Alumni and Friends,

ABET review of our undergraduate program has been completed, and, based on initial comments, we expect to have full accreditation. The Graduate Program review is scheduled for Spring 2010.

Record research funding of $5,238,664 was achieved in 2008/09 for the Department, almost half of the total research funding received by the College of Mines and Earth Sciences.

We were selected to have the first AMIRA mineral processing research program in the U.S., on agglomeration technology for heap leaching. This is described further on page 3.

Although our pilot-plant space was reduced with the demolition of the Ore Dressing Laboratory, we are making good use of the new Ivor Thomas Laboratory Building and expanding into additional office and lab space in the Browning Building and EMRL. Two new reactor laboratories have been secured for advanced fuels research.

There has been considerable concern regarding support from the university administration. Budget cuts due to the economic downturn have resulted in the loss of two faculty positions. It is most evident that we will have to find other sources of support if we are to maintain the quality of our programs.

Notwithstanding the challenges we face, program funding and student recruitment, we are excited about our vision for the department and the great opportunities to contribute to education and research in many areas of technology. We would like our friends and alumni to have a part in this vision and our future. Your financial support of scholarships, advanced equipment and instrumentation, and/or endowed chairs is needed and will be greatly appreciated.

All the best for 2010,

Jan

Message from the Chair

Energy Resources

Class a Success

Five years ago, Met E 1001 Energy Resources was a small General Education class catering to a handful of students – those who dared to sign up for a class listed under Metallurgical Engineering! The growing role of energy and global sustainability in the daily news cycle and in our daily lives underscored the need to bring an understanding of these issues to more students.

In 2007 Dr. Jack Hamilton of the U’s Technology Commercialization Office, and an Adjunct Professor in our department, assumed teaching responsibilities for the class. Jack has worked in industry in petroleum geology, geothermal energy, and coal and lignite exploration. Ola Opara, a grad student in our department doing her degree in the Environmental Engineering option, and an integral part of the teaching team, brings expertise in gas hydrates and other energy issues. Outstanding guest lecturers provide expertise in their own fields.

The class was renamed Energy Resources in a Sustainable World and is now cross-listed with Geography, Environmental Studies, and Geology. It covers all types of energy resources, including fossil and biofuels, wind, solar, nuclear, geothermal, and ocean energy, examining their role in the planet’s energy future, and related issues in Utah such as transportation and conservation. Sustainability is an increasingly vital part of the class, involving such topics as climate change, carbon management, air pollution, water resources, the law of unintended consequences, and tipping points. Students get hands-on experiences like the chance to drive a hybrid automobile or visit a nuclear reactor, and are encouraged to do a community-involvement project in lieu of the traditional term-paper.

The cross-listing and increasing interest in energy spurred a dramatic increase in class enrollment. Forty-four students were enrolled in 2009, and the course’s popularity should continue to grow. Classes like our Met E 1001 help bring information and critical thinking on the pivotal issues of the 21st century to a broad spectrum of students.
Faculty & Staff News

Two alumni joined us on campus this year, J. Brent Hiskey (BS 1967, MS ’71, PhD ’73), who stepped-down recently as Associate Dean for Research and Administration at the University of Arizona, helped with our research programs during a sabbatical leave fall semester.

Keith Prisbrey (BS 1969, PhD ’76), Professor Emeritus, University of Idaho, has been appointed Adjunct Professor in our department. In addition to being a down-to-earth Professional Engineer, he is involved in near-earth orbital resource development and research on zero gravity manufacturing. Keith will help the department with recruitment, teaching, and research now that he has “retired” in Salt Lake City.

Prof. Zak Fang and his team won the 2009 R&D 100 Award for his invention and development of double cemented tungsten carbide. Prof. Fang accepted the award, on behalf of the U and Smith International, at a ceremony in Orlando, Florida, in November 2009.

At the 2009 TMS Meeting in San Francisco, Milt Wadsworth (BS 1948, PhD ’51), Distinguished Prof. Emeritus, received an AIME Honorary Membership.

The U also did very well at TMS’s honors, with two undergrads getting TMS scholarships, plus Ray Peterson (MS 1983, PhD ’85) being installed as 2009 TMS president, and Ramana Reddy (PhD 1980) winning both a best paper award and a Service Award.

Prof. H. Y. Sohn received the TMS 2009 Fellow Award “in recognition of outstanding contribution to the practice of metallurgical/materials science and technology.” In March 2009 he traveled to Hungary, Austria and Slovakia to lecture on his work on new ironmaking technology and on hydrogen storage materials. He also presented a lecture on green ironmaking technology at ICSTI 09 in Shanghai and Changsha, China in October 2009.


Prof. Michael Moats received the 2008/09 Mellow Met Award for Excellence in Teaching Metallurgical Engineering.

Student Recognition

Undergraduate

Oblad Medal for Excellence in Metallurgical Engineering — Scott Middlemas
Team of Excellence Award — Megan Marshall

Outstanding Student Awards

Freshman — Neal Hardin
Sophomore — Ryan Morrison
Junior — Nathan Carlson
Senior, tie — Tyler Helsten & Scott Middlemas

Graduate

Award for Best Graduate Seminar Student Presentation — “Fatigue of Nickel Base Superalloy René 88DT,” by Paul Chang
Department Best Teaching Assistant Award — Haitao Wang

2009/10 Enrollment

Graduate: 54
Undergraduate 29
Research

Crushed Ore Agglomeration

In April 2009, a department team led by Michael Moats started the first North American-led AMIRA project – P966: Crushed Ore Agglomeration. AMIRA is a nonprofit research organization, originally located in Australia, sponsored by most of the large multinational mining companies. Based on our department’s world-class reputation and a research proposal that would likely impact operations’ bottom-lines, we were chosen to be the North American flagship project as AMIRA expands its international presence.

The three-year US$1.5 million project will develop quality-control tools for crushed ore agglomeration, empirically model the process, improve the understanding of crushed ore agglomerates and their interaction with leaching, and attempt to invent novel acid-resistant binders. The team will examine the agglomerates of gold, copper sulfide and nickel laterite ores from three continents. The project is funded by BHP Billiton, Freeport McMoRan, Gold Fields and Vale.

The faculty team members are Mike Free, Chen-Luh Lin, Jan Miller and Raj Rajamani. Graduate research assistants on the project are Nikhil Dhawan, Priyank Gupta, Adirek Janwong, Mike Peoples, Sadegh Safarzadeh and Thien Vethosodsakda. Undergraduate researchers include Brent Randall and Tyler Tucker.

Electrometallurgy & Hydrometallurgy

During the past year, Prof. Mike Moats and his group explored quality control for coated titanium anodes for two industrial sponsors. The methods developed can be used at customers’ sites and have already proven invaluable in the scheduling of preventive maintenance and troubleshooting operation problems.

The group won an international competition to examine nondestructive testing methods that could be used to judge coated titanium anodes produced by different suppliers. Several promising methods were identified and are being evaluated.

Youness Khouraibchia developed an empirical model to predict the current efficiency loss caused by ferric reduction in copper electrowinning. This model has enabled the sponsor to improve operations scheduled to produce about 1.6 billion pounds of copper cathode annually. Priyank Gupta examined the behavior of common electrorefining slime components during hydrometallurgical recovery of gold. The sponsor is using project data to evaluate possible changes to their operation, which produces about 400,000 troy ounces of gold per year. Priyank is continuing for a Ph.D.

Francis Elnathan completed a two-year study examining nanoparticle fuel cell electrocatalysts for the oxidation of ethanol. Several nanoparticle catalysts produced using Pt-based alloys during this project were superior to pure platinum, but still suffered from surface poisoning and deactivation. Francis is now performing research related to coated titanium anodes.

Thien Vethosodsakda joined Prof. Mike Free’s research group to work on gold ore agglomeration as part of the new AMIRA project. Avi Jurovitzki, an undergraduate, also joined the group this year. Three students from the group are completing Master’s this semester: Shamita Shitole, co-advised by Prof. Jack Adams, on gold biosorption; Prashant Saraswat on electrowinning and leaching; and Nathan Warner on palladium recycling. Nate’s work is showcased on the front cover of the October issue of JOM with an accompanying article in that issue.

On-going work includes predicting corrosion damage in aluminum alloys with specific naval applications and exploring new materials and manufacturing methods for solar cells.

Prof. Free established the Sustainable Metallurgical and Recycling Technologies industrial research consortium. Its mission is to create sustainable metallurgical and recycling technologies that reduce energy and environmental impact, improve extraction and separations, and enhance recovery and recycling of metals and associated products. The consortium will include department professors as well as some from outside. Several companies are anticipated to join this year, with others joining later.

Mineral Processing

High-Resolution X-Ray Microtomography

With the help of industrial partners Barrick, FMI, Newmont, Terra Tek, and USG, a new high-resolution X-ray microtomography (HRXMT) system has been acquired, for 3D imaging of multiphase systems at a voxel resolution of one micron. This lab provides the foundation for a research program on characterization and simulation of multiphase systems in 3D, under the supervision of research professor Dr. Chen-Luh Lin. Systems to be characterized range from tooth enamel mineralization to structural

Youness Khouraibchia, Morocco

MS, Fall 2009: "Improving the Fundamental Understanding of Copper Electrowinning," with Dr. Michael Moats

After getting a bachelor’s from the University of Mohamed V, Youness worked on hydrometallurgical production of cobalt at C.T.T. Managem. He loves surfing, which he took up at the age of seven. He thanks his family for their encouragement and love and is very grateful to Dr. Moats for his help and technical guidance. He plans to pursue a PhD at the University of Arizona.

Alvaro Rodrigo Videla, Chile.


Alvaro is working for Molycop in Santiago, Chile.

Vamsi Kumar Paruchuri, India.


Vamsi is the Manager of Unit Process Technology for IBM Research in Albany, New York.
analogs of geological material observed by the Martian Rover. Grad students participating include Ken Hsieh, Wenjing Xu, Alex Mejia, Juan Francisco Medina, and Phanindra Kodali.

Already, significant contributions have been made on mineral processing systems such as particle breakage in high-pressure grinding rolls, preferential grain boundary fracture, transport phenomena in porous media such as particle beds and drill core, and spatial analysis of phase boundaries.

Efforts are being made to secure funding to expand our CT laboratory to provide a complete range of facilities, mill, micro, and nano CT. This will require considerable financial resources, and additional industrial partners are being sought.

Bauxite Separation

Research under Dr. Xuming Wang’s supervision is characterizing bauxite ores for liberation analysis, using high-resolution X-ray micro CT. With the rapid development of the alumina industry in recent years, the need for bauxite has increased significantly. For example, production of bauxite in China reached 21.5 million tons in 2006, yet this was far from satisfying the needs of China’s aluminum industry. Nearly 42% of the alumina produced in China in 2007 used imported bauxite. World alumina production capacity is projected to be nearly 30 million tons per year in 2010. This will cause a serious bauxite shortage.

Based on Xuming’s results, flotation separation strategies are being developed for effective utilization of low-grade bauxite ores. This research is supported by fundamental surface chemistry studies funded by DOE Basic Sciences, which includes graduate students Vishal Gupta, Xihui Yin, and Xia Zhang.

Eddy Current and Lorentz Force

The work Prof. Raj Rajamani has found most intriguing recently was on eddy current separation of metallic granules from waste streams, especially because it is not about comminution, his main research direction. A ferrite core was wound with copper wire and energized by a high-frequency alternating current. As a granule passes through the gap, a force known as the Lorentz force develops on the surface of the granule. It was fascinating to see how these 2- and 3-mm aluminum, copper and lead granules would jump out of the gap. Raj and his student Swadhin Saurabh were so excited that they began increasing the frequency. At some point, however, the granule just got hot; guess it became an induction heating coil! Once they overcame the problem whereby the ferrite core was generating emf back in response to the emf imposed by the external voltage supply, the device worked nicely on a variety of synthetic granule streams fed continuously. Now and then Raj hears from a foundry asking if he has a full-scale device. So far he hasn’t come across a large ferrite core with a diameter of, say, 10 inches. The basic idea is very exciting and he hopes to take it further.

Back on the comminution front, Tugcan Tuzcu is finishing a PhD on converting impact spectra from discrete element method into selection and breakage function. You may remember the good old selection and breakage functions taught by Prof. John Herbst. Now we peer deep into these and see what makes them up. Simply, a number of collisions of various energies acting on the bed of particles contribute to the function’s make-up. One can actually follow each and every particle in DEM and let it break as it experiences a collision. That will be a large computational gymnastics. Instead Raj computes the impact spectra and converts it to a selection and breakage function. Works beautifully for grinding done in a 3-ft mill.

Advanced Fuels Development

Profs. Wlodzimierz Zmierczak, Jan. D. Miller, and Sajo P. Naik are working on large long-term R&D projects to produce dimethyl ether (DME) and its derivatives, olefins and other chemicals and fuels, from synthesis gas generated from coal gasification and other hydrocarbon resources, and development of a new catalytic slurry reactor.

In biomass research, early in 2009 the status of the lignin-to-fuels process was demonstrated for representatives of Lignin BioFuels and ATK. Samples from different stages of the process were prepared for further evaluation by LBF and ATK. Recently Dr. Zmierczak was selected to be a member of the North American Affairs Committee of the International DME Association. This committee will spearhead the certification of DME as a transportation fuel, mostly for diesel engines, compliant with EPA and DOE requirements, and raise awareness among influential lawmakers and regulatory bodies in order to facilitate DME’s inclusion in federal and state funding for fleet testing and other programs likely to further DME’s successful commercial acceptance in North America.

Pyrometallurgy

Based on the promising results from the project “Gas-Solid Suspension Ironmaking Technology,” AISI is adding a new $0.7 MM bench reactor to Dr. H. Y. Sohn’s lab, over the $2.5 MM original budget. This project, supported by a nine-company consortium, aims to develop new technology to produce iron directly from iron ore concentrate by a suspension process, eliminating the energy-intensive and pollution-prone cokemaking and pelletization steps. The new process will eliminate or drastically reduce CO2 emission from the steel industry.

Prof. Insoo Kim from Dong-A University, Korea, spent a year here working on plasma synthesis of oxide nanomaterials. Dr. Joon Pyo Park carried out research on molybdenum refining
by plasma. Prof. Jae-Woo Ahn of Daejin University, Korea, arrived in July for an eight-month stay as a Visiting Professor.

Prof. Sohn welcomed four new grad students, Tyler Bronson, Yubo Gao, Samar Emami, and Lianzhu Zhu, to his group. He published 21 papers during 2009.

Dr. Weol Cho is working on a project developing new technology to recover rare earth metals from waste phosphors by either solvent extraction or ion exchange. Rare earth metals have increasing industrial and commercial uses such as lighting and display devices such as flat television. Their low natural abundance and high value have stimulated interest in recycling them.

Physical Metallurgy
Magnetic and Electronic Materials Group
Prof. Siva Guruswamy’s Magnetic and Electronic Materials group is focusing on low-cost magnetostriective alloy development, materials technologies for energy harvesting from wind and ocean, and thermal diode technology for waste heat harvesting. The group has added three new grad students, Biswadeep Saha, Chai Ren, and Meenakshisundaram Ramanathan.

The NSF renewed funding for work on fundamental understanding of relations between structure, composition and magnetostriiction. Prof. Guruswamy and grad student Gavin Garside spent more time at the Argonne National Lab during the year carrying out extended X-ray fluorescence spectroscopy measurements to probe the local atomic environments in Fe-based magnetostrictive alloys. Gavis was selected for the DOE Neutron and X-ray Scattering Workshop at Argonne and Oakridge National Labs during the summer. Prof. Guruswamy was the Lead Organizer for the very successful Global Innovations Symposiums on Materials and Technologies for Energy Harvesting and in Photovoltaics and Thermoelectrics at the TMS 2009 Annual Meeting in San Francisco.

The metallic single-crystal growth and metals processing facilities have consolidated and reorganized in nicely remodeled space in the Browning Building.

Profs. Guruswamy’s and Moats’s Nuclear Materials Course has been very well-received. AIST Foundation renewed the Ferrous Metallurgy Curriculum development grant, used to enhance the Physical Metallurgy and Metal Processing courses. New research in nuclear materials has been initiated.

Physical & Mechanical Metallurgy of Materials
Prof. Ravi Chandran’s group is working on fatigue of aero-space materials, unconventional diffusion treatments, surface modification of titanium, synthesis of bulk nanostructured materials and armor materials.

Research by Biplab Sarma, under NSF support, involves exploration of near-transus isothermal and cyclic thermal diffusion of boron into titanium to develop deep, hard and wear-resistant coatings on titanium. In collaboration with GE, Paul Chang is working to understand the competing failure modes in Rene88 type nickel base superalloys. Madhu Jaghannathan has initiated efforts to make Li-Mg alloys for negative electrodes in solid-state rechargeable batteries. This is the sixth year for the State Center of Excellence on Titanium Boride Materials and Coatings — we are looking to commercialize the three US patents received for the COE research from 2003 to 2009.

Dr. Chandran co-edited a special issue of the International Journal of Fatigue, published December 2009, on fatigue of materials, competing failure modes, and variability issues in fatigue.

A new project on exploring reinforcement and cladding concepts for titanium orthopedic devices has been initiated under support from Ortho Development Corp.
Alumni News

Phil Thompson (BS 1972) has been named laboratory director for FLSmidth Salt Lake City, Inc. Phil was president of Dawson Metallurgical Laboratories for 18 years prior to its acquisition in 2008 by FLSmidth. He worked for Cleveland Cliffs Iron Co., US Bureau of Mines, and Cortez Gold Mines before joining Dawson. Phil and his wife Marjean have been married for 39 years and live in Salt Lake City. They have a 37-year-old daughter Angela in Meridian, Idaho who is a successful regional manager for a large retail company. Phil and Marjean’s hobbies include gardening, travelling, and driving Corvettes. Phil chairs our Department Advisory Committee.

Jaime Sepulveda (MS 1977, PhD ’81) celebrated 30 years since completing graduate studies at the U and returning to Chile. Currently at Moly-Cop, Chile, Jaime has had a distinguished career, making significant contributions to extend and expand technical knowledge in Chile’s mining industry. The July 24th celebration was organized by Alvaro Videla (PhD, 2008) and other colleagues to thank Jaime for his effort, consistency, and hard work.

Barada K. Mishra (PhD 1991) received the Indian government’s prestigious National Mineral Award for his unique software-based numerical approach to allow computer-aided visualization of stratification in large systems of fine particles. He was recently elected a Fellow of the Indian National Academy of Engineers. Prof. Mishra is the Director of the Institute of Minerals and Materials Technology, Bhubaneswar, which will soon offer a PG diploma program in Materials and Minerals Engineering.

Avimanyu Das (PhD 1994) joined the faculty at the Indian School of Mines, Dhanbad, India, did a PDF at the U of Kentucky, and finally joined the National Metallurgical Laboratory at Jamshedpur, India. He leads a number of projects, including one mega project on electronic waste, and has been able to create a vibrant research group. He is extremely happy with a life that leaves him just about enough time to sleep. His biggest responsibility presently is to organize a National Seminar on Electronic Waste for January, 2010. His daughter Shreyasee, known as Diya, is in 8th standard. Physics is her favorite subject, and she has a strong desire to go into space research. She loves Indian classical dance, Bharatnatyam, which she has studied since the age of 6 and is pretty good at. His wife, Swastika, is the pivot of their family. She works with Alstom Power at Kolkata. She often recites poetry from memory to celebrate occasions.

Courtney Young (PhD 1995) received the 2009 SME President’s Citation for his contribution in developing and organizing the 6th International Symposium on Hydrometallurgy. Courtney is department head and Asarco distinguished professor of metallurgical and materials engineering at Montana Tech of the University of Montana. He researches process technology in both primary and secondary production, particularly resource recovery and waste minimization, and consults for companies in testing ore processing options and solutions to environmental problems.

Clayton Walker (BS 1995), formerly Kennecott Utah Copper’s VP of projects and value generation, has been promoted to COO. He has been with Rio Tinto for eight years and earlier served as the general manager of Kennecott Mineral’s Greens Creek Mine in Alaska. He has an MBA from the U. Clayton has been instrumental in continuing to drive the business improvement culture at KUC while focusing on critical business issues and funding approval for significant capital projects.

Srinivas Veeramasuneni (PhD 1997) was appointed Director, Corporate Innovation Center, USG Corp. in February 2009. He works closely with relevant business units and provides strategic technical oversight to the programs under his supervision. He is the current Chair for SME’s Industrial Minerals Division.

Ronel du Plessis Kappes (PhD 2003) received the SME Mineral & Metallurgical Processing Division’s 2009 Outstanding Young Engineer Award. Ronel works for Newmont Mining Corp. as a senior metallurgical engineer at the Malozemoff Technical Facility. She is involved in process development and operations support in the technical services group and has presented and published several papers on sulfide mineral flotation. She has been the treasurer for SME’s Colorado Section board of directors for the last three years and recently the MPD representative on the Student Member Affairs Committee.

In preparation for ABET and Graduate Council Program reviews, the Advisory Committee met with the faculty in April 2009. From left, Rocky Sohn; Zak Fang; Karen Quinn, ATK Launch Systems; Neale Neelemeggham, US Magnesium; Mike Frees; Jan Miller; Phil Thompson, FLSmidth; Raj Rajamani; Clayton Walker, Kennecott Utah Copper; Mike Moats; and Siva Guruswamy.

The other advisory committee members, not shown, are Ray Peterson, Alers International; Pinakin Chaubal, ArcelorMittal; Ramana Reddy, University of Alabama; Dr. Ashok Joshi, Ceramatec; and Michael King, consultant.
In Memoriam

Dr. Rong-Yu Wan
1932-2009
PhD 1984

On September 22, 2009 Dr. Rong-Yu Wan lost her courageous fight with cancer.

Rong-Yu received a a BS in Chemical Engineering in 1952 from Chiao Tung University in Shanghai, China. She was strongly involved in China’s postwar industrial reconstruction, working with different research institutes in Beijing and receiving numerous awards.

In 1980, at the age of 48, Rong-Yu returned to school, earning a PhD at the U in 1984. After two years as a Research Associate Professor in the Metallurgical Engineering department, she joined Newmont Mining Corporation’s Metallurgical Services R&D team, while remaining an Adjunct Professor in the department. She published over 80 articles and was co-inventor on seven patents.

In 1994, Rong-Yu was the first woman to be elected to the National Academy of Engineering. She received the SME Antoine Gaudin Award and the Newmont Chairman’s Award in 2001, and, in February 2009, the Distinguished Member Award from SME.

Even as her research made significant contributions to mining technology, Rong-Yu actively mentored and supported colleagues and students in her circles at Newmont Mining and the University of Utah. Her brilliant research, personal warmth, and, above all, tireless mentoring won her friends and admirers among numerous industry colleagues. Her friends and coworkers will always remember her smile and her excitement in new ideas and dedication to her work, which was never really work, but rather a passion.

Despite great professional accomplishments, Rong-Yu was down-to-earth, always about being simple and unfussy. She expected everyone to be the best they can be, and taught those around her to reach higher in all aspects of their lives.

Rong-Yu is survived by Ke-Zhong Wang, her husband of 52 years, and her son, grandchildren, and siblings.

Rong-Yu’s family is establishing a memorial fund in her memory through the SME Foundation, to award and recognize research and publication by graduate students in metallurgy and metallurgical engineering. Please direct donations to the Dr. Rong-Yu Wan Memorial Fund at the SME Foundation.

Kay Sherman Mortensen
July 6, 1939-November 16, 2009
PhD 1967

Kay was murdered during a home invasion. A police investigation is ongoing.

He was born in Ephraim, Utah and grew up farming, raising sheep, and hunting, and developed a lifelong love for the land, farm equipment, and raising livestock. He received degrees from Snow College, Utah State University, and the University of Utah.

Kay was a well-known and respected scholar at Brigham Young University for more than thirty years, teaching courses in manufacturing design, engineering technology, and mechanical engineering. His farming stories piqued the interest of students and illustrated practical application for the principles he taught.

Kay and his wife Hermona Anderson had four children. Kay later married Darla Pectol Jones. Darla and Kay just finished a mission for the LDS Church at Cove Fort Historical Site, Utah.

Kay is survived by three siblings, three children, two stepchildren, and eleven grandchildren; and preceded in death by a daughter and a sibling.

Louis Raymond “Ray” Wright
September 30, 1951-July 29, 2009
BS 1974

Ray passed away at home with his wife and children at his side, at the age of 57. Ray will be remembered for his sense of humor, his sharp thinking, and his great artistic abilities. He loved teaching his children, hiking, exploring caves, taking long bicycle rides, and studying art.

He was born in Salt Lake City, Utah, to Earl Raymond Wright and Elizabeth Marie Williams Wright. He was employed first by Kennecott Copper Corporation then by South Valley Water Reclamation Facility. Ray married Sandra Boehme, with whom he had three children, Amanda, Thomas (Niccolette), and Gordon. Over the years, Ray and Sandra welcomed several foster children into their home.

Ray is survived by his wife, children, four grandchildren, and his sisters, Janice Stuessi and Linda (Kenneth) Bloch. He was preceded in death by his parents and brother-in-law.

Charles Nyberg Hansen
November 28, 1915-May 22, 2009
BS 1940

Charles passed away at home in Salt Lake at age 93. Born in Clearview, Utah, he married Lois Ivory in 1943; a week after his death would have been their 66th anniversary. They had two sons and two daughters.

Charles graduated from the U in 1940 with degrees in both chemical and metallurgical engineering. He was a member of the American Society of Professional Engineers. He loved inventing; following his retirement from Wasatch Chemical, he developed seven patents in the field of de-icing.

He taught classes and served in a bishopric and stake high council for the LDS Church. He and Lois served a mission to Oakland, California from 1983 to 1985 and worked in the Salt Lake Temple for 20 years.

Charles and Lois enjoyed playing tennis, and traveled to Mexico, Israel, Egypt, China, Australia, New Zealand, Brazil, and Scandinavia.

Charles is survived by wife, children, 24 grandchildren, 41 great-grandchildren, and a sister. Preceded in death by three brothers, a sister, and a grandchild.
New Alumni — Bachelor of Science, 2009

Ali Jawad Ali

Ali is from Kuwait, is married and has two handsome boys. He likes traveling, fishing and parasailing. He is glad to be graduating from the University of Utah and would like to give many thanks to the metallurgical engineering faculty and students and especially to his wife. He plans to work for Kuwait Petroleum Corp. for a few years, then hopefully get a masters degree in a different field. He also wants to start a parasailing business in Kuwait.

Richard Wendel Cutler, Honors

Like a turtle found on top of a fence post, Richard knows that he did not arrive where he is solely from his own efforts. He acknowledges the faculty and staff of the Department of Metallurgical Engineering for their excellent instruction, support and patience. He is grateful to his parents and seven siblings for their support in his successful pursuit of two engineering degrees from the "U". His senior research project investigated the electrode lifetimes in current reversal applications. Richard is pursuing a Master's degree in materials from Ohio State University.

Adam Edward McGrath

After three years of trying to choose a major, Adam finally decided on Metallurgical Engineering, and finished the program in three years. He is the oldest of three children, is unemployed, and lives with his parents. Now that he has graduated, he may be able to change the last two. Adam loves the mountains of Utah and hopes to find a job that won't take him away from the natural beauty Utah has to offer.

Steven Clark Merrill

Steve is from Sandy, Utah. His favorite thing to do is spend time with his wife Kristen. He also enjoys traveling, sports, snowboarding, fishing, hiking, camping, and practically anything in the outdoors. He admits that he was a BYU fan as a child, but he outgrew this and came to the University of Utah. Steven has very much enjoyed the Metallurgical Engineering program and has taken a particular interest in the flotation industry. He works for Dawson Metallurgical Labs in Salt Lake City.

Spencer Wallace Rex

Spencer has lived in New Hampshire, California, Texas, Missouri, Utah and Brazil. He enjoys snowboarding, surfing, and riding dirtbikes. He got married the day after convocation. He is moving to Texas to do failure analysis for a metallurgical firm, M&M engineering. He'd like to thank his family, his professors, and especially his mother for always being supportive.

Scott C. Middlemas

Scott was born in Sandy, Utah, graduated from Hillcrest High in 2003, and served an LDS mission in Anaheim, California. Scott served on the ASUU Assembly, the Metallurgy SAC, and as President of the U's Material Advantage chapter. He worked with Prof. Michael Free for two years on electrowinning and leaching projects. He is currently with Dr. Zak Fang as a Masters student researching hydrogen storage materials. He received the Metallurgy department's Outstanding Freshman Award and Oblad Silver Medal of Excellence awards. He would like to thank God, his family, and especially his beautiful wife Amberly for their support.