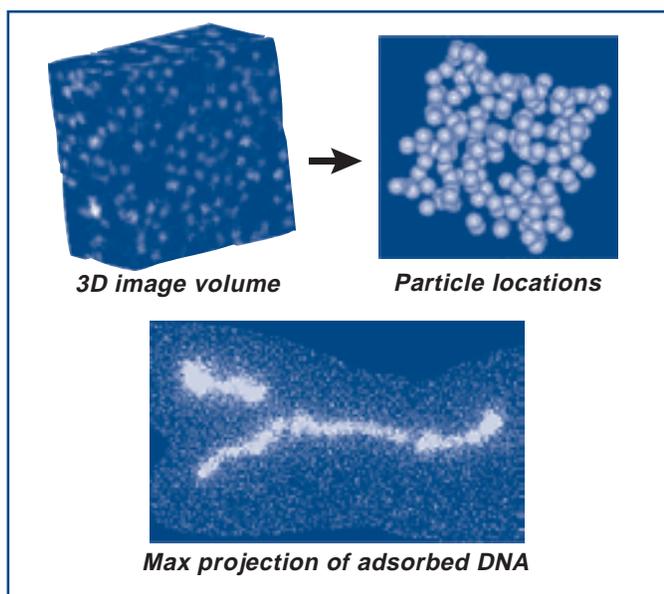


Confocal Microscope to Enhance Complex Fluids Research



Courtesy of Priya Varadan and Lei Li

Confocal microscopy images captured by department researchers of 0.80 micron diameter colloidal particles (top) and of DNA (below).

much like those obtained for the human body by magnetic resonance imaging (MRI). Because confocal microscopy is an optical method, submicron resolution is possible. For example, with the best microscope objectives, objects as small as 200 nm can be located with precision as great as 30 nm (*above figure*). Since the 3D slice thickness is typically as small as 100 nm, the microscope can achieve very fine resolution of previously unknown features of complex fluid structure.

According to Solomon, the project director, "Confocal microscopy is a cutting edge imaging technique that has long been a primary research tool in the life sciences. Our department and college are leading the way in applying this method to engineering research, particularly in the areas of complex fluids and biomaterials." Approximately fifteen Ph.D. students, four post-doctoral fellows and seven undergraduate researchers are members of the

(continued on page 7)

The department has installed a new confocal laser scanning microscope as part of a project supported by the National Science Foundation's Major Research Instrumentation Program. This state-of-the-art device, which opens exciting new research directions for the study of complex fluids, significantly adds to the department's already strong experimental capabilities in this area. Faculty members Mike Solomon and Ron Larson joined with departmental colleague Mark Burns and faculty from the Biomedical Engineering, Materials Science and Engineering and Electrical Engineering and Computer Science Departments to acquire the instrument.

Confocal microscopy is a unique instrument because it directly images the three-dimensional structure of materials by collecting multiple slices of fluorescence emission from stained specimens. The 2D slices are acquired by progressive scanning with a rastering laser. This stack of 2D slices is then reconstructed into a 3D rendering. The reconstruction yields results that are

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Note from the Chair

Dear Alumni and Friends,

The department has had a very exciting year, especially in our key research areas. The team of Thompson, Gulari, Savage, Schwank, and Yang, along with other faculty in the College of Engineering, has initiated research on hydrogen and fuel cells under a \$6 million Department of Energy grant. A group headed by Solomon, along with Burns and Larson, again teaming up with colleagues in the college, obtained a National Science Foundation grant to create a microscopy center, including the college's first confocal microscope, which is the MRI of fluids and materials, as it creates three dimensional optical images of complex fluids and materials such as colloids, biological fluids, and polymer blends. We have added an adjunct faculty member, Chester Ni, of Pfizer, who has created a departmental graduate course on bioinformatics, which was very popular when offered for the first time last year. You will find details on these and many other topics in this newsletter.

For the coming year, we are planning a major expansion in our research space, which will occur as a result of the move of Biomedical Engineering Department from their space in the G.G. Brown building to their new home in the Gerstacker building, scheduled to be completed in December of this year. Their departure will free up around 7,000 square feet of lab and office space, increasing our total by about 20%. This will not only relieve crowding in our existing labs and graduate student offices, but also create room for new faculty hires. The department will be conducting two faculty searches this year, one of them a unique "cluster" search, involving three departments, Chemical Engineering, Materials Science and Engineering, and Biomedical Engineering, to fill two to three slots in the bio area.

You might notice that many of our activities involve substantial collaboration within the College of Engineering, including major research thrusts, joint hiring, and space re-allocations. It has been a pleasure to be part, not only of a strong department, but also a top engineering college, and a very strong university as well. Not only will the construction of the Gerstacker building and a second biomedical engineering building (devoted, in part, to undergraduate education) affect us positively, so will the completion of the large life sciences complex, which is bridging the medical campus to the main campus. Our department already has significant interactions with the Life Sciences Institute, and we expect these growing collaborations to help make our department an even more exciting place to be.

Our department continues to have significant teaching involvement outside of the department, offering an evening M.S. program at Dow Chemical Co., in Midland, courses at Chulalongkorn University in Bangkok, and a program for visiting chemical engineering students from South Africa. These programs continue and extend a long tradition of excellence in teaching and service in our department.

We continue to value our alumni and seek their advice. I was glad several of you visited the department during alumni weekend in October, 2001, and hope to see more of you this October for the 2002 Michigan Engineering Alumni Weekend. We are proud to announce that our Engineering Society Merit Award this year will go to Professor Stuart Churchill, who not only obtained his bachelor's and doctorate degrees from the University of Michigan, but served as a faculty member, and department chairman (1961-1967) as well. These facts, and many, many more, are available in Jim Wilkes' book, *A Century of Chemical Engineering at the University of Michigan*. Any of you who would like to receive the book should complete and return the form on page 16. Stu Churchill will be here from the University of Pennsylvania, where he is currently on the faculty, for the alumni weekend on October 25. Please come and meet him and our faculty, staff, and students!

Sincerely,
Ronald G. Larson

Faculty News

New Adjunct Associate Professor Introduces Bioinformatics Course



Dr. Chester Ni was appointed adjunct associate professor of chemical engineering this year. Dr. Ni is a manager and senior group leader of bioinformatics and scientific computing at Pfizer Global R & D, Ann Arbor Labora-

tories. His major responsibility at Pfizer is to manage projects in advanced algorithm development for biomarker discovery in utilization of emerging genomics, proteomics and metabonomics technologies. Dr. Ni earned his M.S. and Ph.D. in bioengineering at the University of Michigan, where he worked with Dr. Michael Savageau on whole-cell dynamics and system theories research. He did post-doctoral diabetes research with Dr. Richard Bergman at the University of Southern California. His research interests are systems biology, novel algorithm development, knowledge management, data warehousing and mining, and high performance scientific computing.

In fall 2001, Dr. Ni developed and taught a new graduate course in bioinformatics, ChE/Bioinformatics 530, for the first time. Bioinformatics is the field of science in which biology, computer science, and information technology merge into a single discipline. The ultimate goal of the field is to enable the discovery of new biological insights as well as to create a global perspective from which unifying principles in biology can be discerned.

Most of the students enrolled in the class last year were from the chemical engineering department or the medical school. Ni says the first class was a success and he looks forward to this term.

Biotechnology became a major new area of study in chemical engineering in the 1980s with advances in molecular biology and related fields. Similar progress is taking place in genomics and other related fields, such as transcriptome/RNA profiling, proteomics, metabonomics and physiomics. Because of the sheer volume of high-throughput data, systematic and computational approaches have become even more relevant. The broad technical and scientific emphasis of the traditional chemical engineering curriculum does an excellent job of preparing students for bioinformatics and genomics research.

ACS Symposium Held at Michigan

The 76th American Chemical Society Colloid and Surface Science Symposium was held at the University of Michigan June 23-26, 2002, co-chaired by Professor Stacy Bike and Professor R. Nagarajan (Pennsylvania State University). Approximately 400 scientists and engineers from around the world presented 343 papers. This was the fourth time that the University of Michigan has hosted this meeting. In fact, the first time Michigan hosted the symposium, in 1927, the newly-created ACS Division of Colloid and Surface Chemistry sponsored the event.

Several faculty from the University of Michigan organized technical sessions. Those from the Chemical Engineering Department were Professors Sharon Glotzer, Rob Lionberger, Johannes Schwank, Mike Solomon, and Henry Wang.

Tissue Regeneration Research Update

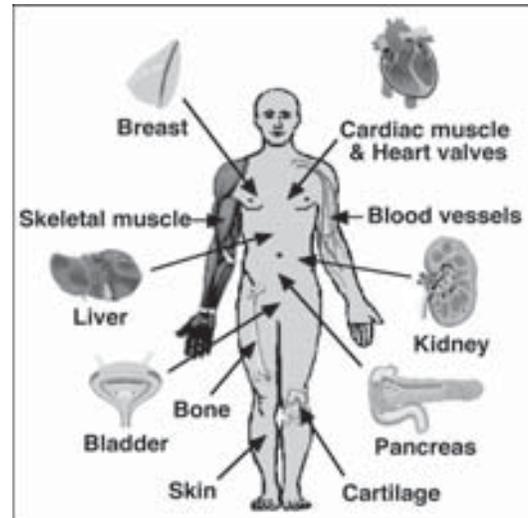
Many of us have suffered or know someone who has suffered because of tissue or organ failure. Current therapies for these types of major medical problems, which account for approximately half of all health care costs in the United States, have significant limitations. These drawbacks spurred interest in engineering for regenerating tissues and organs in the body by combining principles of engineering, life sciences, and clinical sciences (*right*). Professor David Mooney's laboratory is applying chemical engineering principles to the design and development of novel systems to regrow tissues and organs in the body. Mooney is a professor of biologic & materials sciences in the Dental School, and associate professor of chemical engineering. Researchers in his lab are taking a

variety of approaches to achieve this goal, including transplanting a patient's own cells, delivering proteins that make cells already in the body form new tissues, and using gene therapy to grow tissues. A common theme in these approaches involves combining basic studies on the mechanisms by which cells interact with materials with the synthesis of new polymers that mimic natural materials in the body.

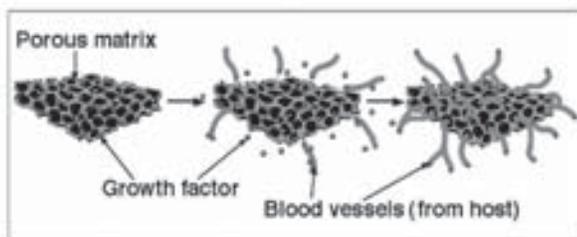
Specific projects range from the development of novel polymer systems that allow for gene therapies to be applied to specific tissues in the body, to the transplantation of stem cells capable of growing into bone and cartilage tissue.

One recent topic based on chemical engineering fundamentals involves addressing the mass transport requirements of the new tissues and organs. These tissues require convective transport of nutrients, via a system of blood

vessels, to support their metabolic requirements and keep them alive. Researchers in Mooney's laboratory have developed novel systems for the sustained and localized delivery of drugs that promote new blood vessel formation (*left*), and this research may have broad applicability to the entire tissue engineering field and more specifically to the treatment of coronary artery disease. Another project based on engineering fundamentals involves the development of polymers that can be injected into tissues using syringes or other non-surgical approaches. These may allow easy and virtually pain- and trauma-free options for cell transplantation and new tissue growth. The rheological properties of these



Academic researchers and companies are currently attempting to engineer virtually every tissue and organ in the body.



New systems are being developed that allow drugs, called growth factors, to be immobilized within biodegradable polymers for subsequent local and sustained release following placement in the body. These systems can be used to drive the formation of new blood vessels in tissues with insufficient blood flow, such as heart tissue in patients suffering from coronary artery disease.

polymers are critical in these approaches. Altogether, the research in the Mooney laboratories has resulted in a number of patents, which have been licensed to industrial partners for development into medical products. The research is supported by the National Institutes of Health, and the Advanced Technology

Program of the National Institute of Standards and Technology. Mooney is also the principal investigator in a new graduate training program in "Tissue Engineering and Regeneration," which was recently funded by the National Institutes of Health. This training program is a joint endeavor of the College of Engineer-

ing, and the Medical and Dental Schools, and will allow the university to expand its research efforts in this emerging area of biotechnology. To read more about Professor Mooney's research, visit www.engin.umich.edu/dept/cheme/people/mooney.html.

ChE Summer Short Courses at Michigan

The Chemical Engineering Department presented two industrial short courses this summer in Ann Arbor. Professors Levi Thompson and Phil Savage taught their three-day course on Reaction Engineering and Applied Catalysis for the 10th consecutive year. The course, which covers essentially all aspects of catalytic science and technology, attracts participants from the chemical, automotive, petroleum, and energy industries, along with researchers from national laboratories.

The department also presented, for the first time "An Introduction to the Science and Engineering of Fuel Cells and Fuel Processors." Fuel cells offer a promising emerging technology that may eventually deliver electrical power to a spectrum of applications across the economy. Their corresponding fuel processors are an equally important component of the overall fuel cell system. Professor Johannes Schwank and Robert W. Fletcher, a chemical engineering Ph.D. candidate and also a senior development engineer at Advanced Modular Power Systems, taught the course together. They offered this course in response to the growing need for technologists to understand the fundamental science and engineering issues relating to these systems. Representatives from industry, universities and governmental research centers from across the country attended. The three days of instruction were enthusiastically received and all attendees strongly encouraged the department to offer this course again next year.

These industrial short courses reflect the strong commitment the Chemical Engineering Department has in bringing relevant technical education to not only the students in the College of Engineering, but also to the broader engineering community. Both courses are available for "on-site" training at an employer's location. Contact Sandy Swisher (734-764-7413, sandys@umich.edu) or visit the department's web page www.engin.umich.edu/dept/cheme/events.html for more information about these courses.

Hydrogen: Powering our Future?

As the nation's demand for energy exceeds its supply, there are insufficient sources of energy to power our factories, our homes, our transportation systems, and the all-pervasive electronic appliances and devices that are now part of our daily lives. Moreover, the nation's energy requirements are further complicated by geopolitical and environmental concerns, such as the problem of U.S. dependence on foreign oil and the turmoil in the Middle East, the troublesome problem of "greenhouse gases," and the competing concerns of the auto industry to comply with federal fuel-economy standards. Locally, Detroit, the "automotive capital of the world," is initiating programs to reeducate its workers and refit its factories as trans-

portation systems change to propulsion systems that extend or move beyond the internal combustion engine.

There is a critical need for a multidisciplinary approach to address these challenges.

Recently, Michigan's Governor John Engler launched NextEnergy, a comprehensive economic development plan to make Michigan a world leader in the



Graduate student Andy Tadd adjusts the settings of the flow reactor for autothermal reforming of iso-octane (gasoline).

research, development, commercialization, and production of alternative energy technologies. Part of this initiative is an aggressive program to

Fogler co-Chairs ASEE Summer School

The Chemical Engineering Division of the American Society for Engineering Education (ASEE) held the 13th Summer School for Chemical Engineering Faculty this year from July 27-August 1, on the campus of the University of Colorado in Boulder. Professor Scott Fogler was co-chair, along with Professor Mike Cutlip from the University of Connecticut. This school, offered every five years, is unique amongst the various engineering disciplines as it strives to promote development of primarily new faculty with the assistance of established faculty and representatives from governmental agencies such as NSF and EPA, and industrial participants. Other department faculty who attended the school were Susan Montgomery, who was in charge of mentoring; Brice Carnahan, who taught a workshop on integrating computing across the curriculum; and Phil Savage.

The main purpose of the summer school was to disseminate innovative and effective teaching methods to a wide spectrum of new chemical engineering faculty who will be teaching courses and laboratories in undergraduate programs. Additionally, the summer school introduced new faculty to a number of promising research areas in which concepts, principles, problems, and laboratory experiments can be incorporated into undergraduate coursework. It also brought new faculty together with mid-career and senior faculty to discuss educational methods and educational delivery and to provide tested educational materials directly to new faculty for use in a variety of courses. Workshops included molecular modeling, bioengineering, green chemical engineering, and effective use of computers and educational technology.

move the development of hydrogen-powered fuel cells forward. The University of Michigan College of Engineering is uniquely qualified in terms of its personnel, expertise, and facilities to address the technical challenges and questions posed by the nation's and the state's energy research and educational needs. The university has a rich portfolio of research efforts that include both fundamental scientific discovery in advanced power generation and applied research solving real-time problems of integration, manufacturing, and control systems. A group of faculty from several departments in the College of Engineering, including a strong chemical engineering contingent, has been working since last fall with Gary Was, the associate dean for research,

and Jim MacBain, the director for research relations, on a blueprint for an interdisciplinary program in hydrogen-based energy technologies. Several university schools and colleges will be working with the new fuel cell energy program. Participating engineering departments include: Aerospace Engineering, Chemical Engineering, Materials Science and Engineering, Mechanical Engineering, and Nuclear Engineering.

The program will also provide the collaborative advantages of a research university-industry affiliates program, but, at the same time, offer individual companies, state and federal agencies the opportunity for separate, more focused, basic research contracts tailored to meet

their specific commercial needs. The objective of the research activity is to be *both* scientifically significant and industrially relevant. The program's core technology areas are leveraged by a multi-million dollar college-wide basic research program supported by federal agencies and industry. The research topics tackled by the faculty and students involved in this initiative cover a broad spectrum, from catalyst and reactor development for fuel processors that make hydrogen for fuel cells, to sulfur removal from fuel and hydrogen storage in carbon nanotubes. The new program is intended to be a focal point for research, development and education in hydrogen-based energy technologies within the College of Engineering.

Confocal Microscope, continued from page 1

department's complex fluids research group. Complex fluids typically contain polymers, colloids and surfactants, and are widely used by chemical engineers in such diverse sectors as automotive, pharmaceutical, paints and personal care. These researchers will all have access to the instrument, and for many it will become their primary research tool.

Students are eager to use the new microscope for their projects. Ali Mohraz, a Ph.D. candidate working with Solomon says, "It's remarkable to see submicron particles in 3D that before I could only observe indirectly." Graduate student Bruce Schiamberg, who is advised by Larson, adds, "I hope to use confocal microscopy to observe the 3D structure of complex flows."

The confocal microscope adds to an experimental facility that is already among the best in the nation. Students will use the equipment to further explore the effect of flow on complex fluids. Applications of their work are in such diverse areas as nanocomposites for automotive materials, DNA conformation for human genome mapping, and colloidal gels for advanced materials, such as optical fibers. For more information about complex fluids research at the University of Michigan, visit www.engin.umich.edu/dept/cheme/research/researchcf.html.



Students Ali Mohraz, Bruce Schiamberg, and Tesfu Solomon discuss results of experiments with the department's confocal microscope, shown at left.

Balzhiser in Academic All-America Hall of Fame



Dr. Richard Balzhiser (BSE ChE '55, MSE (Nuclear) '56, PhD ChE '61), former ChE faculty member and one of the nation's leading energy and engineering experts, was inducted into the Verizon CoSIDA Academic All-America Hall of Fame in June 2002. For two seasons, Balzhiser was a key member of the Wolverines' single-wing offense as a "spinning fullback" — the equivalent of today's option quarterback — for legendary coach Bennie Oosterbaan. He was an Academic All-American for two undergraduate years and in 1954 was awarded the Big Ten Conference Medal of Honor.

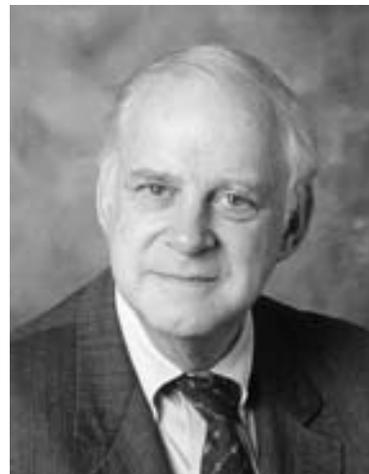
Dr. Balzhiser was a member of the chemical engineering faculty at the University of Michigan from 1960-1971, and served as chairman of the department from 1970-71. His chairmanship was only for a brief period, because in late summer of 1971 he took a leave of absence (which eventually became permanent) to serve as assistant director in the Office of Science and Technology, in Washington, D.C.

In 1973, Dr. Balzhiser joined Dr. Chauncey Starr in founding Electric Power Research Institute in Palo Alto, California. He retired from the Institute in 1996 as CEO, but remains active in a president emeritus role, in addition to serving on the boards of Reliant Energy, Aerospace, Electrosources, and Nexant. He also served on advisory boards for the National Renewables Energy Laboratory, the National Research Council, California's Public Interest Energy Research Program, and was a member of the two recent President's Council of Advisors on Science and Technology studies requested by the White House. Throughout his career, Dr. Balzhiser has served on numerous scientific and technical advisory boards for government agencies, the National Academies and universities. He has published extensively, including two thermodynamic texts, and he speaks and lectures frequently to utilities, universities, and public groups.

In 1992, he received the Chemical Engineering Merit Alumni Society Award in recognition of his many accomplishments during his career, and in 1994, he was elected to the National Academy of Engineering. Dr. Balzhiser is currently a member of the department's External Advisory Committee.

Contributions from Media and Marketing and Professor James Wilkes

Lederman, new AIChE Director



Peter Lederman was elected a director of the American Institute of Chemical Engineers and will serve a three-year term from January 2002 to December 2005.

Lederman retired from NJIT on June 30, 2000, but still serves as an adjunct professor. He also teaches Hazardous Site Remediation and Environmental Policy (two courses) at Chulalongkorn University in Bangkok at the graduate level. He is the chair of the National Academies' Committee on Review and Evaluation of the Chemical Military Stockpile Disposal Program, which is the committee that has been evaluating the Chemical Demilitarization Program since 1987.

Pete remains actively involved in service to the department and college. Most recently he has been a member of the department's External Advisory Committee and a member, ex-officio, of the Engineering Alumni Society Board.

Kudos

Faculty

Mark Burns' paper, "Everyone's a (Future) Chemist," appeared in the June 7 issue of *Science*. Burns has written about the development of a small, portable "lab-on-a-chip" – a tool that could help in complex chemical and biochemical analyses. In addition to its value as a tool for chemical and biological analyses, the device can act as an intelligent sensor.

Sharon Glotzer was the invited faculty lecturer at this year's annual CoE alumni board retreat held at Camp Michigania. She spoke on the use of modeling and simulation in nanoscience and nanotechnology, a topic that very much interested the alums and their families. Sharon also presented her work on computational materials at two Gordon Research Conferences this summer (her fourth and fifth GRC lectures in 30 months), and was just awarded two new grants from the Department of Energy and the National Science Foundation for computational research on bio-inspired directed self-assembly of nanostructured materials.

Erdogan Gulari was selected for the ChE Departmental Achievement award for 2003.

Ron Larson has received the Bingham Medal from the Society of Rheology. This annual award is the highest award in the field of rheology, a branch of mechanics that focuses on the properties of materials that determine their response to mechanical force.

Susan Montgomery has received the Spread the Word/Campus Rep award for the North-Central section of the

American Society for Engineering Education (ASEE).

Michael Solomon received the 1938E Teaching Award for the year 2001. The 1938E Award is presented by the college "in recognition of an outstanding teacher in both elementary and advanced courses, an understanding counselor of students who seek guidance in their choice of career, a contributor to the educational growth at his/her college and a teacher whose scholarly integrity pervades his/her service to the university and the profession of engineering."

Levi Thompson was selected to receive the 2002 GEM Outstanding Alumni in Academia Award in recognition of his outstanding achievements in the field of education. GEM, the National Consortium for Graduate Degrees for Minorities in Engineering and Science, is a nonprofit organization whose mission is to enhance the value of the nation's human capital by increasing the participation of underrepresented minorities at the master's and doctoral levels in engineering and science.

Ralph Yang has been appointed as Dwight F. Benton Professor of Chemical Engineering. This endowed chair was established in 1983 by a bequest from Dwight F. Benton, a 1923 graduate of the college, to support a distinguished faculty member in chemical engineering or advanced technology.

Ralph Yang was also named the 2003 recipient of the ACS Award in Separations Science and Technology. This award is in recognition of "major advancements of our knowledge on gas separation by adsorption processes; invention of novel sorbents; and placing a scientific basis to sorbent design and development." The award will be presented formally at the ACS National Meeting in New Orleans on March 25, 2003.

Students

Ali Mohraz was selected as a 2002 Outstanding Graduate Student Instructor by the Rackham Graduate School. This university-wide award recognized Ali for his many accomplishments in teaching and education while pursuing his doctoral studies. Congratulations Ali!

The following department scholarships were awarded to undergraduates:

Theodore C. Argue Scholarship
Dustin Bringley

Dow Outstanding Junior Award
Faye Sheridan

Helen B. Gibson Scholarship
Derek Bagozzi and Michael Burns

Clifton S. Goddin Scholarship
Wyatt Istvan-Mitchell, Marissa Bayman, and Jessica Mattis

Lloyd L. and Barbara B. Kempe Scholarship
Eric Sirota

Eli Lilly Fellowship
Jessica Garbern

Merck E&T Fellowship
Anthony Dunsky and Matthew Olsofsky

Ian & Frances Patterson Scholarship
David Gale

P & G Minority Scholarship
Bryan Styles

P & G Technical Scholarship
Eric Jankowski

Jane & Howard TenBroeck Scholarship
Paul Albertus

James O. Wilkes Scholarship
Timothy Johnson and Claire Felczak

G. Brymer Williams Scholarship
Michael Burns, Doug Urquhart, Erik Schroepel, Landon Greene, David Kryscynski, and Adam Cole

ChE Alumni Serving the Nation and the World

Many of our current chemical engineering students spend many hours each week volunteering around Ann Arbor and participating in activities such as Engineering Service Day. That desire to serve continues after graduation. Five alumni who have chosen volunteer service are highlighted in this article: Sujata (Suju) Naik (1998) spent two years with the Peace Corps in Madagascar, working on women's health and teaching English; Jeff Sanchez (1997) served with the Peace Corps in Paraguay, working on community running water projects; Neha Shah (2001), currently an Americorps participant, has "tutored middle schoolers, built a house for Habitat for Humanity, and worked on native species restoration"; Eric Wakild (1999) and Maria (Zamora) Peralta (1995) are both Teach for America alumni. Maria taught high school math in rural North Carolina, and Eric was a chemistry teacher in the Rio Grande Valley in south Texas.



Local community workers assist in piping installations at a water tower construction site in Paraguay. This system, one of Jeff Sanchez' Peace Corps projects, provided potable running water to 40 houses and a nearby elementary school.

This experience has been a chance for Eric to "expand my horizons – see parts of the world, experience new cultures." Neha saw it as a chance to "continue the service work I did at the University of Michigan, travel, meet people, and learn new skills." "Volunteering for the Peace Corps has always been a dream of mine," reports Suju, "I also wanted a chance to get away and do something totally different before I buckled down to an engineering career."

These alumni used many of their engineering skills during their volunteer experiences. "Some of the students had a lot of difficulty with story problems," reports Maria, "so I would break them up into groups, (like in ChE 344, reactor design)

and have the students try to come up with solutions." Neha also mentions teamwork: "The work I did in my ChE classes in teams has helped tremendously in figuring out group dynamics and using people's skills to the team's advantage." Suju reports that she "used a lot of ideas I learned in ChE such as 'thinking outside of the box.' I also used a lot of engineering



Sujata Naik teaching in Madagascar

when I worked on water sanitation projects." "To me I think the most important skills ... were problem-solving and communication skills," echoes Jeff, "and the ability to look at a situation, analyze it, and make a sound decision." While some of us might hesitate to travel to such remote locations as Madagascar, Suju tells us that "inconveniences like no electricity and no running water were only an issue for a couple of days, until I got used to it. I had an incredibly hard time until I learned the language but people wanted to help me learn so it was only a few months until I could have normal conversations." But you don't have to leave the country to have such life-changing experiences. "It's impossible to remember what my life was like before Teach For America," says Eric. "I saw families in the United States living in wood shacks with dirt floors and no running water, let alone a sewage system." This experience changed Eric's career plans: "I plan on being a teacher for a while." He has goals of "one day becoming a principal of a low income or under-resourced

school. My hope is to make a change on a greater level and improve this country one student at a time.”

Maria has continued her volunteer involvement now that she is back at EPA. “I still do outreach through the Society of Hispanic Professional Engineers in the Detroit Young Engineers and Scientists program,” says Maria, who is also working toward a master’s in engineering.

For those searching for an industrial position upon their return, these experiences are “either looked at favorably, or not really mentioned because the type of work and work environment is so different than that in the States,” says Jeff. “It’s important to explain exactly what you did and relate it to work done here in the States.” Steve Pondell (BSE’79), Director, Chemical/Fermentation QA Operations and Development, and head of the Michigan Recruiting Team at Abbott Laboratories, says that experiences such as a tour in the Peace Corps “can result in a very dynamic resume and a highly desirable candidate and can be valuable in fully developing an individual.” Pondell believes many volunteers “learn self-sufficiency, leadership, and adaptability to new cultures and environments—some of the same skills that employers search for when recruiting engineers.”

All the volunteers encourage others to take the plunge, and have provided guidance and advice to undergraduates considering such experiences. As Jeff tells them, “I don’t know why I was a little apprehensive to leave in the first place! It passed all expectations.”

External Advisory Committee Visits the Department

On May 2 and 3, 2002, the department’s External Advisory Committee gathered in Ann Arbor to assess the department’s strengths and weaknesses, and to give expert advice to the faculty on how best to improve the department so that it can better serve the university and its students. The committee is called in on a regular basis, every other year or so, for this purpose. In 2002, the members of the committee were

- Bill Russel (professor and former chair of chemical engineering, Princeton), committee chair;
- John Anderson (dean of the College of Engineering, Carnegie Mellon University);
- Bob Armstrong (chemical engineering department head, MIT);
- Dick Balzhiser (retired from Electric Power Research Institute), U-M alumnus (BSE 1955, MSE (Nuclear) 1956; PhD 1961), ChE faculty member in 1960s and 70s, chairman of department from 1970-71;
- Stu Churchill (retired from University of Pennsylvania), U-M alumnus (BSE (ChE and Metallurgical) 1942, MSE 1948, PhD 1952), on the ChE faculty 1950s and 60s, chairman of department from 1962-1967;
- Pete Lederman (consultant, AIChE director, adjunct professor at NJIT), U-M alumnus (BSE 1953; MSE 1957; PhD 1961);
- George Keller (retired from management at Union Carbide);
- George Quarderer (retired from Dow Chemical), U-M alumnus (BSE (Chemical and Metallurgical) 1962, MSE 1964, MS 1964, PhD 1967).

The committee was impressed by improvements in the department since the last external review in 1999, and gave valuable advice on how to continue moving the department forward. The faculty is very grateful to the committee members.

We always appreciate receiving suggestions from our alumni about ways to improve our research and teaching efforts. If you have any comments, please contact Ron Larson at 734-764-2383 or rlarson@umich.edu.

If you participated in volunteer service and would be willing to be contacted by students considering this route, please contact Dr. Susan

Montgomery, undergraduate program advisor, at smontgom@umich.edu.

Gifts from our Alumni, Friends, and Research Partners

July 2001 to June 2002

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.

Cache-Computer Aids for Chemical Engineering Education

Brice Carnahan, Ph.D.

ChE Alumni-Faculty Merit Scholarship

ChevronTexaco

Dr. Dae Y. Cha

Dr. George T. S. Chen

Dr. Julie F. Hoffman

Marvin W. Jackson

Pharmacia Foundation, Inc.

Sunil D. Rege, Ph.D.

ChE Fellowships Fund

Clarence J. Young Family Trust

Warren D. Gilbert

ChE Special Fund

Anne M. Moss Pooled Income Fund

BASF Corporation-Headquarters

BP Amoco Foundation

Charles M. Thatcher, Ph.D.

Chevron U.S.A., Incorporated

Coral L. DePriester

Dan Chapel

Darryl T. Hansen TTEE

Dr. Cedomir M. Sliepecevic

Dr. David E. Bidstrup

Dr. Donald A. Nast

Dr. Earl A. Ebach

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Dr. Peter B. Lederman

Dr. Roger K. Rains

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Keith H. Coats Rev. Liv. Trust

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Jensen Presents the 32nd Donald L. Katz Lecture

Klavs F. Jensen, the Lammot du Pont Professor of Chemical Engineering and Professor of Materials Science and Engineering at the Massachusetts Institute of Technology, was the 32nd recipient of the Donald L. Katz Lectureship. This lectureship, created in 1971, is named in honor of the late Donald L.

Katz, who was a professor of chemical engineering from 1936 until his death in 1989. Dr. Jensen is the co-author of more than 300 publications, including several edited volumes, and is the recipient of several awards, including a National Science Foundation Presidential Young Investigator Award, a Camille and Henry Dreyfus Foundation Teacher-Scholar Grant, a Guggenheim Fellowship, and the Allan P. Colburn, R. H. Wilhelm, and Charles C.M. Stine Awards of the American Institute of Chemical Engineers.



James Wilkes, Mrs. Elizabeth Katz, Ron Larson, and Klavs F. Jensen, 2002 Katz Lectureship Recipient

A dinner honoring Dr. Jensen was held during the two-day event at the Michigan League, attended by Mrs. Elizabeth Katz, the widow of Professor Katz. Other special guests included Steve and Kathleen Correll, Mrs. Katz' son and daughter-in-law, and Mrs. Ernestina Parravano, widow of Professor Giuseppe Parravano, former ChE faculty member.



New Addition to ChE Staff

Rhonda Sweet joined the ChE staff in April 2002. She is an administrative assistant and provides financial support to our faculty. Employed by the university since 1990, Rhonda came to us from the Nuclear Engineering and Radiological Sciences Department, where she had worked as an academic secretary since 1996. She enjoys playing softball and loves the Detroit Red Wings. Rhonda received her B.B.A. from EMU in 1997.

2002 Alumni Society Merit Award



Tenho Sihvonen Connable received the 2001 ChE Alumni Society Merit Award. Ms. Connable was the guest of honor at a departmental alumni luncheon during the

Michigan Engineering Alumni Weekend in October.

Throughout her life, Tenho has cultivated an intense curiosity for science and technology, together with an active interest in the University of Michigan, and its College of Engineering. Along with her husband, the late Regent Alfred B. Connable, she has been one of the university's most loyal and active alumnae. Receiving her bachelor's degree in chemical engineering from Michigan in 1942, Connable was among the first female engineers to graduate from the College of Engineering. In 1941, she became a member of Tau Beta Pi. Upon graduation, she worked briefly as an administrative

assistant for the vice-president of operations at the Shell Chemical Company in San Francisco.

After raising four children, Connable continued her interest in engineering and completed a master's degree in mathematics with a concentration in computer science at Western Michigan University in 1973. She went on to teach at Western, first as an instructor and later as an adjunct assistant professor of computer science, before retiring from teaching in 1983. To this day, she continues to be fascinated with science and technology, and has a special interest in both chaos and string theory.

from CoE Media and Marketing



Guests at ChE Alumni Luncheon in October 2002

Front row (l/r): Stuart Churchill (BSE '42, MSE '48, PhD '52), Tenho Sihvonen Connable (BSE '42), Peter Soderberg (BSE '51, MSE '51). Back row: Bert Cullen (BSE '73), Fred Shippey (BSE '62, MSE '70), Sid Sapakie (BSE '67), D. Russell Smith (BSE '51), Dick Balzhiser (BSE '55, MSE '56; PhD '61), Jim Brown (BSE '61).

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

Fall 2002 Alumni Events



We will host our annual Alumni/Student Reception during the SWE-Tau Beta Pi Career Fair. The event will take place on Monday, **September 23** from 5:30-7:00 p.m. in the Podbielniak Lounge (3158 Dow). If you will be in town for the career fair and would like to stop by, please contact Sandy Swisher

(734-764-7413, sandys@umich.edu.) Come visit with faculty and meet some of our graduating seniors.

This year's annual tailgate will take place before the Michigan vs. Michigan State game on **November 2**. We will be outdoors at our regular location—Rainbow Creation, directly across from the stadium, on the corner of Main and Stadium. The festivities will begin two hours before game time (starting time is yet to be announced). Bring the whole family to this pre-game party! If you would like to stop by the tailgate, please contact Sandy Swisher by phone or e-mail. Join us for some food and fun before heading over to the stadium for the big game. Go Blue!

FALL ALUMNI CALENDAR

<i>ChE Alumni/Student Reception</i>	<i>September 23</i>
<i>Michigan Engineering Alumni Weekend</i>	<i>October 24-26</i>
<i>ChE Alumni and Faculty Luncheon</i>	<i>October 25</i>
<i>CoE Homecoming Tailgate</i>	<i>October 26</i>
<i>ChE Annual Tailgate</i>	<i>November 2</i>

Michigan Engineering Alumni Weekend

The College of Engineering will hold its annual Michigan Engineering Alumni Weekend from **October 24-26**. Events planned for the weekend include technology forums, campus tours, the Alumni Society Annual Meeting and Awards Dinner, and a college update from Dean Stephen Director. The weekend will be capped off on **Saturday, October 26** with a tailgate brunch before the Michigan vs. Iowa football game. We have reserved a special table at the engineering tailgate for ChE's so we can all sit together. In addition, there will be reunion tables for the Classes of '52, '62, '77, '92, and '97. The tickets for the tailgate/football package are \$65/person and \$30/person for the tailgate only.

On **Friday, October 25**, there will be an opportunity for alumni to visit the department when we host a luncheon for ChE alumni and faculty. Our guest of honor will be Dr. Stuart Churchill, professor emeritus of chemical engineering at the University of Pennsylvania and former chemical engineering faculty member at the University of Michigan, who is the recipient of this year's Alumni Society Merit Award.

For more details on the Michigan Engineering Alumni Weekend, please log on to www.engin.umich.edu/alumni or contact the Office of College Relations at 734-647-7042.

Visit the ChE Alumni page at www.engin.umich.edu/dept/cheme/alumni.html

Our History Book

We thank our subscribers and others who have been waiting patiently for publication of our history book, *A Century of Chemical Engineering at the University of Michigan*.

I note from a 1998 solicitation of subscribers (those who trustingly anted up their \$25 before publication) that I naïvely anticipated 150-200 pages and 100 photographs; and in 2000 some 300 pages and 200 photographs. But even that could not do justice to our splendid department, so I kept going! The text is now complete, weighing in at 22 chapters and 623 pages, plus an index of more than 3,000 entries. Checking and updating the subscriber list and making final adjustments for printing will take more time, but we can anticipate final production in late 2002 or early 2003.

I think you will enjoy *A Century . . .*, which contains much of interest for



all alums. It starts with approval of our degree program in 1898 and ends with Commencement in 2002. We reproduce here a representative group of three from the total of 559 photographs of our students, staff, faculty, and buildings. Can you identify them?

Subscribers and those who have donated \$200 or more during the past three years will automatically



receive a copy of *A Century . . .*. If you wish to order one or more copies (they will make excellent presents), please complete and return the form below. If you have any questions, please call Sandy Swisher at 734-764-7413 (e-mail sandys@umich.edu).

James O. Wilkes, compiler of *A Century of Chemical Engineering at the University of Michigan*.

Chemical Engineering History Book

*If you wish to purchase a copy of the book, please complete and return this form.
The cost is \$25.00 per copy, including postage.*

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*Top left: Don Katz age 12, on the farm;
top right: John Ulicny, Cleatis (Fanny) Bolen, James Hand, and Dave Hammer;
bottom right: Doors to East Engineering.*

Alumni News

Don Kory (BSE '50) and Delores (BA LSA '50) Kory celebrated their 50th wedding anniversary, March 30, 2002, with their daughter, Deanna and her husband, Alon Ben-Meir at the Rainbow Room in the RCA Building, Manhattan. Don and Delores still live in Coral Gables, Florida where Delores is a professor at St. Thomas University, Miami. Don retired in 1997 from his own computer consulting business. They would love to hear from classmates or any professors who are still around (deakon@aol.com). Both Don and Delores received their emeritus alumni status in June 2002 at their 50th reunion.

Linda (Marcon) Deschere (BSE '74) is a partner in the law firm of Harness, Dickey & Pierce, one of the country's largest intellectual property law firms. She writes patents for high tech companies, particularly advanced batteries and fuel cells. Husband, **Bruce Deschere** (BSE '73) was recently appointed president of University Physician Services, Inc., the management services organization for the 750-physician joint practice of the Wayne State University School of Medicine. He received the Michigan Family Practice Teacher of the Year award from the Michigan Academy of Family Physicians and a College Teaching Award from Wayne State University earlier this year. Linda and Bruce have two children. Their son, Andy, is a student at MIT and daughter, Cristina, is in high school.

Robin L. Brack (BSE '80) is currently employed as an advisory engineer, in the Environmental Programs Department, at IBM in San Jose. The site is

one that will be sold to Hitachi, which will be taking over the disk-drive business from IBM. The next year will be a busy time for the department, as the 350-acre site needs to be split in half between Hitachi and IBM tenants. Unlike the HP-Compaq merger, they have not been informed of massive layoffs, as Hitachi does not have disk-drive manufacturing facilities in the United States.

Dan Sajkowski (BSE '81, MSE '82, PhD in 1986 from Stanford) became vice president of Refining Technology for BP. He has staff in Naperville, Illinois and Sunbury, England. The position is accountable for all aspects of refining technology in BP's 15 refineries — made up of BP, Amoco, Arco and soon Veba sites, throughout the world. Dan is also on BP's Group Technology Council that oversees technology throughout the corporation. His family life with his wife, Eileen, (also a UM grad) and their two daughters, Alyssa (14) and Shannon (11), remains a priority.

Bob Ranger (BSE '83, MBA '95) is business development manager at Dow Chemical. Bob is also involved in recruiting ChE's at UM.

Ann Heil (BSE '84) is a senior engineer with the Los Angeles County Sanitation Districts. Her focus is on pollution prevention in wastewater and she recently completed a project to reduce the amount of the toxic pesticide lindane entering sewers. The project led to a California-wide ban on lindane in pharmaceutical products and received the most prestigious pollution prevention award in the

nation - the National Pollution Prevention Roundtable's Most Valuable Pollution Prevention First Place Award. Ann was named the Western Region Pollution Prevention Network's Pollution Prevention Advocate of the Year for 2000 and the California Water Environment Association's Industrial and Hazardous Waste Control Person of the Year for 1999. Ann is married and has two delightful boys, who are now 8 and 11.

Saroja Ramanujan (BSE '93) did her doctoral work at Wisconsin after graduating from Michigan, followed by a post doc at the Massachusetts General Hospital/Harvard Medical School. Now, she lives in the San Francisco bay area and works for a biosimulation startup company called Entelos. She got married in August in Ann Arbor.

Steve Hurley (BSE '95) is married and has two daughters and is currently working for GE Plastics in Southfield.

Michele Pfeiffer (BSE '95) moved from GE Lighting, Cleveland in 1999 and is currently working at GE Aircraft Engines in Cincinnati as a leader for Material Services Demand Planning. She gets to make her way up to Ann Arbor a few times a year to participate in recruiting for GE and the Industrial Cluster for the Minority Engineering Program Office (MEPO). She says it's amazing to see how much North Campus has changed!

**Join the ChE Alumni
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Contact Sandy Swisher at
sandys@umich.edu**

Visit the ChE Alumni News page at www.engin.umich.edu/dept/cheme/alumni.html

Jennifer (Tipa) Beedon (BSE '95) graduated from Harvard Business School on June 6, 2002, with a master's degree in business administration. She and her husband relocated to California this summer, as Jennifer has accepted a job as a manager of business development with Guidant Corporation.

Sam Wall (BSE '97) is going back to school for an advanced degree, after working as a development engineer at a Bay Area biotech for the last four years. This fall he will be starting a joint Ph.D. program between UC Berkeley and UC San Francisco in bioengineering. In addition, Sam recently became engaged to fellow Michigan graduate, Brita Graham, and they plan to marry next year.

Becky J. Vander Eyk (BSE '96) just finished her M.B.A. at Harvard Business School in June 2001. She's working in Business Development for Advanced Payments at American Express, and living in Hoboken, NJ. Becky is enjoying the job very much even though her office was forced to relocate to Stamford, CT, after the Amex building was damaged in the WTC disaster. She recently returned from a five-week trip

around Asia, including Japan, China, Thailand and Cambodia.

Amit Advani (BSE '98) is currently living in Mumbai, India. In 1999, he started his own company, Bombay Fluid System Components Ltd, in association with the Ohio headquartered Swagelok Company. His company is the regional partner of Swagelok Company in India, and is in the business of fluid system components for instrumentation applications in most major process sectors. Amit is currently the managing director of the company and is responsible for the overall operations, growth, and strategy. He got married in February 2002 to Pooja Tulsiani, who attended the university at the same time he did.

Mathieu Delahaye (MSE '98) is doing fine in France, where he is in charge of research and development of new water treatment processes (drinking water and waste water) in several countries (France, Italy, Spain). He is working for SAUR, which is the fourth largest water treatment company in the world.

Steve Gray (BSE '98) married Emily Sayers, his college sweetheart, the

summer after graduation. He began pursuing a degree in dentistry at UM in fall 1998. Steve graduated in April 2002 with a D.D.S. Last fall Steve and his wife had their first child, a boy named Ezekiel ("Zeke") David Gray. Zeke was 8 lb., 15oz., 22.5 inches long- a big boy! He and mom are doing well.

Sujata Naik (BSE '98) spent two years in Peace Corps in Madagascar doing health education after graduation. She is now a process development engineer for the Hair Care Unit in Procter and Gamble in Cincinnati.

Rachael Schmedlen (BSE '98) is entering the fifth year of a Ph.D. program in bioengineering at Rice University, where she has been working on the development of elastic hydrogel scaffolds for tissue engineered vascular grafts. If all goes well, she will be Dr. Schmedlen by May or August of 2003! Following graduation, she hopes to find a job in the biotech industry.

Isaac Yue (BSE '98) graduated from Harvard School of Dental Medicine on June 6, 2002, cum laude. He will be attending the University of Illinois at Chicago in September for a post-doctoral residency in orthodontics.

Naoko Akiya (MSE '99, PhD '01) has been working for Dow Chemical in Freeport, Texas, in the Research Assignment Program, a rotation program for new hires in R&D since the end of June 2001. She will be done with the program by mid-August, at which point she will join the Reaction Engineering discipline in Corporate R&D. Naoko and her husband are moving into a house in a suburb of Houston, which they are building in July of this year. They thoroughly enjoy being back in Texas!

Engineering Education Celebrates a Birthday

In 2003-04, the College of Engineering will celebrate 150 years of engineering education at Michigan. Planned events include a sesquicentennial banquet, an academic focus conference, an engineering dean's forum at which past deans will reminisce about their experiences in the college, and a Michigan Marching Band half-time show honoring engineering education. Look for further details and a calendar of events on the college website (www.engin.umich.edu) as fall 2003 nears.

Visit the ChE Alumni News page at www.engin.umich.edu/dept/cheme/alumni.html

Carmita Burnette (BSE '99) will be leaving her job at Procter & Gamble and returning to school. She'll be pursuing an M.B.A. at the Kellogg School of Management (Northwestern University) in Evanston, Ill. Her concentrations will be in real estate finance and public/nonprofit management.

Benita (Kuo) Comeau (BSE '99) married Jon Comeau (MSE EE '99) on May 18, 2002, in Minneapolis. Benita and Jon will be leaving their jobs at Agere Systems in Minneapolis, and moving to Atlanta where they'll both be attending Georgia Tech for graduate school.

Jamey Condevaux (BSE '99) finished an M.S.E. degree in Aero (Propulsion) in 2000. He has been working for a couple years as a Combustion Specialist at an aerospace company, Williams International. Jamey just got engaged in

Alaska a couple of months ago and is still living in Michigan.

Jenny Ma (BSE '99) is still working for 3M in St. Paul, although she now works in one of the technology centers as a process development engineer. She got engaged in March while on vacation in Disney World and is getting married in June 2003!

Elizabeth (Peckham) Stavens (BSE '99) graduated in August 2001 from Purdue University with an M.S. in chemical engineering and joined the ExxonMobil Process Research Labs (EMPR) in Baton Rouge, LA. She recently got married (September 2001) to Kevin Stavens. Liz and her husband met at Purdue during a summer internship in 1998 and he also now works at EMPR.

Megan Peplinski (BSE '99) is working as a Six Sigma Black Belt at the DuPont Belle Plant in Belle, WV. She is

pursuing her master's in business administration from Indiana University, and she is expecting to graduate in the fall of 2003. Megan plans to marry Kevin Reehling in October 2002.

Johanna E. Rovira-Carrasquillo (MSE '99) has been working for Merck & Co., Inc., Rahway (NJ) Technical Operations since Dec. 2000. She recently purchased a lovely townhouse! Her email is johannar@umich.edu.

In Memoriam

Richard "Dick" R. Kraybill (BSE '43, PhD '53) died November 19, 2001. Dick worked at Eastman Kodak and was a professor of chemical engineering at the University of Rochester in Rochester, NY.

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 on the alumni web page and in next year's newsletter.

Name _____

Address _____

This is a new address

Home Phone _____ Business Phone _____

E-Mail _____

Degree(s) with year of each _____

We Want to Hear from You

Activities, family, and professional news:

Send to:
Sandy Swisher
 Dept. of Chemical Engineering
 The University of Michigan
 Ann Arbor, MI 48109-2136

Update your alumni information online at <http://www.engin.umich.edu/alumni/updateform.html>

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

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