a sense of pride about their town, and especially about their country roots ("You've never ridden in the back of a pick up truck?" one contractor asked me incredulously as I shook my city slicker head in shame). But there were moments throughout the summer—maybe too many of them—when I wondered how anyone would ever actually choose to live there.

Then, two weeks before I left, I met Dan. Dan was one of the operators at my plant, a self-proclaimed hippie (although his Wranglers and steel-toed boots didn't exactly scream "hippie" to me) who'd lived in Dodge City all of his life. He was a talker, with fiery red hair that seemed impossibly vibrant for his sixty years of age. I spent one beautiful July day accompanying Dan around the complex to check on our groundwater wells, and as we talked and toured, I finally

understood how people survived in a town like Dodge City.

First we drove by the little bungalow where Dan grew up, which sat on the Arkansas River bank. He showed me the mud marks on the side of the stucco marking the flood waters that came through when there was actually water in the river. On the way back to the plant he drove us to the park where he would lie in the grass as a teenager and shoot jack rabbits, and where he once saw a bobcat take down a deer. Dan knew the name of every bird that flew by and every snake that slithered by, and had a story for each and every kind. Dan showed me the correct way to munch on a piece of freshly picked wheat, and even wrangled up some berries from a bush near the river. Finally, he showed me his favorite fishing spot, where he and his brother spent almost every summer day growing up. The more Dan told me about his life in Dodge City, the more I understood: home is home, even if everybody's home is a little bit different.

So while the Madison air was certainly refreshing after my summer on the plains, I think the best part of coming back was feeling that sense of comfort I've developed over the last four years. And as I go into my last semester on this beautiful campus, it's comforting to know that I can come back anytime, and it will always feel (and smell) like home. **WB**

Carrie Bunnell



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It's all GREEK to me

Members of three UW-Madison fraternities and sororities discuss camaraderie, employment opportunities and how they give back to the community.

Greek life has always had a bad rap, especially when it comes to Hollywood. From *Animal House* to *Legally Blonde* to *Old School*, movies have suggested that living in a fraternity or sorority is like spending a weekend with the cast of *Jersey Shore*. Luckily, the tired Greek life stereotypes—beer! bros! bad grades!—are giving way to more respectable perceptions, but many UW-Madison students still don't know what goes on behind closed doors. To set some facts straight, we decided to investigate three Greek organizations on campus: the non-engineering Alpha Phi sorority, the engineering Triangle fraternity and the engineering Alpha Omega Epsilon sorority.

Our first stop was Alpha Phi. I wondered what the reception would be like as we entered the all-female residence at 28 Langdon, where a social was taking place. While Alpha Phi is not itself an engineering sorority, our host, Kate Slattery, is a mechanical engineer.

Upon entering the Alpha Phi house, I couldn't believe this was even student housing. To my left was the main room with a fireplace and a baby grand piano, to my right a staircase leading upstairs to bedrooms. Adorning the walls were large frames, each filled with about a hundred portraits of the current members. There was a frame for each year of the sorority's existence. Further down the hall on the right, we

entered a study room with open double doors. Placed around the room were plush leather couches and coffee tables.

Like many second-year members, Slattery is living in the Alpha Phi house this year. She explains some of the events that she and the other Alpha Phi's participate in each week. "During the week, we have dinners for different things or meetings for other activities we are in," she says.

It is often during the second year that strong ties are born among members. Over winter break, Slattery went on a trip to London. "I went with people I just met this year," she says. It is spontaneous experiences like this that make her enjoy being an Alpha Phi sister.

At the Alpha Phi sorority, members have devised a simple way of helping the younger girls ease their way into college life. Every year,

freshmen are assigned a sophomore "big sister." These big sister-little sister relationships turn into entire families of sisters over the course of one's four-year education.

Although Alpha Phi is a standard sorority, some of the Greek organizations are built around a single theme or academic focus. For instance, on the opposite side of campus, I found the embodiment of young professionalism in the men of Triangle fraternity. Their purpose statement is as follows:

"Developing balanced men in engineering, architecture, and science by providing an environment which fosters personal growth and professional success."

Logan Campbell is the president of Triangle fraternity, and has been a member since 2005. After serving in the U.S. Army, he sought the type of brotherhood that had been missing since his time in the military. "It was easy for me to relate to more mature students than to the freshmen that I was in class with at the time," Campbell says of his draw to the fraternity. One way the members of the fraternity embody professionalism and maturity are through mandatory afternoon study sessions.

Of course, Triangle frat isn't all business. With their location on Breese Terrace, they have a prime location for football tailgating. In fact, tailgates



Mechanical engineering sophomore Kate Slattery squeezes in a few more minutes of studying before evening activities

draw a lot of Triangle alumni back to campus each fall. Alumni interaction with the students offers great prospects for possible future employment or business opportunities. Since most former alums work in the science and engineering fields, this type of social networking can provide a lot of good options for the future.

When they aren't holding their daily study sessions, Triangle members can be found participating in intramural athletics. "Right now, we are in co-ed intramural volleyball," Campbell says. In the past they have also played hockey and flag football, which ultimately provide a unique bonding experience among brothers. They usually only have time in their rigorous academic schedule for one sport per semester.

Triangle is also an official member of the Greek Society of Fraternities. Every semester they participate in Greek Week, an entire week of competitions and events involving all of the Greek fraternities and sororities on campus. Events are similar to those that occur within other organizations around Homecoming week, such as building floats for the parade. Displaying school spirit during the homecoming parade has been a rewarding experience for these young students.

Few people on campus are aware that there is actually an engineering sorority on campus. These young women don't even have a house to call their own yet because they have only been in existence for around six years. Despite Alpha Omega Epsilon's relatively young age, they do many of the same types of events as the older societies.

Philanthropic events, or events that promote human welfare, are considered one of the most important types of work that these young men and women participate in. For example, every semester, the women of Alpha Omega Epsilon hold a volleyball tournament in order to raise money and awareness for breast cancer. This semester Alpha Phi held a 5k run/walk in support of women's heart disease research.

One of the aspects of Greek life that is most shrouded in mystery is initiation. For all Greek organizations, the limitations of initiation are made very clear to keep safety a priority. Slattery said during Alpha Phi's big sister-little sister week, even games of hide and seek violate the terms of their hazing rules. If rules such as these are violated, they may lead to suspension or expulsion of the fraternity or sorority.

For their initiation, Triangle fraternity members participate in a ritual that closely examines the standards of the fraternity. The new

pledge is told exactly what is expected of them as a student and a man while they are brothers in Triangle fraternity. When asked about hazing, Campbell says, "Our [initiation] isn't like that. We don't have any of the movie initiations with paddles or nonsense like that."

More than anything, participating in a sorority or fraternity allows members to create lifelong bonds and establish strong networks. "I'm going to be in two weddings this summer for two guys that graduated," Campbell says

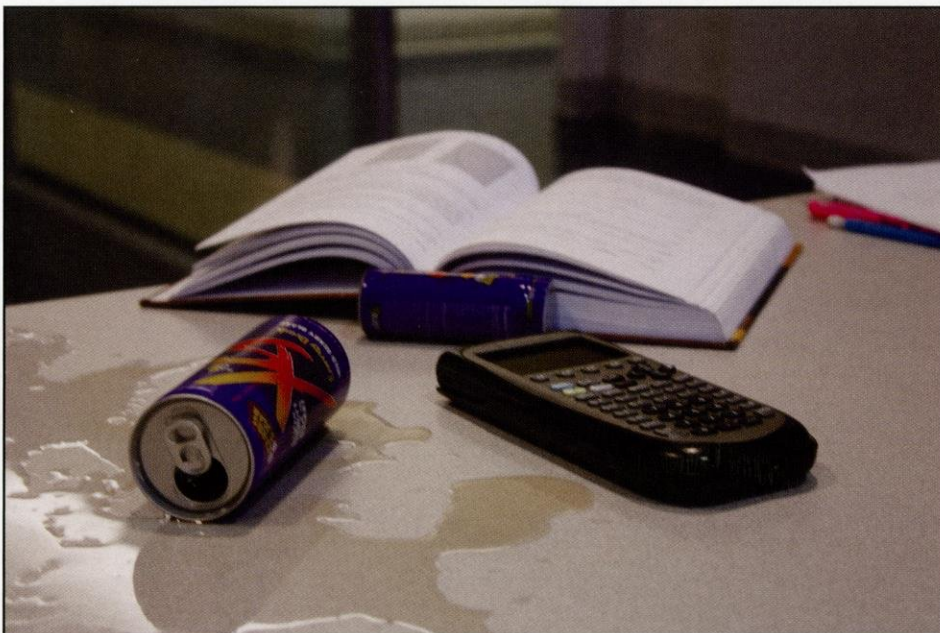
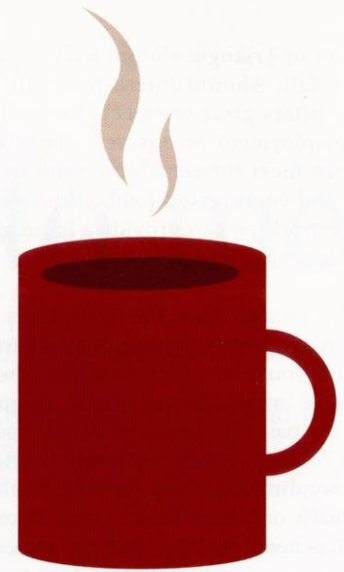
of his own friendships born from the Triangle fraternity. Unlike the booze-fueled Greek organizations of Hollywood yore, the core values of UW-Madison fraternities and sororities are based around professionalism and friendship—not kegs and cat fights. **We**

Article by: Zach Laporte
Photography by: Brian Mogen
Design by: Jacqueline Lowisz



Studying with STIMULANTS

Pulling an all-nighter with a cup of joe



obvious truth: caffeine to a college student is like gasoline to a car. It is the driving force that keeps students going, keeps them awake and keeps them working. Kemp is just one of the many students fueled by coffee. While many people develop their coffee-drinking habits during college, Kemp actually began drinking coffee in high school.

"It began as a social thing ... just going to coffee houses to talk and socialize," he says. He started consuming more coffee in college, often drinking a pot every day. "It definitely picked up a lot more in college because I use it for more purposes ... like studying," he says. On nights when Kemp is cramming for exams or cranking out a paper, he will drink at least one pot during the evening, then sometimes an additional pot of coffee throughout the night. He says, "I start right around dinner time ... and depending when—or if—I want to sleep, it could be another cup or two, or even a full pot." There are countless college students that can relate to Kemp and find themselves needing caffeine to provide extra energy and focus for a night of studying.

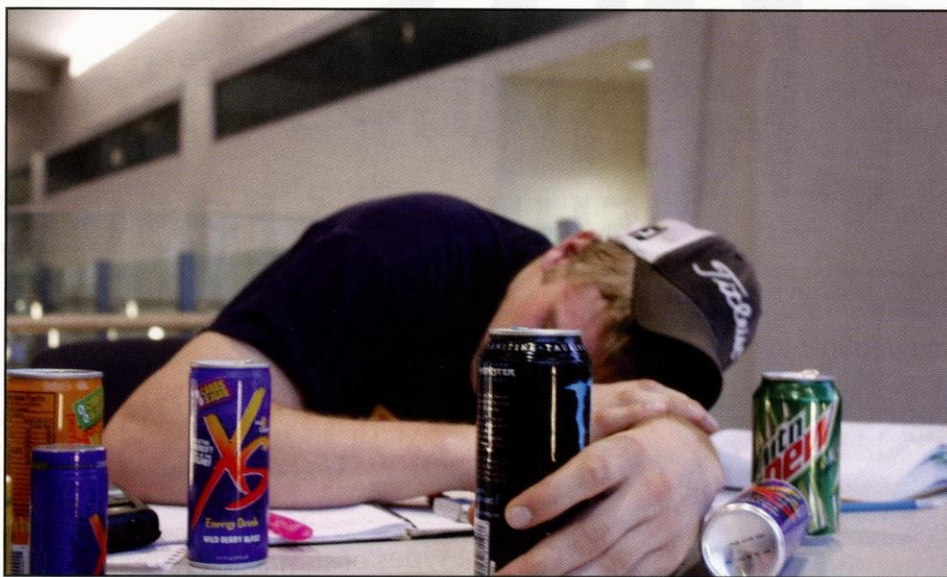
Hunched over a textbook and several empty coffee cups, UW-Madison senior Keith Kemp fights to keep his eyes open. It's now approaching the wee hours of the morning, and he hasn't gotten a minute of sleep in almost 24 hours. Finally, when he can no longer hold his head up, Kemp relents. He closes his book and gets up from the table, but instead of falling into bed, he cruises into the kitchen and clicks on Mr. Coffee. Time for more caffeine!

Cramming for exams and writing countless papers are activities all too familiar to the average college student, and it is no secret that many students turn to various stimulants to

conquer their heavy workloads. The most prevalent stimulant is coffee, but if you aren't a fan of a cup of joe, there are plenty of options ranging from energy drinks and gum to pills and prescriptions, all promising to provide hours of energy and focus. However, as the market for stimulants expands, the concerns rise as the safety of these products becomes more questionable.

Coffee is one of the oldest and most common stimulants on the college campus. It is readily available, and the high level of caffeine offers an immediate boost for many. A glance at vending machines and cafes across campus offers the





However, some scientists argue that pumping excessive amounts of caffeine does little to promote good study habits. Some researchers believe caffeine can have a negative effect on the body, and ultimately even a negative effect on studying. To put caffeine dosage in perspective, the average daily consumption of caffeine is about 400 mg, and a “toxic” dose would be about 10,000 mg. The amount of caffeine in a 7 oz cup of coffee varies, but typically ranges from 50-150 mg, depending on strength, brand and so on. It would take many cups of coffee to reach a “toxic” level, but some researchers argue even having an excess level of caffeine can interfere with one’s studying abilities.

Caffeine is a stimulant that interferes with a chemical in the brain called adenosine. Adenosine slows down activity and has a calming effect, so higher consumption of caffeine blocks adenosine and raises concentration and energy while putting off sleep. However, there is a point where too much caffeine can make a person so hyperactive that he/she cannot sit still and focus, and at this point studying is hampered rather than helped. Some studies have shown that caffeine enhances the ability to do simple arithmetic tasks, but can inhibit the ability to do more complex problems. Ultimately, most research has shown that effects from caffeine depend on the individual, and there is no clear-cut answer regarding the effects of caffeine on one’s study habits.

College students are some of the first to counter claims that excess caffeine may have an adverse effect on studying. Kemp explains that the effects of drinking so much coffee do benefit his studying. “Specifically, when I’m reading, I am not dozing off,” he says. Like Kemp, many students feel positive effects from drinking additional caffeine. For some, this may translate into a more focused and

productive study session, but for others the blockage of adenosine may lead to restlessness and an inability to concentrate.

In addition to coffee and caffeine, some students may turn to more controversial—and sometimes riskier—stimulants. In recent years, the use of Adderall, Ritalin and other prescription stimulants has increased dramatically. According to a 2005 study by the University of Michigan’s Substance Abuse Research Center, ten percent of college students use stimulants illegally at some point during their college years, usually with the intent of improving focus and concentration.

One anonymous UW-Madison student who has taken Adderall several times says, “I use it to stay more focused and to get things done.” The student has tried the drug multiple times and found that he was able to stay focused on a task for many hours at a time. “I was able to sit down and write a paper and study during a seven-hour span,” the student says. He found the drug gave him the ability to concentrate and not get distracted, but there were some side effects associated with taking the it. “The crash was bad because I felt very tired and hungry,” the student says; but, in the end, the benefits outweighed the drawbacks. “It was worth it for me because I was able to focus on studying for nearly eight hours.”

Drugs like Adderall have a unique effect on the brain that results in the ability to focus and concentrate. Craig Berridge, a professor in the psychology department at UW-Madison, has a background in neuroscience, and is studying the behavior of certain transmitters in the brain and their actions under moderate to high arousal. Berridge explains that stimulants, specifically amphetamines like Adderall, have been studied for over 30 years, but mostly only in

high dosages. Berridge began to study the effects of lower dosages of amphetamines to treat ADHD. His findings showed that drugs like Adderall had similar effects on people without ADHD as they did on those with ADHD.

“[The drugs] improve your attention and act as cognitive enhancers on things that are dependent on a particular part of the brain called the prefrontal cortex,” he says. The prefrontal cortex is the part of the brain responsible for keeping you on task and preventing you from being impulsive or distracted.

As far as negative effects of taking Adderall or other amphetamines, there is concern about using these drugs without a prescription as a means of improving academic performance. As with any drug taken without a prescription, there are risks. Professor Berridge says, “We know there are minimal risks associated with taking low doses of these drugs ... but where you get big risks is when people start to take doses that aren’t clinically appropriate.” Many college students seem to be willing to face these risks for the benefits of their studying, however.

In addition to the potential physical harms of prescription stimulants, there are also legal problems. According to the Controlled Substance Act of 1970, possession of a drug like Adderall without a prescription can result in fines or even imprisonment. Punishments can be much stiffer for those selling the drug, including fines that may reach as high as \$2 million.

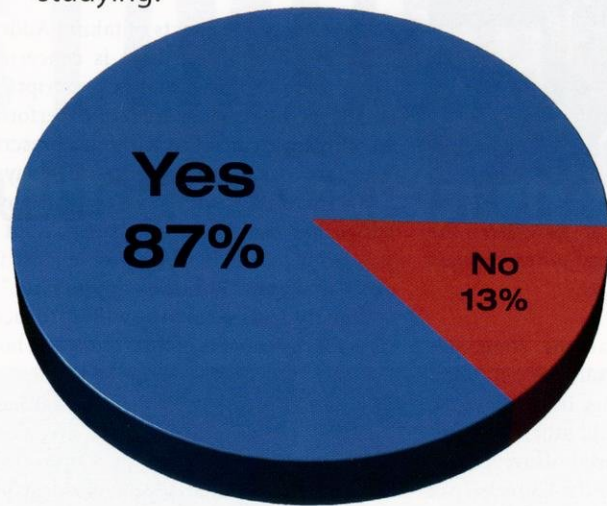
When finals time or a particularly busy week rolls around, many college students turn to stimulants to help them get things done. While there are risks associated with using these stimulants in excess, the risk of failing an exam or not finishing a paper might be more detrimental. There really is no answer as to whether stimulants are a beneficial study enhancement, and scientific studies haven’t shown a clear-cut results. Whatever the case, downing a pot of coffee or several energy drinks before studying has become the norm for many students. **we**

Article by: Lauren Kern
Photography by: Rachel Ziegler
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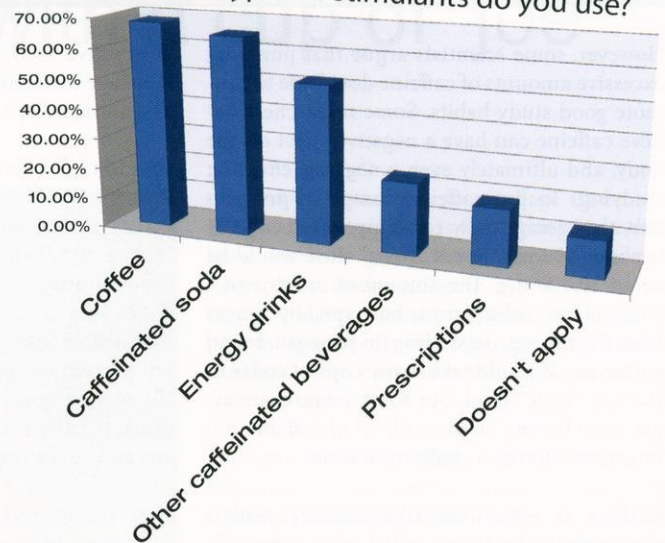
STIMULANTS

survey results

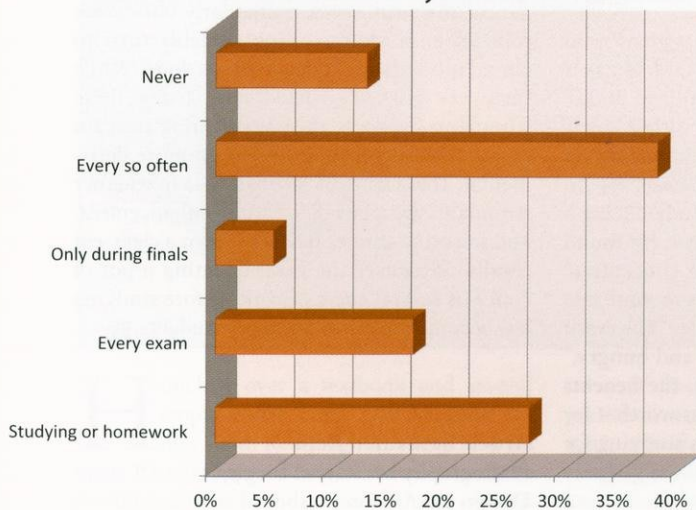
Do you ever use stimulants to aid you in studying?



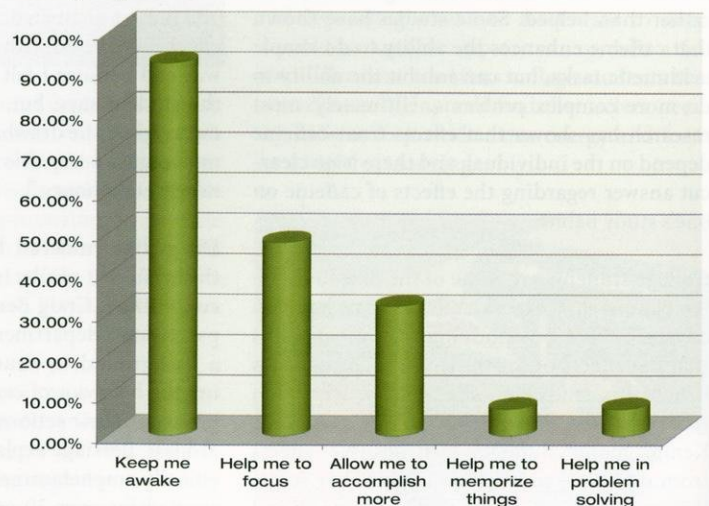
What types of stimulants do you use?



How often do you use stimulants?



How do you feel that the stimulants aid you in your studying?



There were 352 responses to the survey.

Coffee Trivia

- Theoretically, one could die from caffeine overdose after about 100 cups of coffee in a limited time period.
- Caffeine is on the International Olympic Committee prohibited substance list at levels higher than 12 micrograms per liter of urine.
- Coffee beans are actually berries by definition.
- About 75% of all caffeine consumed in the United States comes from coffee.
- In Britain, instant coffee is preferred over brew coffee at a ratio of about 10:1.
- Want fewer bathroom breaks while getting the same kick? A cup of tea has about twice the caffeine as a cup of coffee.



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There's a class for that

*Computer Science 407
challenges students to develop
innovative and functional
mobile phone software*



Engineering and computer science students are often stereotyped as having mechanical and purely concrete ways of thinking, but many times, the most innovative ideas are born in the minds of UW-Madison's aspiring engineers. In order to harness the full potential of all of its students, UW-Madison offers a wide range of courses where students can explore their unique interests and develop their individual talents. A new computer science class, Computer Science (CS) 407, has further opened doors for students.

CS 407 was recently formally adopted by the university as a regular course, previously it was the exploratory course CS 638. This course is the brainchild of professor Suman Banerjee, and taps into the emerging world of high-tech mobile devices. Banerjee's students learn how to write software for mobile phones, and eventually launch their own working phone applications.

The class explores the iPhone, Android and Windows Mobile computing platforms. The lectures cover all issues concerning mobile devices and mobile applications. For instance, how does one deal with the unpredictability of wireless coverage? Or how do you create an effective yet energy efficient application that doesn't eat up precious battery life?

At the beginning of the semester, each student completes two projects designed to teach about mobile programs and applications. The projects are interesting, but pretty standard for a CS course. The course quickly becomes unique and exciting when the students begin to work on their final project.

Every student designs and creates a working mobile application that will be available to all smart phone users around the world. Some students work individually, while others form groups. The main task for each team is to develop a creative, functional and successful application for the iPhone. By the end of the semester, each team will have launched its application, hoping that it makes it to the "top of the charts."

The class and project are both open-ended, leaving it up to the students to design and create any type of application. This differs from many CS classes, which often have every student working on a similar task. Unlike most courses at UW-Madison, the work that students do in the class will instantly be applicable to the real world, possibly becoming the next Tap-Tap Revenge of the iPhone.

A former student of CS 407, Alex Bird, says that he loves "the cool factor for learning about

something that's cutting-edge and popular. You don't get to do that in other classes." His team is currently working on a real time, real life racing application for runners who are looking to add a competitive edge to their workouts.

Another group in the class is developing software called EZ Speech that is intended to help mute or disabled users to communicate effectively using their phones. The application shows a list of words that automatically adapts to its user's location: for instance, a list of common menu items might appear when the user is in a coffee shop or restaurant. The user simply presses one of the commands and the phone will speak it.

Students have successfully created numerous unique phone applications in just one semester of Banerjee's course. Members of the class found it fun, rewarding and informative. Classes like CS 407, encourage engineers to use their creative abilities in addition to their logical thought. **we**

Article by: Steve Nelms
Photography by: Thai Nguyen
Design by: Patrick Bersch

iPhone 4 vs Droid X

What's the difference

Apple has ruled the world of smart phones with the ever improving iPhone. However, in the past year new companies have challenged the iPhone. Each new challenger seems to possess the qualities to dethrone Apple, but the iPhone itself is constantly improving. Two of the most capable and popular smart phones right now are the Apple iPhone 4 and the Droid X. If you're in the market for a new phone, or are simply curious of how these two stack up, check out these comparisons.

	iPhone 4	Droid X
Manufacturer	Apple	Motorola
Operating System	iOS 4.0	Android 2.1 with Motoblur
Price	\$299 (32GB)	\$200
Processor	1 GHz	1 GHz
On-board storage	16 or 32 GB	8 GB
Size	4.5 x 2.3 x 0.37 in	5 x 2.6 x 0.4 in
Weight	4.8 oz.	5.4 oz.
Camera	5 megapixels	8 megapixels
Talk Time	7 hours	8 hours
HDMI capability	No	Yes
Video Calling	Yes	No
Applications	App Store, 225,000 apps	Android Market, 65,000 apps
WiFi Hotspot	No	Yes

BusRadar for Madison

Team Members: Michael Choi, Aleksandr Dobkin, Christopher Mills

Platform: Android, iPhone

Application Type:
Transportation

Description: The BusRadar mobile application helps users conveniently lookup bus times and bus stop locations for the Madison Metro Bus. BusRadar allows users to lookup real-time bus arrival times and locations in Madison. The application also provides real time bus locations throughout the city. Users can also explore and plan routes and destinations with a visual mapping feature.

Class Notes: None

GoBuzz Mobile

Team Member: Max Lynch

Platform: iPhone

Application Type:
Business - Relationship Management

Description: GoBuzz is a mobile application for a firm, GoBuzz.com that provides relationship intelligence for professionals who need important and timely information about their contacts and clients. For instance, a professional might want to look up information about their contact on the go, before going to a meeting with them. GoBuzz.com was started by Dan Voell and Max Lynch in 2008.

Class Notes: This is first iPhone project that Max has created, and he found it difficult to deal with the different interface elements on the iPhone software development kit.

MapRace (pending)

Team Members: Alex Bird, Alex Delga do, Luke Kahovec

Platform: iPhone

Application Type: Fun/Sports/Running

Description: MapRace is a name-pending mobile application for a real time, real life race. This application acts as a kind of game that adds competition to your outdoor exercise. Users can create a new race or search for an existing race and run against others.

Class Notes: Alex Bird says that he loves the freedom and creativity that CS 407 offers to its students.

IO

Team Members: Dan Fischer, Cody Hanson, David Capel

Platform: Android

Application Type: Game

Description: IO is a top down, scrolling space shooter game. IO utilizes many of the unique Android capabilities, including the touch screen, accelerometer and internet connectivity. IO even offers users the ability to post their scores to their own Twitter page or the official IO page at <http://twitter.com/ioandroid>.

Class Notes: "It's really exciting to be working on the cutting edge of hardware and software, utilizing such exciting social networks like Twitter, to bring together the connected Web 2.0 integrated experience," says Dan Fisher.



Flash back to 1992: your family is bringing home a computer for the first time. Card-board boxes and styrofoam packing are scattered about the room. On the once-barren desk now sits what appears to be another TV with its own mess of wires and a matching cream-colored box on the ground. Someone plugs it in and turns it on. The box beeps and the screen blinks to life. You soon begin to realize that this "TV" responds to your every command, be it through a movement of the mouse or a touch of the keyboard. The future was finally in your home.

Back in the present, that lovable machine that overwhelmed the desk at home isn't exactly the American dream anymore. Today, laptops rule the computing world. Sure, there are still a respectable number of students on campus with desktop computers, but the portability of a laptop is an incredibly attractive feature for on-the-go students. However, that does not always mean that the laptop is the best choice for everyone.

"Last year, I had [a rented laptop] about 90 percent of the year. I would take one back and check one out immediately."

-Chandler Sterling

The immediate allure of laptops is rather obvious. The convenience of a laptop's size allows it to be carried around campus as if it were just another textbook. On campus, courses often require use of the internet, paralleling the nation's general dependence on technology. From downloading assignments and taking online quizzes, to checking Gmail and socializing with friends

on Facebook, computers have become an essential part of a student's life.

Although a quick glance around a coffee shop, library or the Union may suggest otherwise, not everyone on campus has a laptop. Despite the conveniences that prompt many students to bring their own portable computer to college, it is not a necessity. The Department of Information Technology (DoIT) and Computer Aided Engineering (CAE) offer students 18 computing labs around campus, and each computer is equipped with thousands of dollars of software, from Adobe Photoshop to AutoCAD.

For those looking for the mobility offered by a laptop, UW InfoLabs offers an equipment checkout system through which students can rent laptops. We spoke with Chandler Sterling, a junior at UW-Madison, who takes full advantage of the program, even though he owns a desktop computer. "I use the rental program

at least once a week, but mainly for exams. Last year, I had [a rented laptop] about 90 percent of the year. I would take one back and check one out immediately. I didn't always need it but it made [studying] so much more convenient."

Through the campus program, students can check out a laptop at any library and some dormitories for up to three days. In the past, the laptop lending program allowed students to check out laptops as often as possible. Due to the frequency with which some students use the program, a new rule was implemented that now limits students to 20 checkouts per semester. This could force students like Sterling to plan for when renting a laptop is truly necessary. "I think it goes against the purpose of the program. The program exists to supply you a laptop if you need it, not for students to have to prioritize their whole year to figure out exactly when a laptop will be most convenient," Sterling says.



Laptops provide the convenience of studying everywhere, including on Bascom Hill.

For students who choose to purchase a computer, laptops are typically more expensive than desktops but offer the convenience of portability. A new laptop battery can last for several hours. However, over its lifetime a battery's ability to hold a charge depletes. This limits the user to only a few minutes of mobility effectively anchoring the computer to a power outlet. Replacement batteries can be purchased, but they're usually pricey. Rather than buy a new battery, most students turn to one of the best-loved games on campus: a hunt for the open outlet.

Some areas, such as College Library's study rooms, have recently installed tables with enough outlets for as many computer users as there are chairs. Other studying hotspots, however, were built before the electronic charging era, and simply do not have enough space to facilitate the growing number of laptops. In this case, students must get creative to power their laptops. They often take turns using different computers, swapping out chargers and even bringing their own power strips to favorite study spots.

In addition to not requiring a constant search for electricity, desktop computers have other definite

advantages. For instance, desktops shine when it comes to processing, as larger processing hardware fits more easily into the desktops for a lower price than laptops. The way technology progresses, new hardware often starts large and gets smaller (and cheaper) with innovation. If you run processing-intensive programs, such as video editing software or video games, a desktop is often the better choice. You can buy laptops that have the ability to smoothly run these programs, but prepare to part with more of your hard-earned cash.

Another advantage of the desktop computer is the larger screen size, especially for those who work with graphics or design. The biggest screen you'll find for a laptop is usually only around 20 inches, but with a screen that size, you will be giving away a good amount of portability as well. For a desktop, with the right video card, you can hook up an LCD TV or even multiple monitors to satisfy your visual needs. While some laptops can connect to multiple monitors, it seems rather pointless to haul around a monitor just to have a second screen.

The exponential growth of computer users in the past several years indicates that both laptop and desktop models will only become more ubiquitous in the future. Which choice

suits you comes down to personal preference and lifestyle. Desktops are generally more powerful, cheaper for the money, and can boast larger screens, while laptops are for on-the-go individuals and offer the convenience a bulky desktop can't give. For those who prefer not to purchase their own laptop, DoIT and CAE computer labs offer students top-of-the-line computers with software in their labs, and the library offers the rental laptop program for students looking for more portability. Regardless the scenario, a look around campus shows that computers have come a long way since the beige box your parents brought home eighteen years ago. **WE**

Article by: Nathan Galep & Joshua Dawson

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Design by: Sarah Sandock



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Beyond the classroom

Going from backpacks to briefcases

Alright, set aside your physics homework and take a shot at this riddle.

80 percent of all engineering students will do it during their stay at UW-Madison.

60 percent will do it within the state of Wisconsin.

15 percent will travel outside of the Midwest region to do it.

Any guesses?

It is participating in an internship or co-op. Roughly 80 to 85 percent of all engineering students will set their textbooks aside

and forget about final exams to take on the role of a real engineer at some point in their academic careers. No exams, no term papers, no obnoxious 9:30 AM power lectures ... sounds awesome, right?

But are you ready to trade in your backpack for a briefcase? For those students who are ready and willing to take on a real engineering job, the opportunities are available, and Engineering Career Services (ECS) is the best place to find them. Engineering Career Services' main role is to match employers who are looking for co-op students and interns with the students seeking these positions. John Archambault, the director of ECS, believes close to 95 percent of students utilize the services of ECS at some point. Archambault stresses that ECS is a great place to start your search, but encourages students to also "actively search" for research companies and opportunities independently. "The reality is there are three of us [working at ECS] and 3,200 students," he says.

A co-op is generally a six month stint, whereas an internship takes place only over the summer months. ECS requires four things of all internships and co-ops: First, students must have a 40-hour work week.

Second, the internship must involve engineering work. Third, the student must be supervised by an engineer, and finally, it must be a paid position. Many students also have the opportunity to earn credit. Archambault said most participate in internships or co-ops during their junior or senior year, but some do take advantage of

the opportunity sooner. He said General Electric has actually started recruiting freshman for summer internships, hoping to find students who will stay with the company throughout their college career, and who can ultimately be hired full-time after graduation.

Last spring, junior Brian LaQua ditched the rigorous engineering curriculum at UW-Madison to take on the role as an engineer in Rockford,

Illinois. During his semester-long co-op LaQua was able to try his hand at designing and testing ram air turbines, which are the emergency power systems found on most aircrafts. LaQua, who is pursuing a degree in material sciences engineering, says this opportunity gave him a lot of hands-on experience in his field.

When asked what his favorite part of the experience he quickly says, "The meetings. I actually loved the meetings." LaQua says the

"I was able to learn a lot more by actually taking on the role as an engineer and doing the hands-on work I did."

-Brian LaQua

staff meetings allowed him to learn a lot from the more experienced staff members. He also says that his classes at UW-Madison prepared him quite well for his position, and he was able to apply a lot of what he had learned in class to his daily tasks. "I was able to learn a lot more by actually taking on the role of an engineer and doing the hands-on work I did," he says. He also learned a lot about the computing tools he used nearly every day on the job, including Microsoft Excel and UniGraphics. When asked if he plans to work for the same company in the future, he jokingly says, "Well, I guess that is up to them," then adds more seriously, "but I would definitely consider such an offer."

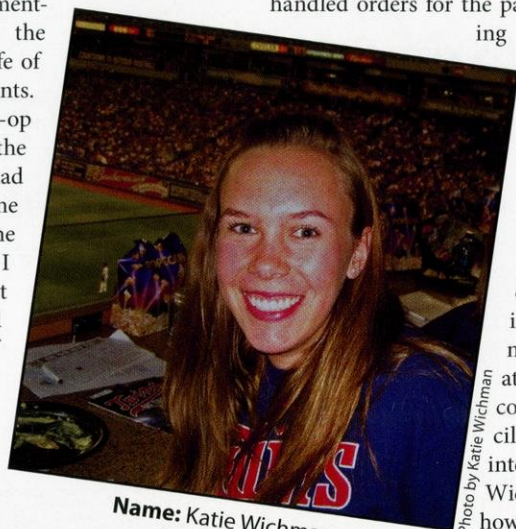


Photo by Brian LaQua

**Name: Brian LaQua
Year: Junior
Mechanical Engineering Co-Op
Rockford, Illinois**

Bob Hocraffer, who will graduate from UW-Madison this December, took on his first real engineering job in the spring of his junior year. Hocraffer spent a semester in Fitchburg practicing reliability engineering. He worked on designing and implementing tests to evaluate the strength and fatigue life of mechanical components. Hocraffer said his co-op made him appreciate the value of the classes he had taken. "The job gave me a very specific use for the skills and knowledge I have gained throughout college. It reinforced the need for many of the classes I have taken and the things that I was taught," he says. Hocraffer said he was surprised how easy it was to transition from the classroom to the workplace, noting that the switch from the theories presented in the classroom to the actual implementation on the job was easier than he expected. Hocraffer worked with the same company again this past summer and has been offered a full-time position.

The summer after her freshman year at UW-Madison, junior Katie Wichman found herself the youngest intern among thousands of engineers working in a large engineering firm. Wichman worked in the purchasing department and handled orders for the parts used in the making of medical devices.



Name: Katie Wichman
Year: Junior
Purchasing Department Intern
Plymouth, Minnesota

Photo by Katie Wichman

tasks on time than some of the hired workers." Wichman interned with same company this past summer as well, this time working on the equipment for the production lines. Her lat-

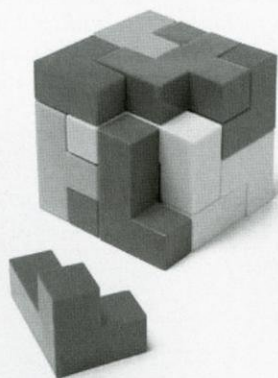
est position gave her a more hands-on engineering experience, spending a lot of time working with CAD and SolidWorks.

"It reinforced the need for many of the classes I have taken and the things that I was taught."

-Bob Hocraffer

LaQua, Hocraffer and Wichman all learned through their experiences that what is taught in classes is applicable to the working world. So the next time you find yourself sitting through a physics lecture, convinced none the information spewing out of the professor's mouth will ever serve a purpose, remember that it will. Still not convinced? Head over to Engineering Career Services and start searching for a co-op or internship of your own. **we**

Article by: Kelsey Coleman
Design by: Tessa Chia



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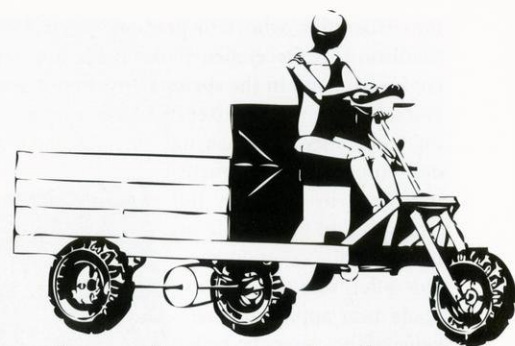
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Lifting the Capstone



A look into one of the most notorious courses in the engineering curriculum: senior design.

The capstone course: everyone has heard tales about it, and no other family of courses in the College of Engineering breeds a more concentrated mixture of curiosity and apprehension. For many students, the senior design or “capstone” course is a requirement that looms large over the curriculum, a mysterious gatekeeper standing watch over their diploma. However, the capstone course is a class striving to be more than a dreaded requirement. Students who challenge it and overcome it, report themselves far better off from the experience. Professor Willis J. Tompkins, associate chair of the biomedical engineering department says, “A lot of the stuff [students] learn in this course can’t be found in a textbook. They have to go find the answers themselves somewhere out there.”

But what is the capstone project? What purpose does it serve, other than eating up the lives of engineering students? Tompkins says, “We

are trying to demonstrate that engineering is lifelong learning.” As the name suggests, the senior design project is a course traditionally taken by seniors that involves selecting a topic and working in a group to design a device, product or system around that topic. The projects and the specifics of the courses, however, tend to vary dramatically from field to field.

Kim Manner, senior lecturer in mechanical engineering and instructor of the ME senior design class, encourages his students to “fix a problem.” Students in his class are supplied with a list of possible engineering problems to solve, but are given a great deal of freedom in selecting their topic. They are advised to match their interests and skills to a project that they are passionate about. One of the groups in Manner’s class constructed a basic utility vehicle for use in disaster relief, an endeavor the students say the recent earthquake in Haiti inspired them to undertake.

The biomedical engineering department takes a slightly different approach. Students are divided into groups by lottery, and their projects are assigned in the same way. Another difference is that students in biomedical engineering participate in six semesters of intense design, more than other engineering majors. “No other department in the United States, that we know of, has design throughout the curriculum, in any discipline,” Tompkins says.

The civil and environmental engineering department’s undergraduate degree culminates in the capstone course, CEE 578, where students submit plans and proposals for civil construction projects. Like mechanical engineering, the teams are formed based on the interests of the students. As Professor Jeffrey S. Russell, chair of civil and environmental engineering, says, “We ask them what they want to do for a living, then we form the



The Basic Utility Vehicle capstone group from (left to right) James Pradun, Joe Azukas, Adam Laurent, Jared Amundson and Andrew Knuteson present their design to the rest of the mechanical engineering capstone groups.

teams.” A typical team consists of four senior students, an advisor who acts as the quality control manager and a “mentor” who is a practicing engineer recruited from industry.

Students in mechanical engineering reported spending an average of four hours a week in class for capstone, and more outside as they approached the end of the semester. When asked about their coursework, many students reported a great amount of satisfaction with the content of the course. The capstone projects are designed in the spirit of “lifelong learning,” with the students undertaking the lion’s share of the responsibility. The students are given guidelines, but are responsible for the majority of their work. They produce regular reports and keep a detailed project notebook in order to simulate, as accurately as possible, the experience of working on a team-based project in industry.

Graduate students are also involved in the capstone courses in some of the departments. The civil and environmental engineering department hires teaching assistants to grade some assignments and to deliver general engineering facts to undergraduates. As Michael D. Doran, adjunct professor of civil and environmental engineering, says, “teaching assistants act as mass communicators between the professors and the undergraduates.” The industrial and systems engineering (ISyE) department, along with the manufacturing systems engineering department, offers the ISyE 641 course, which acts as the capstone course for manufacturing systems and a senior elective for the industrial department. Unlike many of the other courses, graduate students form a large part of this course. A team in ISyE consists of one or two undergraduate students, a graduate student and a person who has been exposed to the industry and its practices for a year or more.

But why a capstone? Why is this particular breed of course found in most the engineering programs at UW-Madison and in engineering curriculums across the country? The key is experience. When the students step into the design classroom for the first time, they are, for the most part, without real world experience in engineering. The purpose of the capstone project is to instill a certain amount of confidence and worldliness to the students before they are let loose on industry. Manner says, “I tell the students when they start this course that they’re already engineers. They’re not going to get much smarter in three months, so they just need confidence in their abilities.” Thus, the capstone course also strives to impart confidence in a group of seniors who, for all intents and purposes, are fully qualified for entry-level jobs in industry.



Members of the Water-Wagon group present their mobile water purification device that purifies water via a pump run by the movement of the cart.

With all the hubbub surrounding capstone, how do students actually feel about the course? Students generally seem excited about stepping into the course, finding the idea of “getting their hands dirty” appealing as they apply the engineering principles they’ve been learning for the past few years. As Seethapathy says, “[The capstone course is] as close as you can get to doing a live industry project when in school.” Having worked with a team on reducing lead times in a Madison-based company, RenewAire, she says, “The whole course is about going out to the industry, talking to them, getting their problems and solving it for them. It is not completely just academic, since the industries are very serious about the solutions and get them implemented.”

“A lot of stuff [students] learn in this course can’t be found in a textbook. They have to find the answers themselves somewhere out there.”

-Professor Willis J. Tompkins

This high level of involvement does have a flipside. Most students currently taking the course feel they should earn more credits for their work. However, most students also recognize that the experience they gain is more valuable than academic credit. Dr John P. Puccinelli, faculty associate in biomedical engineering, earned his undergraduate and postgraduate degrees from UW-Madison. Having gone through capstone himself, he knows firsthand the great and not-so-great aspects of the course. “There were times when

there were some frustrations, with major constraints being time and money, and the team working to find more resources. But looking back, though six semesters in biomedical engineering might at first seem a lot, you keep learning stuff and the destination is worth the journey,” he says.

The capstone courses do not serve simply as windows into the world of professional engineering, they also open doors to step out into the real world. “The chances are high to be called as interns to the clients’ companies for implementing the proposed solutions. And then one day, you might find yourself being recruited by them,” Seethapathy says.

The capstone courses across the College of Engineering nurture creativity and responsible engineering. Together, the teams strive to deliver novel, cost-effective and sustainable solutions to the community. Students and professors are eager to find the best solutions to the problems presented to them. “It’s an evolving thing, we learn more as we do it. We try our best as a team and develop in the face of a real world challenge,” Professor Doran says. And students aren’t the only ones who benefit from the capstone courses. Doran says, “The students teach us a lot: what they want to learn, the method they want to learn in and in the environment they want to learn it in.” **WE**

Article by: Casey Sennot &
Vindhya Venkatraman
Photography by: Danny Marchewka
Design by: Benjamin ward



More than just manure

Two UW-Madison undergrads investigate E. Coli amidst mounds of poop

In a society so immersed in consumerism, product recalls and contamination are just a way of life. Perhaps you remember 2009, when Nestlé Toll House cookies were recalled for an E. coli contamination that made many consumers sick, or maybe when you were denied your Gordita Taco from Taco Bell because of the same bacteria, found in their diced lettuce. The government works very hard at preventing these situations by granting money to laboratories, which in turn work to track and understand dangerous production mechanisms that may lead to outbreaks. Here on the UW-Madison campus, Dr. Dörte Döpfer's laboratory in the School of Veterinary Medicine was recently awarded federal stimulus money to study the most deadly of all E. coli strains: E. coli 0157:H7.

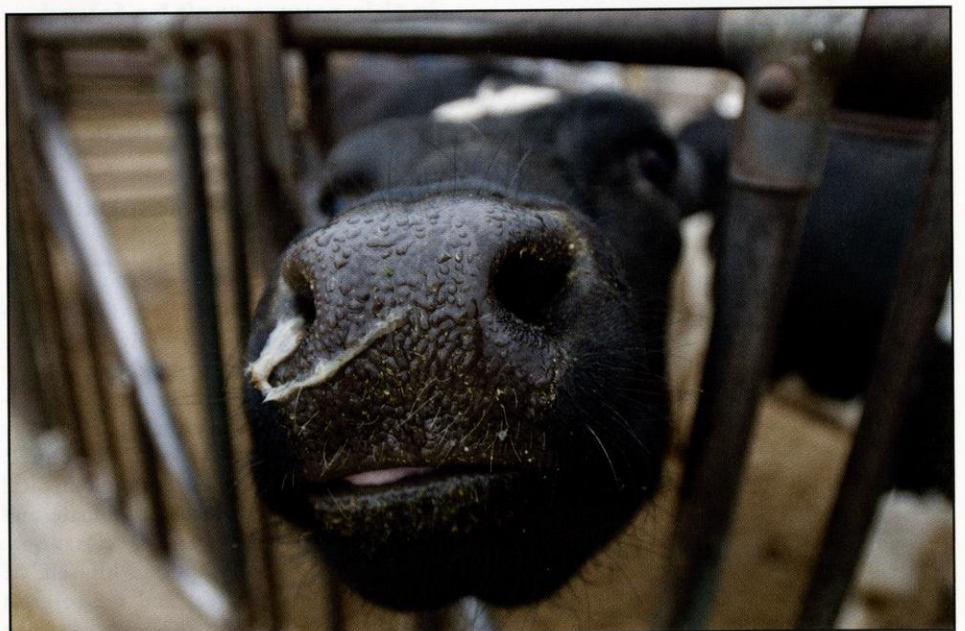
E. coli, short for *Escherichia coli*, is a bacterium that develops in the intestine of many warm-blooded animals. Though there are hundreds of different strains of E. coli, only five of them are harmful to our health, and these five strains can be very detrimental. In fact, just three cells of the strain studied here at UW-Madison can kill a human.

The Döpfer lab is focused on cows as a source of the E. coli bacteria. When cows are six to eight weeks old, their manure starts to contain E. coli. If a farmer is not extremely cautious,

bacteria can be transferred to cow meat or nearby crops, and later to grocery stores and restaurants.

We had the opportunity to meet with two undergraduates working in Dr. Döpfer's lab. Kristen Kerrish and Kelly Pertzborn are juniors studying biology who both plan to continue on to the School of Veterinary

Medicine. They were kind enough to talk about their experiences with this harmful bacteria born in a sea of manure. Because the actual lab requires a level 3 safety clearance (out of 5), we were unable to walk around. Maybe that is for the better; although we enjoy cow poop just as much as the next person, hearing about it from Kerrish and Pertzborn was enough.





Kristen Kerrish and Kelly Pertzborn at the Pertzborn family farm.

Kerrish was part of the farm crew in the School of Veterinary Medicine when she asked Dr. Döpfer if she could do her Biology 152 internship with her. Though denied this position, Kerrish was offered a summer job in Dr. Döpfer's laboratory. Since then, Kerrish has been able to contribute to the project, learning more than she cares to know about *E. coli*. Pertzborn found the project through a family friend who helps out at her farm. Eager to get involved in undergraduate research, Pertzborn soon joined in on the action. Both girls work about 10 hours per week in the lab, and eventually hope to publish a paper on their results. Throughout their research, the students have been thankful for the independence Dr. Döpfer has granted them. "Dr. Döpfer has created an educational environment for undergrads by giving us the opportunity to actually conduct research of our own in a safe and intellectually stimulating setting," Kerrish says.

Each week, Kerrish and Pertzborn work on a project that serves as background research for a grant that will fund yet another project set to start in two years. Their main goal in the project is to get *E. coli* to release phages, or bacteria-infecting viruses, by putting them under various stresses. While Kerrish and Pertzborn thought a nice dose of midterms and lab reports would provide enough stress, it turns out that the *E. coli* responds better to UV light or antibiotics.

The phages that come from the 0157:H7 strain can form what is called a "plaque" when they are stressed. Unlike the dental plaque, this plaque develops on the Petri dish, and is carefully studied by Kerrish and Pertzborn. They look for multiple plaques from the same genotype

to analyze the characteristics of the particular phages. With this information they hope to gain an understanding of which stressors affect the phages, and which strains are more likely to release phages. This will add to the knowledge about the danger of manure, and will hopefully give farmers a greater understanding of the best ways to deal with cow excrement.

"Ultimately Dr. Döpfer's research aims to improve the health and safety of people working in the industry as well as the consumer and the animals involved," Kerrish says.

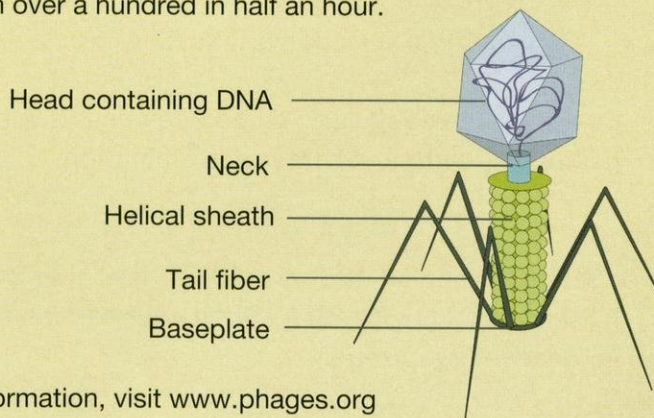
The project is funded by the federal government's federal stimulus package that resulted from The American Recovery and Reinvestment Act. Part of this funding includes a \$1 million grant from the National Science Foundation to Dr. Döpfer and Professor Charles Kaspar's labs, which are researching *E. coli*. Though this is quite an achievement, it's only one of many for Dr. Döpfer. As a septalinguist, Dr. Döpfer has traveled all over the world, gaining a wealth of experience that she shares with fellow colleagues and student researchers.

As for Kerrish and Pertzborn, they could never have imagined how much they would learn from studying something so seemingly common—and disgusting—as manure. But over the past several months they have learned that you can't judge a lab by its odor. **WE**

Article by: Davie Beirman & Kate Slatterly
Photography by: Anna Stonehouse
Design by: Stephanie Kunkel

Facts about phages!

Bacteriophages (phages) are viruses that infect bacteria. Typical phages have hollow heads and tunnel tails, the tips of which have the ability to bind to specific molecules on the surface of their target bacteria. The viral DNA is then injected through the tail into the host cell, where it directs the production of progeny phages often over a hundred in half an hour.



For more information, visit www.phages.org

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Co-op will be assigned to one of the core plumbing product lines (i.e., Faucets, Bathing, or Sanitary), working closely with department engineers to establish product, performance, and test specifications and designs. The program will provide one or more projects that highlight all phases of new product development. Projects will also provide cross functional exposure to areas such as Industrial Design, Marketing, Purchasing and Quality. Time will be spent in the test lab to gain an understanding of the testing protocol and data generation for various projects. Student will be exposed to the manufacturing areas of Kohler Co. through project work, plant tours and learning assignments. Co-op may be required to travel to one of our off-site plants to meet these goals.

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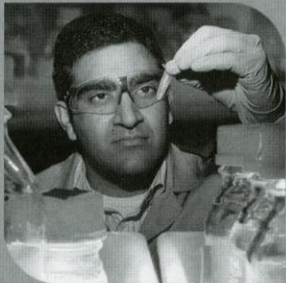
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Class	Description	Units	Status
Confidence 101	Life lessons with Professor Park		✓

“One does not discover new lands without consenting to lose sight of the shore for a very long time.” This quote by French author Andre Gide was exactly why Jim Park, professor of civil and environmental engineering, set sail from his homeland of South Korea years ago searching for a new shore. Three continents and several universities later, Park landed at UW-Madison with a world’s worth of experience. He has only built on this experience during his time at UW-Madison, molding it into a unique academic ideology. All professors make findings in the lab, findings that may be new from a scientific point of view, but Park’s discovery is much deeper, and much more involved: Park has discovered how to change students’ lives. He has discovered how to leave a lasting impact that allows students to reach new heights and inspire them to discover new lands of their own.

Before landing on the beautiful shores of Lake Mendota, Professor Park attended four different universities on three continents. He received his bachelor’s degree from Yonsei University and his master’s degree from Seoul National University, both of which are located in Seoul, South Korea. Park then gained some work experience with a construction company in Australia, before obtaining a Ph.D. at the University of Newcastle upon Tyne in England.

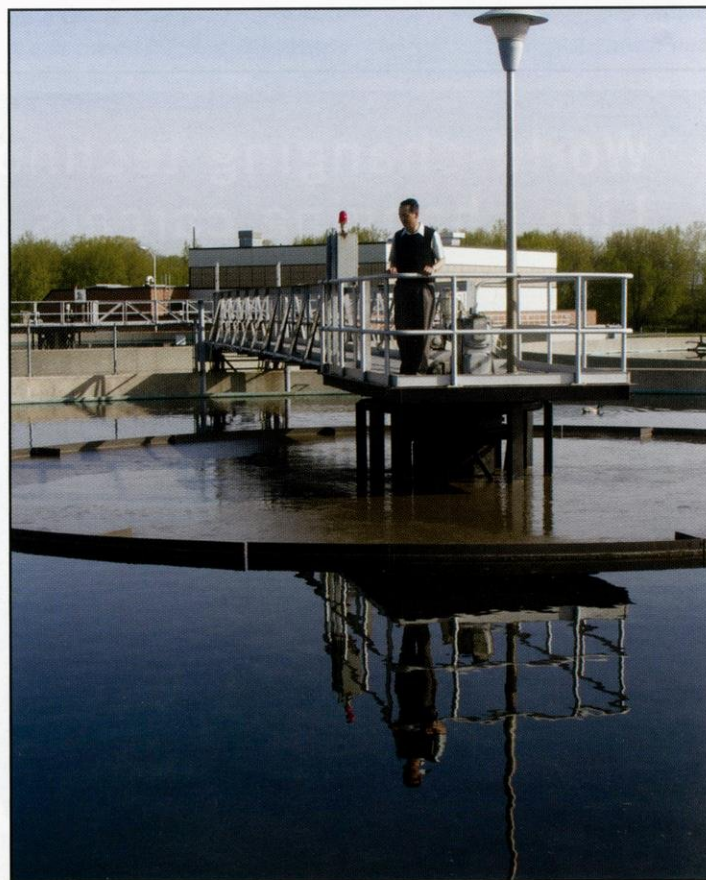
“The reason that I went to the United Kingdom ... is that at the time, the U.K. was the best,” Park says, referring to the program through which he did his primary research in river restoration. Once he completed his Ph.D. research, Park took a research position at UC-Berkeley. He hoped to put his expertise to good use in his home country of South Korea, but realized that political, technological and economic roadblocks would make that impossible, so he settled for California UC-Berkeley. After three years in California, Park was offered the job here at UW-Madison.

It has been 22 years since Park arrived in Madison. He looks back with some regret for falling into what many see as a common trap at UW-Madison those first few years: he spent too much time on his research and not enough time focusing on teaching. “Before, my focus was my research. I feel really bad about it,” he says. Park notes that at one point he had 17 Ph.D. and master’s students on top of his teaching responsibilities, leaving him little time to focus on his courses.

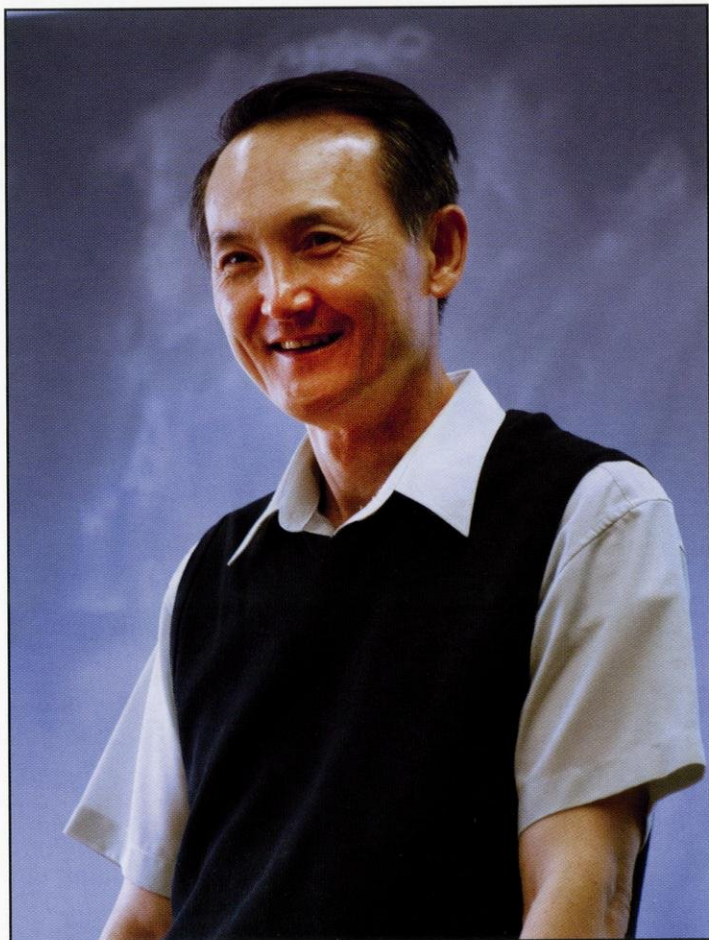
Since then, Park has found that there are much greater rewards than those achievable through research. “Now, I spend a lot more time teaching ... preparing lecture notes and [improving] my way of explaining certain things so a student can learn quicker and better.” Speaking with visible passion, Park makes it extremely clear that he has made his students’ well-being his responsibility.

“Most of the classes I teach are for seniors and graduate students, and mentally, I think they should be prepared for the job and real world work.” In fact, with economic troubles and an uncertain job market, the best way to make students indispensable is to make sure they are well-prepared. To promote preparedness, Park utilizes open-ended problems, group projects and discussions, as well as real world examples in order to better prepare his students. Park admits, however, that giving students a real world problem often causes them to panic, since these problems will likely have a few key parameters missing. “In the real world, that’s what we will have. That’s why we need some more open-ended education.”

Park notes that a proper, open-ended education is about much more than just “mental preparation.” He sees that many students are lack-



Prof. Park above a tank at a water treatment facility that utilizes microbes to consume harmful bacteria.



Inside the classroom, Prof. Park likes to motivate his students by asking hypothetical questions that guide them in prioritizing their commitments.

ing optimism, motivation, and in some cases, creativity. "In education, if we cannot change that, then we're in trouble."

Park likens this situation to that of a chimpanzees' DNA. With a minor change to a chimp's DNA, you can end up with the drastically different human being. With a minor change to a student's attitude, you can end up with a student much more likely to succeed at everything they do. Park notes that when you find a way to get a student interested in a subject, "their focus is different, and they will do very well. If you trigger that, then [the student] will do a lot better with other courses or other things."

Since Park has made the effort to ensure students' 'survival' now and in the uncertain future, it's no wonder he stresses the importance of optimism. "If you are optimistic, you can survive everywhere," he says. Park realizes, however, that the stresses of being a student can make it difficult to remain optimistic. "If you try and fail, try and fail, you cannot be optimistic ... it's hard. But if you program yourself, you can do that," says Park. "When [students] graduate, they can survive everywhere with that kind of attitude."

Park has also found that motivating students is an important tool for changing their attitude. "Why don't you try to push yourself and test yourself ... and see how far you can go," Park says, repeating one of the main points of a talk he gives his students. The talk also involves the hypothetical question, "Why do you waste your time?", which is meant to help students prioritize their commitments. This question

often prompts students to organize their time better, which Park can then see materialize into better homework and exam grades.

Park also stresses the need of a firm philosophical foundation. This foundation can serve as part of the motivation that students need to get through tougher times, and Park helps students build this foundation by introducing them to such philosophical questions as,

"Why don't you try to push yourself and test yourself ... and see how far you can go,"

-Professor Jim Park

"Who are you? What do you want to do? What's your role?" Park also notes that once students have this sort of philosophical sense, they can expand their thinking and explore their creativity.

"We can do a lot of things if we are creative," Park says, citing some positive consequences of creativity, such as the invention of the ice cream cone and J.K. Rowling's rags to riches tale. Park often references another quote from Andre Gide to motivate his students: "Be faithful to that which exists nowhere but in yourself, and thus make yourself indispensable."

These are the words that have pushed Park to realize his own dream: he is finally able to bring his expertise home to South Korea. He is serving the Korean government as an advisor on a \$22 billion river restoration project, which is focused on improving the water quality of four major rivers. The project will be ongoing for the next three years and will require Park to make several trips per year to South Korea. "I'm really glad that finally I can use my knowledge for Korea. I really appreciate what I am now, because I can give some help and I can influence somebody." Park has reached this point by drawing on his own motivation, which includes the knowledge that 10,000 people die every day because of a lack of basic sanitation. "I'm glad that I am in [environmental engineering] because I can change that."

Here on campus, Park is making a different kind of impact. "I know now how I can change students," he says. For Park, this is the most rewarding part of the whole job. "If I can [do that], then it's all worthwhile." **WE**

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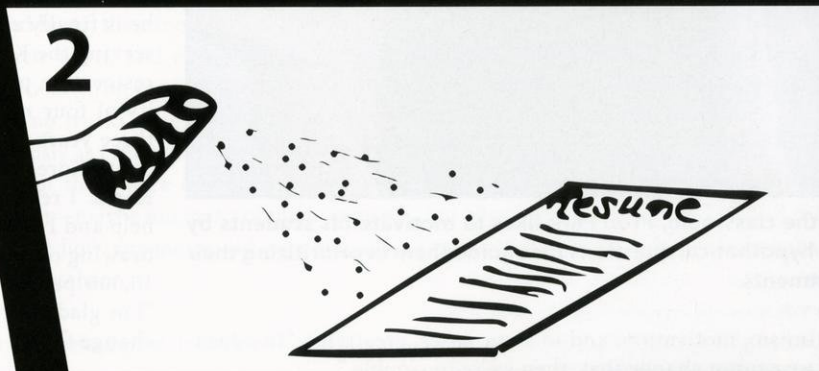
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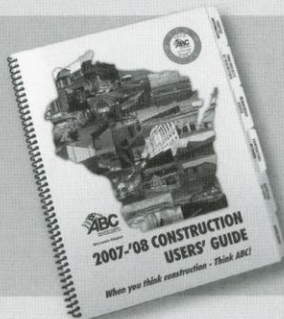
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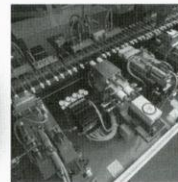
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