ChE
Department of Chemical Engineering
University of Michigan
The Chemical Engineering Newsletter for Alumni & Friends

http://www.engin.umich.edu/dept/cheme cheme@umich.edu

Department Joins Race to Develop Fuel Cells and Fuel Processors

The ChE Group (L/R): Phil Savage, Johannes Schwank, Levi Thompson, Ralph Yang, and Erdogan Gulari

While President Bush promotes his energy plan and the public considers his proposal to drill for oil in Alaska, members of the Chemical Engineering Department are developing energy efficient technologies. This July, the Department of Energy awarded a group headed by Professor Levi Thompson a grant to build fuel processors for PEM (proton exchange membrane) fuel cell-powered automobiles. The chemical engineering group brings together experts in catalysis, reactor design, microfabrication, and combustion. Professor Thompson is joined by Erdogan Gulari, Johannes Schwank, Ralph Yang, and Phil Savage, as well as members of the mechanical and aerospace engineering departments.

According to published reports, if just 20% of today's vehicles were replaced with fuel cell vehicles, oil imports could be reduced by 1.5 million barrels per day, regulated air pollutants would be cut by two million tons per year, and 120 million tons of carbon dioxide would be eliminated. Fuel cells can be used to power anything from handheld devices to automobiles. This expanding market for fuel cells could exceed $10 billion, according to recent estimates. Several industries are hurrying to acquire a share of this market. For example, Michigan's largest electric utility, DTE Energy Co., is a major shareholder in the fuel cell company Plug Power. General Motors recently announced its goal to be the first automaker to sell one million fuel cell-powered vehicles. Several auto companies have already developed prototype vehicles that operate using fuel cells, including DaimlerChrysler's Necar 4, Ford's P2000, Honda's FCX V1, and Nissan's FCV.

Fuel cells are not a new technology. Discovered in 1839, and further developed by NASA in the 1960's, fuel cells convert the chemical energy in a fuel *directly* into electrical energy; bypassing the mechanical pathway of the internal combustion engine. A fuel cell is not a battery, although both fuel

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Note from the Chair

Dear Alumni and Friends,

This is my first newsletter, as I became chairman of the department in September 2000. It is a privilege to serve such an exceptional group of faculty and students, and to work in a College and University as outstanding as this one!

The year has been filled with changes (no surprise!). Professor Brice Carnahan achieved emeritus status. In addition, Levi Thompson is stepping up to the position of Associate Dean for Undergraduate Education for a three-year term. While this will take him out of the classroom for this period, he will continue his active research, with an exciting new thrust in the area of fuel cells, which he is leading, along with Professors Gulari, Schwank, Savage, and Yang. At the same time, we are very pleased to have hired Sharon Glotzer as an associate professor starting January 1, 2001. In addition, we have made two hires at the assistant professor level: Christina Smolke from Jay Keasling's (Ph.D., 1991) group at UC-Berkeley, and Dan Stafford from Greg Stephanopolous' group at MIT. They both have interests in the biotechnology area. To accommodate growth in these areas, the department will be acquiring new space in the G. G. Brown building when the Biomedical Engineering Department moves to its new building (the Gerstacker building), now being constructed on North Campus.

After an enrollment "bubble" in the mid-nineties of 150 students per undergraduate class, our enrollment has decreased to around 110 or so, per class. While we are proud of the attractiveness of chemical engineering at the University of Michigan, the smaller class size does relieve some of the strain on our faculty and classrooms, allowing us to enhance the quality of the undergraduate experience. We have added a spring offering of our heat and mass transport class, ChE 342, making it easier for students participating in the co-op program to complete the curriculum in a timely way. The department's revised undergraduate curriculum is now going into effect, with an added required course on biology, and a transition away from our "catch-all" ChE 486 course to a requirement of a materials course. In our graduate curriculum, Mike Solomon has added a new and popular class on light scattering methods, with plans to expand it to include microscopy.

Since I am relatively new to Michigan, having come here from Bell Labs in 1996, I very much welcome the chance to hear about our department from alumni and to hear suggestions and comments on how we might improve both our educational and research excellence, and our interactions with alumni. I was pleased to get to know Max Pettibone, a 1968 alumnus of our department, who received our Alumni Society Merit Award for 2000, and look forward to meeting Tenho Connable, a 1942 graduate, at this fall's alumni awards dinner, where she will be the recipient of the 2001 award.

Inside you will find other news items and activities of the faculty. We are very proud of the continuing progress the department is making is its research, teaching, and service to our students, alumni, and society. Please feel free to drop in to the department when you are in town, to get re-acquainted or email me at rlarson@umich.edu.

Sincerely,
Ronald G. Larson

Recent Faculty Hires

We are happy to announce that Christina Smolke and Dan Stafford will be joining the department as assistant professors. Christina and Dan will be starting postdoctoral positions elsewhere this fall, and so won't be joining us immediately.

Christina's research focuses on controlling gene expression through RNA design. She graduated with a B.S. degree in Chemical Engineering, with an emphasis in Biology, from the University of Southern California in 1997. She received a Ph.D. in Chemical Engineering from the University of California at Berkeley, where she worked on the directed processing and stabilization of polycistronic mRNA. Christina will conduct her postdoctoral research at UC-Berkeley in the Department of Molecular and Cellular Biology under Karsten Weis. There she will examine the role of Dhh1p, a DEAD-box helicase, in mRNA turnover in *Saccharomyces cerevisiae*.

Dan's research interests are in the areas of metabolic engineering and bioinformatics, with emphasis on applications in medicine and fine chemical synthesis. Dan received his B.S.E. from our department in 1997. He will receive his Ph.D. from MIT in October 2002. His doctoral research has focused on the development and application of the analytical and genetic methods of metabolic engineering to the synthesis of a key chemical precursor to the HIV drug Crixivan by the soil bacterium *Rhodococcus*. This work was performed in collaboration with scientists at Merck and Co., Inc.

Look for more news on these exciting young stars in upcoming newsletters.

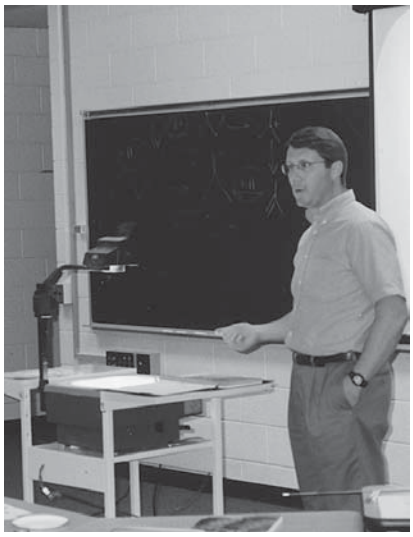
New Faculty Member–Sharon Glotzer

Sharon C. Glotzer joined the Department of Chemical Engineering on January 1, 2001, as an associate professor. She holds joint appointments in Materials Science and Engineering and Macromolecular Science and Engineering. Professor Glotzer received a B.S. in Physics from the University of California, Los Angeles in 1987 and a Ph.D. in Physics from Boston University in 1993. She spent two years as a National Research Council Postdoctoral Fellow at the National Institute of Standards and Technology, where she co-founded the Center for Theoretical and Computational Materials Science (CTCMS). For the past six years, Professor Glotzer served as the deputy director and then director of the CTCMS, working with industry and academia to accelerate progress in computational materials science and its impact on US industry. She has received many awards and honors, including the Presidential Early Career Award for Scientists and Engineers, the American Physical Society's Maria Goeppert-Mayer Award, and the Department of Commerce Bronze Medal Award, and is a member of the Sigma Xi Distinguished Lecturers College. She is an active member of the American Institute of Chemical Engineers, American Physical Society, Materials Research Society, and American Chemical Society, and is involved in numerous organizational and advisory activities in computational science and engineering, both nationally and around the world.

Professor Glotzer is a leader in developing and applying computational approaches to materials problems. Her research focuses on computational approaches to nanoscale systems, complex fluids and soft materials, with an emphasis on elucidating fundamental principles of assembly and ordering processes. She has authored more than 60 papers, edited several conference proceedings, and presented more than 70 invited talks at universities and national and international conferences and meetings. She is well known for her discoveries in the areas of spatially heterogeneous dynamics in liquids and glasses, and controlling mesoscale structure in polymer blends.

Faculty News

Savage 2001 National Catalyst Award Winner



Phil Savage received a 2001 National Catalyst Award from the American Chemistry Council. The award was presented at a banquet in St. Louis earlier this year. The Catalyst Award program recognizes and awards teachers of chemistry and science for their dedication, knowledge, and innovative teaching methods. Only one award in this competition, open to anyone who teaches chemistry or chemical engineering, goes to someone from a research institution. Supporting letters for Professor Savage's nomination came from his colleagues both here at Michigan and at other universities, and from ChE alumni.

Former undergraduate and graduate students praised Professor Savage's dedication to students, helping them not only to learn the fundamentals of chemical engineering but also challenging them to think creatively and encouraging them to act professionally. One student lauded his ability to "make unpopular courses popular and difficult ones understandable, and often even enjoyable." Many remarked that they appreciated Professor Savage's 'open door' policy; they felt comfortable coming outside of scheduled office hours to ask questions or just to discuss topics unrelated to class.

One former student, who was in two of Professor Savage's classes and worked in his research lab more than three terms, recently completed his Ph.D. at another school. In his letter, he expressed his gratitude for all the guidance he has received from Professor Savage as a student, a researcher, and now as a colleague. He wrote, "I can honestly say that it was Professor Savage who got me hooked on chemical engineering and research. He gave me the knowledge I needed to succeed academically and the confidence required to pursue my research and career goals. I, like many other students, owe a lot to Professor Savage."

Three DARPA Grants Awarded to ChE Faculty

Three Defense Advanced Research Projects Agency (DARPA) grants have been awarded to ChE faculty in the area of turbulent drag reduction. The first grant, "Diagnostics for Friction Drag Reduction Technology: Relationship between Turbulent Flow Structure and Drag Reducing Agent Molecular Orientation and Stretching," was awarded to Mike Solomon. This project will assess the role of flow-induced degradation in the application of polymers to turbulent drag reduction.

Professor Solomon is co-PI on another DARPA grant,"Experimental Study of Polymer Drag Reduction for Numerical Model Development and Validation." This project, in collaboration with faculty in the Naval Architecture and Marine Engineering department and researchers at the Veridian Corporation, will collect benchmark data on polymer turbulent drag reduction. The application for both grants is fast ocean transport.

A third grant, "Optimized Constitutive Equations for Predicting Polymer Turbulent Drag Reduction," went to Ron Larson. This project aims to determine the role of polymer deformation in drag reduction by simulating directly individual polymer molecules in turbulent flows. These results will help in devising coarse-grained methods for predicting drag in flow around large objects, such as naval vessels.

Thompson Appointed Associate Dean for Undergraduate Education

Professor Levi Thompson has accepted the position of Associate Dean for Undergraduate Education and will be begin his duties on September 1, 2001.

Professor Thompson received his B.S. degree from the University of Delaware and M.S.E. and Ph.D. degrees from the University of Michigan, all in Chemical Engineering, as well as an M.S.E. in Nuclear Engineering from Michigan. He joined the College of Engineering as an assistant professor of Chemical Engineering in 1988.

He has made many important contributions to the College's mission of teaching undergraduates, such as developing innovative teaching materials for core courses, including Heat and Mass Transfer and Chemical Process Simulation and Design I. At the graduate level, he has taught several courses, including specialty courses in his research fields of catalysis, advanced materials, and reaction engineering. Through his research, Levi has distinguished himself as a leader in the development of novel catalytic materials, including those used in fuel cells and fuel processors.

Professor Thompson has provided substantial service to the Department, College, University, and his profession. Of special note is his enormous contribution and commitment to minority issues. He has attained a highly respected stature as an educator and researcher, and with his leadership in undergraduate education, the College will continue to enhance its curricula and achieve improvements in its student service operations. "There are opportunities now at the College and University that will

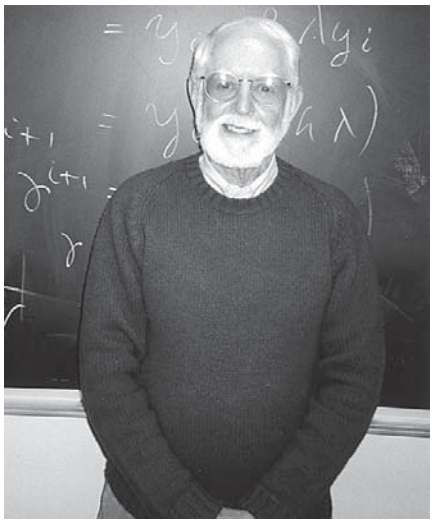
allow us to re-emphasize the importance of undergraduate education," says Professor Thompson. "My main priority as Associate Dean will be to make sure we properly serve the needs of undergraduate students and the faculty and staff who are involved in their education."

Gast Presents the 31st Donald L. Katz Lecture

Alice P. Gast, Professor of Chemical Engineering at Stanford University and at the Stanford Synchrotron Laboratory, was named the 2001 Donald L. Katz Lecturer. She was honored at the two-day event on April 5-6, where she presented two lectures. The first topic was "Chemical Engineering on a Chip: the Coming of Age of Colloid and Surface Science," and her second was "Micromechanics and Dynamics in Magnetorheological Suspensions."

A Texas native who grew up in California, Dr. Gast received her B.S. in Chemical Engineering from the University of Southern California and a Ph.D. in Chemical Engineering from Princeton University. She has received many honors in her career, including the National Academy of Sciences Award for Initiative in Research, and the Colburn Award from the AIChE. This year she was elected into the National Academy of Engineering.

Brice Carnahan Retirement



Brice, after his 'official' last class

Brice Carnahan retired on June 30, after an illustrious 41-year career at Michigan. A native of New Philadelphia, Ohio, he received his B.S. (1955) and M.S. (1956) degrees in chemical (with a minor in nuclear) engineering from Case Institute of Technology. He came to Michigan for his Ph.D. research, and worked on radiation-induced cracking of paraffins under the supervision of Professor Joe Martin. His conclusion: this is a very expensive way to crack hydrocarbons! At one point during his experimental work, Brice managed to contaminate the ground floor of the Nuclear Engineering building with a gamma-emitting silver nuclide, after which he was known as the "silver kid." No doubt this led to his prematurely white hair and a preference for non-experimental work!

Once at Michigan, Brice discovered that the IBM 650 computer in the basement of the Rackham Building was much more interesting than silver nuclides. He became a teaching fellow in the Math Department and an almost full-time assistant at the Computing Center. His computing interests led to a marathon weekend solution of a heat-exchanger optimization problem posed by Don Katz, then chair of the ChE Department. On the following Monday, Don hired Brice as full-time Technical Director of the Ford Foundation project, "Computers in Engineering Education," and later as Associate Director of the NSF project, "Computers in Engineering Design Education."

During the period 1959-1965, more than 200 faculty from nine engineering disciplines and 65 engineering schools participated in the various activities of these Michigan projects; they jointly produced many useful reports that were widely distributed to other engineering faculty in the U.S. and Canada. Brice's principal responsibilities were to keep the project afloat and to handle most of the faculty instruction. Don always referred to him as "a teacher of teachers."

Brice's collaborations with Don Katz firmly established Brice's interests in computing, numerical methods, and process design and simulation, provided opportunities that he would not have had otherwise, and steered him (after putting his doctoral thesis on hold and delaying his Ph.D. by an unconscionable number of years) toward an academic career that has brought him much pleasure.

Brice is well known for coauthoring, with Jim Wilkes and H. A. Luther (Texas A&M), *Applied Numerical Methods*, published in 1969; this text was very popular nationally for the following 20 years, and began a collaboration with Jim that spanned more than 35 years. For various extended periods since 1967—and continuously from 1981 to 1997—the two were responsible for organizing and supervising digital-computing courses for all (approximately 30,000) Michigan engineering freshmen. Twenty-seven different editions of their two course texts were published over the years.

In the department, Professor Carnahan chaired the graduate committee for 20 years (cumulatively) and taught courses on numerical and optimization methods, computer-aided process design, and material and energy balances. His research focused on algorithm development and software for computer-aided design, particularly for dynamic process simulation, most recently on algorithms for the solution of large-scale dynamic chemical process models on parallel computers. He was elected to the Engineering College Executive Committee (1979–1983), and was from 1983–93 a member of the Executive Committee of the pioneering Computer-Aided Engineering Network.

Nationally, Professor Carnahan was a founding member, chairman (1974–1975), and is currently

publications chairman of the nonprofit CACHE (Computer Aids for Chemical Engineering Education) Corporation. He was elected chairman of the AIChE Computer and Systems Technology Division (1981–1982), and was a member of the editorial board of *Computers and Chemical Engineering* (1978–1998). He is an elected Fellow of the AIChE, and has served as editor of six of its *Symposium Series* volumes since 1993.

Brice's leadership in computing has been recognized by the AIChE Computing in Chemical Engineering Award (1980), the Detroit Engineering Society Award as Chemical Engineer of the Year (1987), and the ASEE Chemical Engineering (3M) Lectureship (1991). Citations for his dynamic style of teaching and service include the Class of 1938E Service Award (1963), the University of Michigan Outstanding Service Award (1968), and the College of Engineering Excellence in Teaching (1983) and Excellence in Service (1993) awards.

Brice has been on the department's faculty since 1960, with brief (sabbatical leave) stints as a visiting faculty member at the University of Pennsylvania, Imperial College (London), and University of California at San Diego. Although he officially retired and was named Emeritus Professor in June, you can't keep an old dog down. Brice will be teaching his popular graduate course on numerical methods in Fall 2001.

(continued from front page)

cell and battery-powered vehicles run off of an electrical drive train. A fuel cell-powered vehicle uses a constant fuel supply, which eliminates downtime for battery charging. For NASA space missions, this fuel has been compressed hydrogen; for some stationary fuel cell applications, the fuel may be natural gas. The fuel processor that is being developed by Levi Thompson and his colleagues will use gasoline. Gasoline provides key advantages over gaseous fuels. It is much more dense than hydrogen and natural gas, which reduces the volume necessary for the fuel tank and alleviates safety concerns with gaseous fuels. It would take $100 billion in capital costs to supplement the existing gasoline infrastructure to produce just 10% of today's road fuel from hydrogen, as estimated by DOE.

In the fuel processor, gasoline will be desulfurized and then converted to hydrogen by reforming and partial oxidation reactions. Carbon monoxide is an unwanted by-product and its concentration will be reduced to less than 100 ppm using the water gas shift reaction and preferential oxidation. The fuel processing catalysts will be integrated into microchannel reactors, which are micron-sized catalytic beds. The small size substantially reduces the heat and mass transfer limitations typical of heterogeneous catalytic reactions. Integrated channels will decrease energy demands by fueling endothermic reactions with adjacent exothermic reactions. Graded catalyst beds will be used in order to put the best catalyst in the optimal position to further increase performance. All these strategies will be employed to meet the size and mass constraints. "Right now, we are working on a 5 W fuel processor that is the size of my fist," says Thompson. "The goal of our DOE contract is to design and fabricate a much larger fuel processor that can be used to power an automobile."

"Our group collaboration allows us to accomplish more than any one of us could alone. This large grant has a significant deliverable and will require our best effort, and perhaps a little luck," commented Thompson. Thompson expects to manage this project like a research center or a small business. The grant, in excess of $6 million, is one of the largest ever received by the department. "I hope our success on this project will have a ripple effect in the department and we will be able to attract additional funding to leverage the DOE grant," says Thompson. "We hope to put the department, the College of Engineering, and the University of Michigan at the forefront of the field of fuel processors and fuel cells."

Angela Lueking

Wilkes Retirement Celebration

Professor Wilkes and his wife, Mary Ann

Jim Wilkes retired in May 2000, after 40 very satisfying years in the department. A retirement dinner was held for him on October 7th in the Vandenberg Room of the Michigan League. It was attended by more than 100 friends and colleagues, ten of whom spoke wittily about Jim's career—J. Wayne Jones (Master of Ceremonies and Associate Dean of Undergraduate Education), Brice Carnahan, Donald Nicklin (who was Jim's first Ph.D. student in Cambridge, and who traveled from his native Australia for the occasion), Stuart W. Churchill (Jim's doctoral advisor), Marilyn Mason (Chairman, U-M Organ Department), John C. Ulicny (12th doctoral student), Elizabeth Batesole Hainey (19th doctoral student), Duc Anh Nguyen (graduate student from Chulalongkorn University, Bangkok), Gertrude V. Huebner (U-M Regent Emerita), and Brymer Williams. Jim responded in his own humorous way by recalling his many happy years at Michigan and thanking everybody for their kindness and generosity. Before the dinner, a social hour was generously hosted by Brice Carnahan at his home, and the Wilkes held an open house after the dinner.

The department also established an undergraduate scholarship endowment fund in Jim's honor, only the second time in 102 years that they had done so for a living faculty member. Thanks to the generosity of some 200 donors (those who have given since July 2000 appear on page 12), the fund is already approaching $100,000. The income from the fund will provide two annual scholarships for undergraduates who are working to support their own college expenses and who are helping their fellow students by significant extra-curricular activities.

Some of Jim Wilkes' doctoral students (L/R): Kevin Ellwood, Rick Blunk, John Ulicny, Elizabeth Batesole Hainey, Jim Wilkes, Rosemary Wesson Williams, Clifton Goddin, Joe Greene, and Donald Nicklin; Michigan League, October 7, 2001.

Max Pettibone, Alumni Award Recipient

Max E. Pettibone received an Alumni Society Merit Award during the Alumni Weekend in October 2000. Mr. Pettibone received a bachelor's degree in chemical engineering from the University of Michigan and a master's from Pennsylvania State University. His father, Maurice Pettibone (A.B. '33, J.D. '38), was also a U-M graduate.

Mr. Pettibone founded and managed a land development firm in the Washington D.C. area during the 1970's through 1990's. During this period of heavy growth in the suburban Washington D.C. area, his company developed over 20,000 lots for both commercial and residential markets. Though semi-retired, he continues to pursue select real estate ventures.

An active sportsman, Mr. Pettibone enjoys fishing the Outer Banks and playing hockey with a local team. He is a member of the University of Michigan Major Gifts Committee in Washington D.C., and is an avid Michigan sports fan.

Kudos

FACULTY AWARDS

Mark Burns received the 2001 College of Engineering Excellence in Teaching Award. Mark also has been selected as a member of the Genome Study Section at the National Institutes of Health. The approximately 20-member panel reviews applications on genomics, genetics, technology development, and informatics for various institutes at NIH.

Scott Fogler was the Keynote Speaker at two events in 2000: COBEQ 2000 in São Pedro, Brazil in September and the 50th Canadian Chemical Engineering Conference in Montreal in October.

Sharon Glotzer was named the Sigma Xi Distinguished Lecturer, 2001-2003.

David Mooney received the U-M Dental School's 2000 Award for Outstanding Research.

Mike Solomon has been selected as a recipient of a 2001 NSF CAREER Award. Professor Solomon's research area is the direct visualization of the structure and dynamics of complex fluids during flow by confocal and epifluorescence microscopy. This award supports fundamental research in the area of colloidal fluids and colloid/polymer mixtures.

Levi Thompson received the 2001 College of Engineering Excellence in Service Award. He also received the 2001 Harold Johnson Diversity Award.

Ralph Yang was the John Henske Distinguished Lecturer at Yale University this past April. He was also honored by Yale in April when he received the Award for Advancement of Basic and Applied Science.
The University of Oklahoma selected Dr. Yang as this year's Harry Fair Lecturer.

STUDENT AWARDS

Ali Mohraz, a graduate student in Professor Solomon's group, received the 2001 Outstanding Student Instructor award. He was a graduate student instructor for heat and mass transfer, ChE 342.

Five of our students received awards from the College of Engineering in April:

A.D. Moore Award
Corinne Richards

Charles Barth Jr. Distinguished Prize
Eric Roeder

Undergraduate Distinguished Achievement Award
Michelle Wu

Graduate Distinguished Achievement Award
Sundaresh Brahmasandra

ChE Staff Receive College of Engineering Awards

Two ChE staff members, Mike Africa and Brian Johnson, received Excellence in Staff Service Awards from the College of Engineering this year. They were honored by the College at a reception in May.

Mike, a 1994 graduate of our department, provides computer support for the department's 200 computers and many different users. Maintaining and upgrading these computers require that he constantly stay ahead of new advancements. He not only pursues this challenge enthusiastically, but he also takes the time to recommend useful technologies to his colleagues. Mike is a walking encyclopedia of all things electronic and is rarely stumped by any question or problem.

Brian Johnson is a research engineer in Dr. Mark Burns' research group. As the senior staff member of the group, Brian, who graduated from the Electrical Engineering Department in 1992, has been instrumental to the smooth operation of the unit and a key contributor to many of the group's innovations. Brian has won the respect of his colleagues as both an excellent engineer and an effective manager. His flexibility, dedication and professionalism have helped set the tone for the entire department.

Congratulations to Mike and Brian!

Graduate Students Improve Engineering Education

Ali Mohraz, a chemical engineering graduate student, spent several hours last August studying the department's undergraduate photo album in order to learn the names of each of his heat and mass transfer students. "Ali's dedication to his students was evident the first day of discussion when he said hello to each student by name as we walked in the door! I didn't even know his name, but he knew mine!" commented one of his students. This student, along with five others, nominated Ali for the Outstanding Instructor Award, which he won. The award is sponsored by the University of Michigan student chapter of the American Society for Engineering Education (ASEE). Ali is considering a career in academia, and being a member and now officer of ASEE has helped him to develop his teaching skills.

Chris Lorenz and Sara Soderstrom, past ASEE officers, took the opportunity to develop their teaching skills when they were GSI's in the reaction engineering and design course. They designed a study to examine how students learn in engineering classes: first, they assessed the students' learning styles, and then compared this information to student feedback about preferences in presentation method. Chris and Sara shared their findings with educators across the country at the ASEE national meeting in Albuquerque, New Mexico.

The student chapter of ASEE consists primarily of graduate students, although both undergraduates and faculty are welcome to participate. ASEE events are designed for students at all educational levels—from prospective engineering students to chemical engineering graduate students and faculty. "Improving engineering education is not only about the teachers, but also about the students," said Stacy Pyett, chemical engineering graduate student and president of the ASEE student chapter. ASEE hopes to promote diversity in the classroom by sponsoring luncheon discussions for undergraduates in the upcoming year. In addition, ASEE will provide informational sessions for undergraduates interested in attending graduate school. A summer seminar series organized by ASEE gives Ph.D. students an opportunity to refine their presentation skills. The group also sponsors workshops in which guest speakers discuss innovative teaching methods and engineering education as a career. ASEE has received numerous awards for its leadership in promoting engineering education, both from the National ASEE organization and the College of Engineering. Dr. Susan Montgomery, who founded the U-M chapter and serves as its advisor, commented, "it continually amazes me how successfully these students generate creative ideas. This student group has greatly impacted the culture of engineering education in our college." For more information about ASEE and its activities, visit their web site at www.engin.umich.edu/soc/asee.

Angela Lueking

Students and faculty after student vs. faculty softball game; the students won, 11-8.

New Undergraduate Curriculum Will Prepare Students for Varied Careers

The faculty of the chemical engineering department has completed a two-year review of the chemical engineering undergraduate curriculum, which included input from alumni and students as well as from our advisory board, and took into account the suggestions of "Technology Vision 2020," the result of a two-year study by a coalition of the American Chemical Society, the American Institute of Chemical Engineers, The Chemical Manufacturers Association, the Council for Chemical Research, and the Synthetic Organic Chemical Manufacturers Association, on the factors affecting the competitiveness of the U.S. Chemical Industry. The full text of their report is available at www.chemicalvision2020.org.

We have developed a revised curriculum that addresses the needs for an increased focus in bioprocesses, materials technology, and analytical chemistry, and that we believe will better prepare our students for a range of possible future careers. The highlights of the new curriculum include the addition of analytical chemistry and a biology/life science requirement for all our students. The advanced inorganic chemistry requirement was dropped, but students are still able to take this course to fulfill one of their technical electives. In addition, the first design course, ChE 486, was replaced by a material science requirement. The safety and environmental aspects of ChE 486 will be integrated into the other core courses.

The capstone design course has also been enhanced through the participation of Mr. Barry Barkel, an alumnus of our department and recent retiree from BASF. Barkel, in his part-time position as adjunct lecturer, team-taught the design course last year with Professor Phil Savage. Barkel generously shared his decades of industry perspective with our students, and integrated a greater environmental and safety focus in the course. Students have taken to him and often seek him out for advice on career options and other issues.

For a more in-depth look at the curriculum, we invite you to visit www.engin.umich.edu/dept/cheme/ugoffice/ugprog.html. We are encouraged by the positive response we have received so far from alumni, recruiters, and students, and welcome your response.

Reaction Engineering Course on the Web

Some of our alumni will recall learning reaction engineering and design through the self-paced textbook Professor Scott Fogler authored in the early 70's. Others will remember the computer modules, which allowed them to test their reaction engineering skills in Kinetic Jeopardy. It will come as no surprise to learn that Professor Fogler continues to bring the latest in instructional technology to the teaching of reaction kinetics. His latest endeavor has resulted in a CD- and web-based, asynchronous-learning (AL) version of ChE 344, Reaction Engineering and Design, offered in spring term. AL is based on the idea that students can learn course material at different times and locations, in contrast to synchronous learning, in which students learn by attending a conventional lecture or laboratory.

The interactive CD contains lecture notes with audio clips, interactive computer modules, and example problems, provided as a supplement to the textbook. The course website, accessible to all through www.engin.umich.edu/~cre, contains unit descriptions, class information, course grades, and updates. In addition to the course material, students also complete an open-ended project to explore chemical reaction engineering principles further, and take two exams and a final exam under the supervision of a proctor. A teaching assistant is available to respond to students' questions.

The course has been offered during the past two summers, with increasing enrollments. "Scott is helping the department take the leading position in distance and asynchronous learning," says Professor Ron Larson. "This course is getting kudos from students, and allowing them to tailor their studies to permit cooperative and other flexible curricular arrangements." Students also comment that the structure of the course encourages them to take more responsibility for their learning, and to think more critically.

Gifts from our Alumni, Friends, and Research Partners

July 2000 to June 2001

We are grateful for your interest in our department and your generous contributions. If we have missed someone, please accept our apology, and also let us know so we can correct our records.

Brymer Williams Scholarship Fund
Finis E. Carleton III, Ph.D.
James A. Craig, Ph.D.
Dow Chemical Company Foundation
Dr. Earl A. Ebach
General Motors Foundation
David W. Haartz
Dr. Hua-Tie T. Kau
Mr. Thomas H. Laity
Robert H. Miller, Ph.D.
Mr. Garry M. Mlot
Oxford University Press
Pecsco
Dr. George J. Quarderer
Dr. Roger K. Rains
Shell Oil Company Foundation

CACHE-Computer Aids for Chemical Engineering Education
Robert G. Ringler

ChE Minority Convertible Loan Fund
BP Amoco Foundation

ChE Fellowships Fund
Warren D. Gilbert
Robert M. Itami, M.D.
Clarence J. Young Family Trust

ChE Special Fund
Air Products Foundation
Mr. Charles B. Armstrong
BASF Corporation-Headquarters
BP Amoco Foundation
Laura D. Bracken
Dan Galliver Chapel
Chevron U.S.A., Incorporated
Keith H. Coats Rev. Liv. Trust
Cynthia G. Collins
Gus L. Constan, Ph.D.
Eric F. Cook
DaimlerChrysler Fund
Thomas G. DeJonghe, J.D.
W. Nicholas Delgass
Dow Chemical Company Foundation
Dow Chemical Company
Dow Corning Corporation
James R. Duthie, Jr.
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Oxford University Press
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H. Ray Wortman

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Dow Chemical Company Foundation
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Halliburton Services
Intevep, S.A.
Phillips Petroleum Company
Schlumberger Dowell

James O. Wilkes Undergraduate Scholarship
Anonymous (16)
James R. & Tia Alexander
Richard E. Anderson
Bruce W. Ball
Dr. Richard & Chris Balzhiser
Dr. Robert C. F. Bartels
Ron & Chris Bastien
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Thank You!

Claire O'Connor Returns to Department

We were happy to welcome back Claire O'Connor to Chemical Engineering in June, when she assumed the position of department administrator. Before she left in 1996 to work in the College of Engineering, she had served the department in the capacity of office assistant, and then later as administrative assistant. She brings with her an extensive background in personnel and finances from her five years with the College. While she was in engineering administration, Claire worked in the resource planning and management division, where she managed the budget and personnel affairs for the Associate Dean of Undergraduate Education. She was also responsible for planning and implementing staff development activities in the College.

Claire looks forward to the challenges of her new position and is "delighted to return to the department to work again with my former colleagues, and with the many new staff and faculty members who have come to the department since I left five years ago." An avid Michigan football fan, Claire looks forward to meeting alumni, and in many cases, renewing old acquaintances at the homecoming tailgate this October.

Meet Our Other New Staff

Connie Bacus, Academic Secretary and Seminar Administrative Coordinator. Connie is new to the University of Michigan.

Ruby Sowards, Academic Secretary and Secretary to the Chair. Ruby worked in the EECS and IOE Departments before coming to the ChE Department.

Melissa Bower, Department Receptionist and Graduate Recruiting Coordinator. Melissa worked at Rackham and Undergraduate Admissions before joining the ChE Department.

FALL ALUMNI EVENTS!!!

Alumni enjoying last year's tailgate

If you will be in town for the SWE-Tau Beta Pi Career Fair this fall, please join us at our annual **Alumni/Student Reception** on Monday, September 24, from 5:30-7:00 p.m. in the Podbielniak Lounge (3158 Dow). We were happy so many of you stopped by last year and hope even more of you can work the reception into your schedules this fall. Please contact Sandy Swisher (734-764-7413, sandys@umich.edu), if you would like to attend.

The department will also be hosting the **Annual ChE Alumni and Friends Homecoming Tailgate** on October 13. We have a great location again—the Rainbow Creation, directly across from the Stadium on the corner of Main and Stadium. Our party will begin two hours before the Michigan-Purdue game (starting time is yet to be announced). Please join us this year to enjoy some food and conversation before watching Michigan attempt to avenge last year's loss to Purdue. If you wish to join us, please contact Sandy Swisher by phone or e-mail. We enjoyed visiting with all of you who attended last year and look forward to seeing many more of you this year. Please check out our web page (www.engin.umich.edu/dept/cheme/alumni.html) for game time and tailgate details.

Join the ChE Alumni E-mail Group. Contact Sandy Swisher at sandys@umich.edu.

Chemical Engineering History Book

If you have not yet subscribed to the forthcoming ChE history book and wish to do so and have your name(s) listed at the beginning of the book, please complete and return this form. The cost is $25.00 per copy, including postage.

Name _____

Address _____

_____

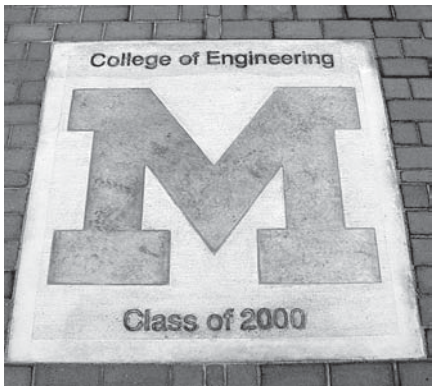
Home Phone _____

Degree(s) with year of each _____

_____

☐ Payment Enclosed

Make check payable to the University of Michigan
Send to: Claire O'Connor
Department of Chemical Engineering, The University of Michigan
3074 H.H. Dow Bldg., Ann Arbor, MI 48109-2136



New Block 'M' on North Campus
(A Gift from the Class of 2000)

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Scholarships Make Life Easier

Cori Richards has received two scholarships from the Department of Chemical Engineering during her undergraduate career here at Michigan. At the end of her sophomore year, she was awarded the G. Brymer Williams Scholarship and, at the end of her junior year, the Jane & Howard TenBroeck Scholarship. The College of Engineering gave her an A. D. Moore Award this year in recognition of her "academic excellence, leadership qualities, and outstanding contributions to extracurricular activities."

Throughout her undergraduate career, Cori has worked during both the summer and school year as a work-study student to help finance her education. The awards she received from the Department and the College allowed Cori time to do unpaid, independent research at the University this past summer, where in previous summers her work schedule would not have allowed it. Cori is grateful for this research opportunity since she is planning to go to graduate school in the fall of 2002 and is considering an academic career. Cori will receive a B.S.E. in Chemical Engineering and a B.S. in Biology this coming May.

Cori has been active in many extracurricular activities, including serving as a coach for her high school's Science Olympiad team. Cori enjoys sports and has played on a number of intramural teams at the university. She is a member of several student organizations and plays the oboe in the Michigan Pops Orchestra. She enjoys traveling and being outside, and is very interested in environmental issues. This past summer Cori visited Costa Rica, where she spent time trekking through the rain forests.

First Wilkes Scholarship Awarded

Michelle Arthur is the first recipient of a James O. Wilkes Scholarship, for the 2001/2002 academic year. She comes from Troy, Michigan, where she was on her high school lacrosse team, and will be graduating from our department in May 2002. She is not only a full-time student, but a full-time employee, working an additional 40 hours every week as a bartender to help pay her way through school. (Self-help by working outside regular studies is an important criterion for the scholarship.) Michelle is the first woman in her family to attend college to complete a degree. She is fluent in both French and German. Her hobbies include running, snowboarding, kickboxing (Thai style), and playing the piano and saxophone.

Faculty/Alumni Scholarship Fund for the Undergraduate Program

If you would like to help ChE undergraduate students at Michigan, you can make a contribution to the Faculty/Alumni Scholarship Fund. We award scholarships each year to our students; however, there are always deserving students who we are unable to help financially.

If you would like to contribute money to the Faculty/Alumni Scholarship Fund for the Undergraduate Program in Chemical Engineering, we ask that you complete and submit the form below.

Faculty/Alumni Scholarship Fund for the Undergraduate Program

Name(s) as you would like them to appear in donor listings

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☐ Please check if you would like your gift to remain anonymous

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Expiration Date

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Signature

Credit card gifts are deductible only in the year the bank processes the transaction. To be processed by year end, these gifts must reach U-M by 12/15/01.

Make check payable to the University of Michigan
Send to: Claire O'Connor
Department of Chemical Engineering, The University of Michigan
3074 H.H. Dow Bldg., Ann Arbor, MI 48109-2136

Eli Lilly Pharmaceutical Engineering Endeavors

Interest in our pharmaceutical engineering program continues to grow, both from our students and from industry. We are delighted to announce that the Eli Lilly Company and Foundation has chosen our department to be the recipient of a three-year award that will provide $45,000 towards our pharmaceutical engineering masters program, and $30,000 for undergraduate scholarships.

The masters program is aimed at chemical engineering and pharmacy students and professionals. Eli Lilly's funding will support the pharmaceutical engineering seminar series, which is broadcast via satellite to remote locations. Corporate sponsorship from Pfizer, Pharmacia and Roche also graciously support this endeavor.

At the undergraduate level, this scholarship will support $10,000 scholarships for third-year students with an interest in the pharmaceutical industry. Eli Lilly joins 3M, Merck, General Mills, and Dow in providing substantial scholarships for our students. "We are humbled by the generosity of our industrial partners, and proud of the performance of our students and alumni. We appreciate that it's their hard work and dedication that gives Michigan the reputation that leads to such generosity, and we will continue to provide the best education we can to maintain this reputation," says Dr. Susan Montgomery, Undergraduate Program Advisor.

Alumni News

Sid Sapakie (BSE '67) was elected vice president of AIChE last year and will serve as president of the Institute in 2001. Sid retired after 33 years with General Mills and is now a Senior Fellow at the University of Minnesota. He is also working as a very part-time consultant.

Daniel Gamota (BSE '87) is leading the team comprised of Motorola, Dow Chemical, and Xerox that was awarded $15.7 million in seed funding to develop the technology and the business strategy for plastic integrated circuits. This space has the potential for a $60 billion market for "things that think" and will compete with the likes of Intel, Texas Instruments, and Advanced Micro Devices.

Michael Ferrante (BSE '93, MBA '98) and wife, Deanna (Glickman), are the proud parents of Emilia Jane Ferrante, born March 21, 2001. Michael is manager of business process engineering at Merck, working on the Operational Excellence initiative.

Sanjeev Majoo (MSE '93, PhD '97) and his wife, Ruchi, were blessed with a baby boy, Kush, on March 24, 2001. Also, in March, he moved to another department, Process Engineering, in Somerset, NJ, within the same company, Merck .

Mike Schultz (BSE '93) has been working for UOP in Des Plaines, IL, as a process research specialist in the Process Design Development group.

Kevin Siebert (MSE '93, PhD '96) is still at Merck in Rahway, NJ. He is currently a project group leader directing the engineering research activities on two compounds. His wife, Sherri, recently gave birth to their first child, a girl named Sarah Jordan Seibert. Sarah was born at 8:05 a.m on April 19, weighing 7 lbs 11 oz.

Deanna Thompson (BSE '93) finished her PhD in Chemical Engineering at Rutgers. She has moved to Boston to do a post-doc in genomics at Harvard/Mass General/ Shriners Burn Center.

Matt Birchmeier (BSE '94) left beautiful Madison, WI, and graduate school and took a job with Pharmacia in Skokie, IL, where he's now making drugs.

Jennifer Casteel (BSE '94) is working at Hewlett-Packard in Roseville, CA, as an engineering manager. During the past year, she finished her MBA and got married—it's been very exciting and busy!

Christopher Fletcher (BSE '94) has been with the same chemical company since graduation, IRMCO in Evanston, IL, which manufactures environmentally safe non-oil lubricants. He has recently been promoted to Technical Service and Product Development Manager. Additions to his family include Abigail, who is 3 months old, and her two older brothers, Caleb, 5, and Jacob, 2. He's building a new house and will be moving to Fenton, MI, by the end of the summer.

Jeff Gray (BSE '94) finished his PhD in chemical engineering at the University of Texas at Austin in August of 2000, with a dissertation entitled "Structure Formation in Colloidal and Nanoscale Systems." He is currently an NIH fellow modeling protein-protein interactions in a biochemistry lab at the University of Washington. In the fall of 2002, he will start as an assistant professor in chemical engineering at Johns Hopkins University.

Javier Jasinski (BSE '94) received his MBA from the Goizueta Business School at Emory University this past May. In August 1998, Javier married his girlfriend, Dorita, who waited for him in Uruguay while he completed his BSE. They are now living in Montevideo, Uruguay, where Javier owns a company that commercializes pharmaceutical active ingredients.

Jennifer Tipa (BSE '95) left her job at 3M last year and became a full-time student (once again) to pursue her MBA at Harvard Business School. She survived the first year, and is spending her summer working in strategic product development at Millennium Pharmaceuticals, a small biotechnology firm located in Cambridge, MA. She's getting married this August to a fabulous guy...other than the fact that he's a Spartan!

Andrea Cousino (BSE '96) has been working for Accenture for five years and was just promoted to manager this March. She traveled in Europe for three weeks this year with fellow ChE alum, Susan Maskery.

Phil Cusick (BSE '96) just completed his MBA at NYU and will start working for BearStearns, a New York investment bank in August. He was recently engaged; no wedding date has been set yet.

Kerri Oikarinen (BSE '97) and **Travis Fischer** (BSE '98) were married on March 24, 2001. Travis and Kerri live in Ypsilanti, Michigan. Travis is working at WorldCom as an LAN/WAN engineer and Kerri is working at Visteon as a product design engineer.

Kim Snodgrass (BSE '97) and **Jeff Draper** (BSE '98) are engaged to be married on September 1 of this year. They currently reside in Evanston, IL. They are spending lots of time outdoors enjoying the summer months.

Don Gualdoni (BSE '98) is employed at Pulte Home Corporation in their IT department after working for Deloitte Consulting for two years. He will be attending the Kellogg Graduate School of Management at Northwestern University in the fall. Don travelled to Europe for two months from mid-May to mid-July.

Andrew Bayley (BSE '99) is in the PDP (Professional Development Program) at BASF and has had the opportunity to work as a project engineer, operations engineer, research engineer, and now as a technical service representative. He spent time at plants in Ohio, Louisiana, and Michigan before taking a permanent placement in Livonia, MI.

Andrea Bologna (BSE '99) married Jeffrey Barringer on June 30, 2001. The couple spent two weeks in Maui for their

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honeymoon. Andrea is still working for Lear Corporation and was just promoted into the Advance Sales Electrical/ Electronics group. They bought a house and reside in Royal Oak.

Dustin Clinard (BSE '99) is moving to Wisconsin to work for BASF. He filed a patent application within the first six months of graduation. Very exciting!

Nicole Coy (BSE '99) lives in Washington, D.C. and works for the United States Patent and Trademark Office. This fall she will be attending George Mason Law School, where she will study intellectual property.

Darrick Holland (BSE '99) joined Abbott Laboratories in the Chicago area after graduation. He went into a development program for engineers and has already had the opportunity to go back to Michigan to recruit! He is currently working as a plant supervisor for one of the R&D operations. This assignment will be his last rotation before he settles down and assumes a regular position at Abbott.

Aisha Rengan (BSE '99) will complete a Professional Master of Science in Industrial Mathematics at Michigan State in December. She will be getting married on April 2, 2002. This past summer she worked at Guidant in California, where she spent a lot of time with Benita Kuo, who is working in the area.

Arul Thirumoorthi (BSE '99) was assigned in April to Engineering R&D at the BASF Group headquarters in Ludwigshafen, Germany for two years. He works there with extraction technologies, focusing on debottle-necking, scale-up and process evaluation using theoretical methods, as well as experimentation in their extraction process laboratory. Mt. Olive, NJ and process engineering in Houston, TX.

Matt Duncan (BSE '00) is a member of the technical staff of the Defense Nuclear Facilities Safety Board, which is a federal agency located in Washington D.C. He plans to attend Princeton University next year to study for a master's degree in chemical engineering. After graduation he plans to return to work at the DNFSB.

Deanna Mouro (BSE '00) has moved to Pennsylvania (about 30 miles north of Philadelphia) to work in Pharmaceutical Research and Development at Merck & Co., Inc. She plans to go to grad school sometime in the future.

Andy Rusiniak (BSE '00, BiomedE '01) started working for Eli Lilly in June of this year in the Fermentation Development department. On November 2, 2002, he will be marrying Lani Pascual.

Nate Barber (BSE '01) was married May 12, 2001, just 14 days after graduation. He moved to Aliso Viejo, CA (Southern California) and is employed by Fluor Daniel as a Process Engineer. Nate is working on dynamic simulation and with reliability, availability, and maintainability analysis.

In Memoriam

Louis Jager (BSE '88) passed away in his sleep on March 23, 2001. He was well respected as an engineer, working for the Michigan Department of Environmental Quality Division, Air Quality Division, where he helped set up and run the pioneering Emission Trading Program. He will be greatly missed by everyone who knew him. If you would like to make a contribution to the educational fund for his children, please make your check payable to the Jager Grandchildren Trust and send to: Jager Family, c/o Palmer-Bush Delta Chapter, 6020 West Saginaw Highway, Lansing, MI 48197. Telephone is (517) 323-7890.

We Want to Hear from You

Classmates and faculty whom you may not have seen in years are interested in what you have done recently, changes in positions, and your plans for the future. Take a minute to send or e-mail (cheme@umich.edu) us your news for inclusion in next year's newsletter and on the alumni web page.

Class of 2001 !

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The ChE Newsletter is a publication of the Department of Chemical Engineering, The University of Michigan, 2001.

Ronald G. Larson, Chairman
Sandra Swisher, Editor and Designer