

UMD Chemical Engineering Newsletter

For Alumni & Friends

Dr. Richard A. Davis **Department Head**

We greet you from Duluth! We hope this newsletter finds you prosperous and well. The Department of Chemical Engineering continues to thrive and attract top-flight students that enrich our programs. Our graduates are increasingly attractive to a wider range of employers and diverse career opportunities. We are extremely proud of our students and their accomplishments in school, as coop and intern students, and service to the department, campus of UMD and greater community.

The 2006-2007 Academic year brought many new opportunities to the department. We are privileged to have Dr. John Brekke join the faculty as a Distinguished McKnight Professor this past year. Dr. Brekke brings expertise in biomaterials to the department and offers interdisciplinary learning and research opportunities for students ranging from chemical engineering to biology. Dr. Brekke also comes with a fully equipped laboratory for biomaterials analysis that includes a scanning electron microscope. Although his McKnight position has ended, Dr. Brekke will continue with us as an adjunct member of the faculty and teach a course next spring. Carol Horabik joined the faculty in the Fall of 2006. She brings over 15 years of industrial chemical engineering experience with her into the classroom. She is teaching a variety of courses including statistical design of experiments and thermodynamics. We are pleased to have Carol with us and look forward to her contributions to the department.

We have also made a concerted effort to upgrade the laboratory experience with pilot scale experiments. Our Lab Services Coordinator, Duane Long has been diligently implementing new heat transfer and fluid flow experiments to challenge and bewilder the students (and sometime the professors!). Our senior design students enjoy working on industry sponsored projects. We welcome any contributions you can make in these areas.

The chemical engineering faculty are serving and leading the university. Dr. Steve Sternberg was appointed as the first director of the new BS degree in

Environmental Science and Dr. Rashid Hasan will serve as the interim head of Mechanical and Industrial Engineering. Dr. Richard Davis is part of the team working on a new program in Civil Engineering, that will begin accepting students in the Fall of 2008. We continue to build on the momentum of our current research efforts and branch out into new areas. Dr. Greg Rutkowski chaired a college task force exploring opportunities for integrating biosciences and engineering.

After 27 years at UMD, Avis Hedin will be retiring after fall 2007. Avis started at UMD in 1980. She joined Chemical Engineering in 1997. Avis has been a great champion of the department and students of Chemical Engineering. We will miss her diligence and expertise, but wish her all the best in her retirement. She will always be welcome at our spring banquets!



Avis Hedin

We would also like to thank all of you who have contributed or who continue to contribute to our scholarship fund. It is greatly appreciated! We look forward again to an exciting and productive year. Please stop by and let us know how you are doing when you visit Duluth.

Dr. Davis becomes the Department Head

Dr. Richard Davis began serving as the chemical engineering department head in the summer of 2007. Students interviewed Dr. Davis to learn more about his plans for the future. The following are some of his responses.

Q: Are you anxious to take over as department head?

Professor Davis: Yes, I am excited to have the opportunity to lead the department and influence the direction we are taking. This is an exciting time for

chemical engineering. We continue to attract the top students at UMD – and they are finding much success after they graduate.



Dr. Richard Davis

Q: What classes will you still be teaching?

Davis: I will still teach Separations and Computational Methods. I will also take over responsibility for the coop course.

Q: Chemical engineering at UMD wouldn't quite be the same if someone else taught those courses.

Davis: I really enjoy teaching those two classes. My PhD work was in the area of separations, and my current research uses computational methods. I like to challenge students, but you might use a different word (laughs).

Q: What classes will Dr. Hasan be teaching?

Davis: He will continue to teach Material and Energy Balances and add Advanced Transport Phenomena. Dr. Hasan will serve as the acting head of mechanical engineering for one year. Then he will teach our first lab course in addition to his other teaching load.

Q: Are you disappointed that you will be spending less time in the classroom?

Davis: Yes, but I am satisfied that I will still be teaching junior and senior level courses. I love teaching and being challenged by students.

Q: What are some of your duties as department head?

Davis: I have a number of duties: budgeting, staff, management, accreditation, department funding, monitoring student progress, student recruitment, as well as curriculum development are among the many duties.

Q: What challenges do you face as department head?

Davis: Managing the course schedule so students can graduate quickly, promoting the chemical engineering department inside the University as well as regionally, and across the globe. We always look for ways to bring more potential employers to campus.

Q: What major projects and initiatives do you have as department head?

Davis: I would really like to see us develop a chemical engineering masters program. But, we want to do it right, without sacrificing the quality of our undergraduate programs. An MS program will provide additional opportunities for our undergraduate students in terms of courses and research. I also want to develop a well defined plan for upgrading the laboratory facilities for the department. Our environmental and biochemical engineering minors help us attract a wider range of students and I am hopeful that with the introduction of a civil engineering program we can promote ourselves to more prospective engineering students.

New Environmental Science Major

By: Corie Ekholm

Dr. Sternberg has been working with Tim Holst (assoc. dean of the College of Science and Engineering) and Howard Mooers (department of geology) to develop a new bachelor of science degree in environmental science. The first students will be entering the program in the Fall 2007 with the first discipline specific class being offered during Fall 2008. The first graduates are expected in Spring 2011. The students will finish their studies by completing an Environmental Impact Statement during their senior year. Dr. Sternberg was appointed as the program director.

The environmental science major will not have its own department. It will be multi disciplinary using current Professors from numerous departments including biology, chemical engineering, chemistry, economics, geology, limnology, math, physics, and statistics. The new major will increase the number of upper level electives offered to chemical engineering students. These could include renewable resources and non renewable resources along with classes on water and air pollution.



Dr. Steven Sternberg

New Faculty Members



Carol A. Horabik

The University of Minnesota-Duluth has two new faculty members. They are Instructor Carol A. Horabik and Visiting Professor John Brekke.

Carol is a professional engineer. She received her bachelor's degree in Chemical Engineering from Michigan Technological University. After several years practicing chemical engineering, she earned her master's degree in Chemical Engineering from the University of North Dakota. She currently teaches Introduction to Chemical Engineering, Introduction to Environmental Engineering, Design of Engineering Experiments, Chemical Engineering Thermodynamics, and Chemical Engineering Laboratory I and II.



John Brekke

Visiting McKnight Professor John Brekke received his bachelor's degree in Chemistry and Biology at St. Olaf College. He then received his Doctor of Dental Surgery from the University of Minnesota. He currently teaches Biomimetic Formulations and performs research in the area of Drug Delivery Systems. He organized a research course that culminated a paper presentation at a Gordon Research Conference. He is working closely with Dr. Greg Rutkowski to further develop opportunities for biochemical and biomaterials education and research in the department. Dr. Brekke brings several new research

and analysis capabilities to the department, that include scanning electron microscopy.

Lab News

New lab equipment has been installed in the student instructional labs thanks to Duane Long and assistance from lab students. Duane has been with the department since its creation and is responsible for departmental purchasing, student labs, computer maintenance, and is our safety officer. Students were asked to design the new equipment over the course of a semester in place of regular lab experiments. Duane helped the students take their projects from theoretical concepts to actual working lab stations and was able to provide input about the practical application of their designs. The new experiments consist of a fluid mechanics setup, heat exchanger, and a gas absorption column. The fluid mechanics lab allows students to measure the effective surface roughness of 50-foot sections of plastic, iron, and copper pipes. In addition, the setup also allows the measurement of C_v for ball, globe, and solenoid valves and conserves water by recirculating it from a tank. A shell and tube heat exchanger was also added with valves that allow it to operate in parallel and counter flow configurations. The heat exchanger is a small industrial type heat exchanger that was purchased using the student technology fees. A gas absorption column that stands 9 feet tall with 6 feet of packing and diameter of one foot is the last addition to the new lab equipment. The new equipment features industrial type control panels to prepare students to gather data as they would "in the field." Installation of the lab equipment began during the spring 2006 semester and will be completed during the Summer of 2007.



AIChE Activities by Troy Gist

The UMD chapter of the American Institute of Chemical Engineers organized several volunteer and social activities for the 2006 – 2007 school year. These activities provided students with opportunities to get to

know other students and faculty members outside the classroom.

The chapter sponsored two major volunteering opportunities this year. They continued to participate in the MN-DOT "Adopt a Highway" program by adopting a portion of MN Hwy 33 north of Cloquet. The chapter then sponsored group clean-up sessions each semester. In addition, the chapter took part in Duluth's "Community Cleanup" by having several AIChE members volunteer at a Duluth Lakewalk clean-up event in the fall.

The chapter also sponsored several social functions. They held a potluck picnic and barbecue each semester at Chester Bowl Park in Duluth. In addition, they sponsored two banquets – a winter banquet at Grandma's Restaurant and a spring banquet at the Dry Dock Restaurant. They also organized a group outing to a Minnesota Twins game against the Baltimore Orioles in early April.



Nearly thirty UMD ChE students came to the Metrodome in Minneapolis to see the Twins defeat the Baltimore Orioles 3-2 on April 3, 2007.



AIChE welcomed UMD ChE students back from break with a winter banquet at Grandma's Restaurant on January 24, 2007.

Intramurals in Full Swing for ChE Students

The 2006-2007 year was another big one for intramural sports at UMD. The ChE department took full advantage. Students took part in basketball, bowling, curling, floor hockey, ice hockey and soccer. Curling, the most exciting of the sports, was new to three of the four team members. Troy Gist, Carl Larsen and Elizabeth Miller all learned the ways of Scottish game from Division III College Curling National Champion, Mark Suchomel. The team finished third in each of the two semesters of competition with a combined record of 9 wins and 3 losses. The teams only losses came to the eventual champion and run-up teams. Other ChE students, including Bobby Quigley and Chuck Erickson, were used as reserves during a few matches. Intramural curling is held on Wednesday nights at the Duluth Entertainment and Convention Center (DECC), in Canal Park.



The Curling Team (L to R): Carl Larsen, Mark Suchomel, Troy Gist, Elizabeth Miller

CHE Athletes

It is commonly known that chemical engineers study hard and devote much of their time to academic endeavors. However, several members of the chemical engineering department are striving toward athletic or artistic excellence as well. Stephanie Jares and John Kallemeyn are juniors competing for the Cross Country team. Sam Whitney is a sophomore offensive tackle for the varsity football team. Laura Stranford, a student who came to UMD from New Mexico for engineering, plays Clarinet in the school pep band. Brian St. Peter has been on the varsity basketball team for the last four years. Aside, from varsity activities, two chemical engineers compete on club teams. Justine Finke is a member of the rugby football club and Rachel Gass plays for the nationally ranked women's lacrosse team.

Companies at UMD

This year several companies visited UMD in search of new graduates. Although many of the companies are looking for full time hires, a large amount of internship and CO-OP positions also exist. The faculty and staff here at the university should be acknowledged for their determination in making sure students are presented with as many employment opportunities as possible. Although several companies like ADM and SSOE came to give private presentations, most came in October for our annual E-Fest event. The companies are given space in the Kirby Ballroom where students can visit with a representative and even drop off a resume. This is a great opportunity for students to get their foot in the door with a company they're interested in and we encourage even more students to attend this upcoming fall. Several of the companies such as Cargill, HTI, and Micron have commented that they return each year due to the high caliber of students at UMD, so lets keep them coming back! Here's a few companies you may see at next Fall's E-fest.

Cargill	Micron	Barr Engineering
HTI	SSOE	Stora Enso
Verso	Ecolab	Sebesta Blomberg
ADM	Arkema	Rosemount

For more information regarding E-fest or other opportunities to meet with potential employers, please visit the Career Services web page at www.careers.d.umn.edu/.

Co-op/Internships

Internships and co-ops are a great way for Chemical Engineering students to get hands-on, real world engineering experience. Students apply what they have learned in class to problems in the field. Students learn about specific processes in the plant, learn to work with operators and contractors, and get to see what engineering is about. Real engineering experience reinforces classroom learning. This kind of experience also makes a student more marketable when looking for a job. Internships and co-op's are not required at UMD, but the faculty members stress that one should be completed to help students decide on the direction they want to go and give a student a better chance of getting a job when they are done with college. Companies like to see experience on a resume and this is one of the ways to do it. One student commented, "My experience on co-op with the pulp and paper industry has only been positive. I was given the opportunity to work with other engineers to reduce mill odor. We ran trials in order to quantify where the odor is coming from and now are currently in the process of finding a solution. It has given me a feel about what engineering consists of. It has also shown me what I

will be doing after I graduate. I would recommend that every Chemical Engineering student attempt to take an internship or co-op before their education at UMD is complete."



Senior Design Projects

This year's senior design projects covered a full range of topics. One group is working with Minnesota Power at the Laskin Energy Center to reduce mercury emissions in their waste water. This project involves developing new technology, as the reduction needed is on the order of parts per trillion. A second group is looking at constructing a biodiesel plant to be used to recover energy from a waste stream. The third group is developing a pilot plant to create energy in the form of methane from wood waste, or cellulose. Duluth Steam Cooperation provided a fourth group with a project that considers extending the steam lines to hotels in the canal park area. This requires determining the best economical option for the hotels, and whether the project is profitable for Duluth Steam. A fifth group is working with Sappi Paper to reduce sulfur emissions from their plant, and recover energy from the emissions. The last project is through Western Lake Superior Sanitary District and involves researching the feasibility of putting a fuel cell on site to recover energy for the plant.

The design groups went to the Twin Cities for a conference with the American Institute of Chemical Engineers (AIChE), where each group participated in a poster contest. Members of AIChE attended and judged the posters. Two groups were also given the opportunity to make formal presentations on their projects so far. Final presentations were made to the faculty, students, and industry sponsors. The tradition of professors asking the tough questions is alive and well.



Duluth Steam near Canal Park

Student Research

The Undergraduate Research Opportunity Program (UROP) has been a great way for students to gain valuable extracurricular research experience working under the guidance of a UMD chemical engineering faculty member. The UROP program, funded by the University of Minnesota provides students with a stipend of \$1400. The program is competitive-requiring applicants to write a research proposal that is reviewed by the college faculty. Winning projects are selected based on the overall project itself, the academic standing of the student, and the recommendation of the faculty member. Current UROP students (faculty mentor) and projects in the ChE department include:

Chuck Erickson (Dr. Michael Rother) Droplet-Surface coalescence.

Elizabeth Miller (Dr. Steve Sternberg) Velocity Fields in Heterogeneous Porous Media

Kevin Bergh (Dr. Steve Sternberg) on Bioremoval of lead in a Semibatch Flow Reactor using *Lemna Minor*

Steve Head (Dr. Keith Lodge) An Examination of Elutriation with Flocculation to the Fractionation and Particle Size Analysis of Sediments

Benjamin Breidall (Dr. Rashid Hasan) Annulus Pressure Build up in Oil Wells

Mark Suchomel (Dr. Richard Davis) Mathematical Modeling of a Pot-Grate Induration Furnace

Corie Ekholm (Dr. Keith Lodge) Particle Size Distribution

The UROP program encourages students to seek out areas of research that are interesting to them or support current faculty research interests. Student work at his or her own pace with the freedom to modify the project as it evolves. During the final months of the UROP project students prepare poster and make presentations at a campus undergraduate research fair. Each year a few students get the opportunity to present their projects at the Council on Undergraduate Research conference. This year Elizabeth Miller presented her work at ECUR in San Francisco California. This is a nationally recognized research conference in which the students can share their work with other students from across the nation.

The UROP program is a great way to gain valuable experience, make a little money, and have fun with an interesting project. We encourage students to continue to get involved and take advantage of this great opportunity.

Alumni News & Updates

Kyle Goochey (Spring '06), *Process Engineer, Hutchinson Technology Inc., Hutchinson MN.* Heather and I were married two weeks after graduation. We took a honeymoon trip to Hawaii and I started work in mid June. We just finished building a new house and moved in the first week in August.

Troy Heaton (Spring '06), *Jr. Process Engineer, Micron Technologies, Boise ID.*

Matt Rowe (Fall '05), *Optimized Operations Project Engineer, 3M Inc., St. Paul MN.* I am training (as of 7/11/06) for my first six-month assignment where I will implement lean manufacturing tools using Six Sigma processes.

Maggie Fasteland (Spring '05), *Chemical Engineer, Minnesota Power, Duluth MN.*

Nicole (Raitz) Buss (Spring '04), *Crush Production Supervisor, Cargill Inc., Sioux City IA.* Scott and I moved into our first house in January and are loving being homeowners. I'm still working for the soybean plant. I've been able to travel to various Cargill plants since my start and am enjoying meeting new people. We're gearing up to run low-linolenic beans this year which will help with the zero trans fat trend.

Landon Carlberg (Spring '04), *Environmental Manager, J.R. Simplot Company, Grand Forks ND.*

Tony Kramer (Spring '04), *Scientist, Pfizer Inc., Groton CT.* Already in my third year working in Research & Development at Pfizer. Recently I've been designated as the lead formulation scientist for lyophilized products and things are going great. I'm also attending graduate school (part-time) at the University of Connecticut and will have finished my Masters in CHE by Fall 2006.

Nicole (Van Handel) Durch (Spring '03), *Research Engineer, Cargill Inc., Newark CA.* Got married!!!

Reynard Moore (Fall '02), *Chemical Process Engineer, Excel Polymers, Kennedale TX.* Finally settling into some more permanent surroundings! Since graduating, I've lived in San Diego, Charleston, Upstate New York, and deployed for 6 months on a Navy Frigate around Central and South America.

Tom Zak (Spring '02), *Research/Chemical Engineer, Cima Nanotech Inc., St. Paul MN.*

Chris Patullo (Spring '02), *Production Superintendent – Crookston Factory, American Crystal Sugar,*

Crookston MN. Recently promoted from the plant engineer to production superintendent where I will now oversee all factory, production, and personnel. Living the quiet life on a ranch in North Dakota!

Michael Evenson (Spring '02), *Process Engineer, General Mills, Minneapolis MN.*

Jeff Johnson (Spring '01), *Shift Superintendent, Mosaic, Riverview FL.* With a promotion in June, I'm now responsible for everything that happens at the plant on my shift. I'm excited to be able to use my people skills to lead a team of about 34 operators & 3 supervisors.

Kari Johnson (Spring '01), *Lead Engineer, Micron Technology, Manassas VA.* I'm still enjoying life at Micron working in the Defect Analysis department. Since the last time I wrote, my facility has grown from a pilot line to a full production lab. We've also started building flash memory as well as DRAM. About a year ago I was promoted to lead of my group and I'm really enjoying this new position.

Zach Knase (Spring '00), *Quality Coordinator, StoraEnso, Niagara WI.* Brenda and I are expecting our first child Sept. 29th! Work has been steady. Our two paper machines are the best running and most profitable in our division.

Jeff Rust (Spring '98), *Product Line Engineer, Cargill IN., Blair NE.* Expanding plants in Texas and Nebraska. Took the Professional Chemical Engineering Exam in April and passed. Great challenge!

Cory Nelson (Spring '96), *QA/RE Engineering Manager, Medtronic, Minneapolis MN.* "Go Agitated Vessels!!"

Jennifer (Marinoff) Wilson (Spring '96). I am currently staying home with my 2 children Bret (6) and Jenna (4). I am starting nursing school this fall, to add to my degrees. I am hoping to work in the medical field part-time in about 2 years.

Whitney (Berry) Berg (Spring '96), *Systems Engineer, Stellant Inc., Eden Prairie MN.*

Katherine (Nelson) Jolly (Fall '95), *Product Development Manager, Medtronic, Revascularization & Surgical Therapies, Minneapolis MN.* Was assigned to manage our pediatric perfusion project in Jan 07. Perfusion is a new technology for me, but it goes back to my roots of chemical engineering. It is hard core

heat and mass transfer, fluid dynamics, and thermodynamics. I am sure there could be some great senior design projects in this area.

I sold my house in Shoreview and moved to Eden Prairie. I will be getting married (2nd go-around) in Aug 2007 to Chris Olig and will also become a stepmother to Meredith (7) and Lauren (6). For fun, I compete in triathlon. It's a blast.

Sheryl (Bergeron) Zellmer (Spring '93), *Software Verification Engineer, Medtronic—Patient Management, Minneapolis MN.* Married July 2002 and had an exciting honeymoon in Italy and wine country. In March 2004, we had our son, Jake. He continues to amaze and impress us daily and is a true joy. In 2006, after 9+ years at the same company, I initiated a career change and am working as a software verification engineer at Medtronic. I'm excited for the opportunity that blends software, science and health. I enjoy being a mom, family time, cooking, wine, and walk/jogs around the lake with the dog.

Pete Elliott (Spring '92), *Product Engineering Specialist, 3M Inc., Maplewood MN.* I work in a tape and adhesives laboratory developing and maintaining a variety of laminating adhesives used for electronics, automotive, construction & industrial applications. Currently I am working on a special project ramping up products on a newly installed process in South Korea, requiring extended trips to the Korea plant site.

Kraig Melin (Spring '91), *Paper Production Manager, Sappi Fine Paper, NA, Cloquet MN.* Busy year. Accepted a position of Paper Production Manager with Sappi this year. Busy summer with transition to Cloquet and move north. Jessica starts at UMD this fall and Blake will finish his senior year at Hermantown H.S.

2007 AIChE Spring Picnic at Chester Bowl

