New Biomedical Engineering Laboratory
By Melissa Baumann, Christina Chan, and Patrick Walton

This year we created a new state-of-the-art biomedical engineering laboratory. The engineering principles and problem solving characteristics of chemical engineering and materials science are being widely used to make advances in medicine and medical research. This new facility is vital for attracting faculty and graduate students to MSU to apply materials processing, metabolic engineering tools, and genomics analyses to address these challenges. Engineering faculty, in collaboration with faculty from the departments of Physiology, Microbiology, Biochemistry, Chemistry, and Small Animal Clinical Science/Orthopedics, are using these research facilities.

In CHEMS Drs. Melissa Baumann, Christina Chan and Patrick Walton are conducting research on two important issues—development and fabrication of tissue engineering polymeric scaffolds for both hard and soft tissue applications and delivery of drug therapies to treat disease; and development of analytical and experimental technologies, using a systems approach, for the analysis of cellular function at the molecular level. Potential applications of scaffold technologies include hard and soft tissue growth strategies to regenerate bone losses and cartilage damage, and delivery of drug therapies for treatment of diseases such as diabetes, HIV, and cancer. Characterization techniques are employed from the nano to the macro scale to analyze and optimize the chemistry and function of these scaffolds. Experimental and modeling techniques are used to further understand disease mechanisms, as in, diabetes, Alzheimer’s and Parkinson’s, and to accelerate the development of new drugs and therapies, as well as to optimize cellular function of engineered tissues and thereby reduce both development time and costs.

Case Elected ACerS Fellow

In recognition of his lifelong professional achievements, Professor Eldon Case was elected an ACerS Fellow and bestowed this honor at their 105th annual meeting in April 2003 in Nashville. This designation is awarded to members of the American Ceramic Society for “outstanding contributions to the ceramic arts or sciences; through broad and productive scholarship in ceramic science and technology, by conspicuous achievement in the ceramic industry, or by outstanding service to the Society.” Dr. Case has been a member of the American Ceramic Society since 1979, serving as chairperson of the Michigan/Northwest Ohio Section since 1998.

He is noted for his work in ceramic microcracking and processing including the areas of thermal fatigue, microwave processing, and joining by conventional and microwave heating. He has authored or co-authored 110 technical papers and five book chapters on these and additional topics. Case received his Ph.D. in Ceramic Engineering from Iowa State University in 1980. He was a research associate at NIST from 1980-82, a research engineer at UC-Berkeley from 1982-85, and joined the MSU faculty in 1985. He is chairperson of the Advanced Technologies Committee, Joining Critical Technologies Sector of ASM—The Materials Information Society. He is also associate editor of the International Journal of Applied Ceramic Technology.
“Green” Products—MSU, Industry Agreement

From University Relations news sources

This spring, KTM Industries of Lansing and Michigan State University signed a licensing agreement for “green” technology developed by Ramani Narayan, professor of Chemical Engineering and Materials Science. The KTM - MSU license is an example of technology transfer that offers a potential royalty return to the university as well as supporting regional economic development. This licensed technology advances KTM Industries’ emerging industrial product line of biodegradable starch foam packaging and insulation materials to provide innovative solutions for global packaging applications, including protection for high-value cargo and electronic components, material handling, defense packaging, and management of sound and vibrations. “Our company’s relationship with MSU is a crucial element in the ongoing success of developing and promoting our expanding line of biodegradable products,” said Tim Colonnese, KTM Industries’ president.

Research Awards to CHEMS Faculty

Awards for Chemical Engineering and Materials Science research projects received in Contract and Grant Administration August 30, 2002 through March 20, 2003 and accepted by the MSU Board of Trustees October 11, December 6, 2002, February 12, and April 11, 2003:

- Baumann, Melissa Jane; Chemical Engineering & Materials Science; Fisher, P David; Baldwin, Roger G; $100,000; Enhancing Bioengineering Opportunities for Engineering Majors; NSF
- Bieler, Thomas R; Chemical Engineering & Materials Science; Crimp, Martin A; Mason, Darren E; $125,000; Mesoscopic Measurement and Modeling of Slip Transfer Across Boundaries in Anisotropic Metallic Systems; Air Force Office of Scientific Research
- Chan, Christina; Chemical Engineering & Materials Science; $100,000; Quantitative Systems Approach for Understanding Hepatic Metabolism; NSF
- Drzal, Lawrence T; Composite Materials & Structures Center; $38,414; Silicon Carbide Fiber Surface; NSA
- Drzal, Lawrence T; Composite Materials & Structures Center, Rich, Michael J; $248,998; Inspection of Composite Adhesive Bonds with an Electrochemical Sensor; Dacco Science, Inc.
- Drzal, Lawrence T; Composite Materials & Structures Center; $66,465; A Multiscale Modeling and Experimental Study of the Mechanics of Polymer Nanocomposite Materials: Experimental Phase 1; University of Utah
- Drzal, Lawrence T; Composite Materials & Structures Center; $75,257; Graphite Nanoreinforcements for Aerospace Nanocomposites; NASA
- Grummon, David; Chemical Engineering & Materials Science; $38,590; Thin Film Shape Memory Alloys on Polymeric Substrates for Microautotrans; General Motors Corporation
- Grummon, David; Chemical Engineering & Materials Science; $15,559; High Temperature Shape Memory Alloy Development for Actuation Above 500 °C; NASA
- Kanatzidis, Mercouri; Chemistry; Hogan, Tim; $53,273; Design of New Thermoelectric Materials Based on Phase Homologies; US Department of Navy
- Hawley, Martin C; Chemical Engineering & Materials Science; Kempel, Leo C; $25,000; RF Polymer Composites; Raytheon Company
- Miller, Dennis J; Chemical Engineering & Materials Science; Jackson, James E; $90,797; Separation of Glycols from Aqueous Solutions by Reactive Distillation; Natl Corn Growers Association
- Miller, Dennis J; Chemical Engineering & Materials Science; Lira, Carl; Jackson, James E; $30,000; Reactive Separations for Producing Bio-Based Organic Acid Esters; Natl Corn Growers Association
- Miller, Dennis J; Chemical Engineering & Materials Science; Jackson, James E; $245,000; Novel High Value Products from Biomass Derived Organic Acids; USDA
- Narayan, Ramani; Chemical Engineering & Materials Science; $124,760; An Integrated Engineering Entrepreneurship Program with Small/Medium Company Specific Product/Business Opportunity Analysis; Michigan Economic Development Corp
- Petty, Charles A; Chemical Engineering & Materials Science; Benard, Andre; Shih, Tom; $10,000; I/UCRC: Experimental, Theoretical, and Computational Analysis of Multiphase Phenomena; NSF
- Worden, Robert Mark; Chemical Engineering & Materials Science; Dale, Bruce E; Ohlrogge, John B; $231,336; Multidisciplinary Graduate Education in Bio-based Industrial Products; U.S. Dept of Education
Blast from the Past! - Results of Spring Alumni Survey

By Daina Briedis

The alumni have spoken! We have compiled and analyzed the results from the Spring 2003 Alumni Survey. Career and curricular experiences were included in the Web-based survey. Many of you responded, and we were encouraged by the constructive advice and positive remarks. The involvement of alumni as an important constituency is crucial for maintaining quality and professional relevance in our curricula and program objectives.

Our sincere thanks go to the 52 alumni (2/3 men, 1/3 women) who answered the 30 survey questions. We received responses from alumni who graduated from 1943 to 2002. The decade 1991-2000 was the most highly represented, comprising about 50% of the respondents.

One of the objectives of our programs is to enable students to succeed in their chosen career path. The survey results demonstrate that, indeed, we do have successful alumni—85% of respondents gained professional employment within three to six months of graduation, and 29% chose post-graduate studies after graduation. These percentages show that apparently some individuals took on both a job and graduate studies! As graduates advanced in their careers, their successes continued with a reported average of one promotion every five years, with instances of advancement into leadership roles noted by 67%. Most have engineering careers, but many of our alumni also described successful careers in such fields as law, medicine, financial advising, real estate, and academics.

Curriculum was the second major focus of the survey. Which courses were of most value to your careers? No surprises here! For chemical engineers, material and energy balances was ranked highest. You also suggested other courses that would have been valuable to your careers, including more economics and finance, biology, and statistics. As the departmental curriculum committee works to improve curricula of both the materials science and chemical engineering programs, many of these suggestions are being immediately incorporated into our planning. We are striving to maintain the relevance of our programs to support the career successes of all our future alumni.

Bottom line? When asked to rate satisfaction with career and education on a scale from 1 (low) to 5 (high), the average alumni responses were 4.1 for career and 4.3 for education. This level of satisfaction provides great encouragement to the faculty of our department, but also shows that there is room for improvement! We look forward to hearing from you in future surveys. Stay tuned!

Willis Receives Breslin Life Achievement Award

George E. (Ted) Willis, a 1942 MSU chemical engineering graduate (minor in metallurgy) and outstanding varsity letter winner in fencing, was recipient of the 2003 Jack Breslin Life Achievement Award which is presented annually by the MSU Varsity Alumni ‘S’ Club to a varsity alumnus whose post-college career has brought great honor to himself, and by reflection to Michigan State University and its intercollegiate athletic programs. Ted was recognized during Varsity ‘S’ weekend this September during half-time of the MSU vs. Iowa football game.

Ted also holds a Harvard M.B.A. His professional career began in 1947 as an engineer with Lincoln Electric—a Fortune 500 company—and progressed to CEO and chairman of the board upon his 1992 retirement. He is a decorated World War II veteran and his public service includes co-founder, president, and chairman of the Health Fund of Greater Cleveland—now the Cleveland United Way.
Pat Walton Joins CHEMS Faculty

Welcome to our newest faculty member—Dr. S. Patrick Walton. Pat brings exciting and important new research capabilities in the area of biomedical research. His research focuses on the application of genomics tools to the measurement of DNA, RNA, and protein expression profiles, and the engineering of active biomolecules through kinetic and thermodynamic design. Walton received his B.ChE. from Georgia Tech, where he began his biomedical research career in the Cardiovascular Fluid Dynamics Laboratory. He attended MIT, where he earned his M.S. in Chemical Engineering Practice, and an Sc.D. While at MIT he was awarded a Shell Foundation Fellowship, was an NIH biotechnology predoctoral trainee, and worked jointly with researchers at the Shriners Burns Hospital and Massachusetts General Hospital in Boston. After his doctoral studies, he joined the Stanford Genome Technology Center as an NIH Kirschstein post-doctoral fellow.

CHEMS Welcomes Eunice VanElls

Eunice VanElls joined us in May as our administrative assistant, and office supervisor, replacing Paula Holzheuer who is now with Human Medicine. Eunice comes to us from the Highway Traffic Safety Programs operation in Civil and Environmental Engineering where she was an administrative assistant. Eunice brings with her a high level of capability and professionalism.

Baker Recognized in National Student Design Competition

Kathryn M. Baker received Honorable Mention in the 2003 AIChE National Student Design Competition. She is a May 2003 chemical engineering graduate and employed by Kraft Foods doing strategic research on packaging and delivery systems. She will be honored at the AIChE annual meeting in San Francisco in November. Congratulations to Kathryn, who has helped to maintain MSU’s 35-year dominance in this national competition.