A Message from Professor Jan D. Miller, Department Chair

Dear Alumni and Friends,

During the 2003/04 academic year we successfully completed the Accreditation Board for Engineering & Technology (ABET) review of our program for a full six-year accreditation. The reviewers wrote that our program “is unique in its horizontal integration of all areas of its field,” and “has an admirable sequence of courses that allows students to gain significant experience with engineering design in the context of materials and metals.”

To the many of you who assisted us with the ABET review by responding to evaluation questionnaires, we want to thank you for your assistance. We continue to need your help and input.

We are disappointed to report that Dr. Saskia Duyvesteyn, Assistant Professor for the past seven years, resigned at the end of the 2003/04 academic year to take employment with Barrick Gold in Elko. We wish Saskia all the best in her new position and are pleased that she has agreed to serve as an adjunct faculty member.

The good news is that the administration has now authorized filling two vacant faculty positions, and a faculty search is being organized by Prof. Rajamani, an important task which demands careful attention to maintain the high quality of our degree programs.

Frederick Sutton Building

The 2004 Utah State Legislature approved the planning and construction of the Frederick Sutton Building for the College of Mines and Earth Sciences. Fred Sutton, a U geology graduate, was known as the person who mapped the Maricaibo Basin. His daughter, Marta Sutton Weeks, is the principal donor for the building.

The Department of Geology and Geophysics, the largest in the College, will be the principal tenant of the new building. By moving Geology and Geophysics, the new facility will let the college consolidate its four departments, Geology & Geophysics, Mining Engineering, Metallurgical Engineering, and Meteorology, into two primary buildings, the Sutton and the Browning. We have been spread in as many as eleven facilities, such as the Old Mines Building, which has changed but little since 1927 when it was completed. Currently, the programming phase for the building is underway, which will determine the facility’s site, size, and its makeup. Design should begin in January and take about a year. Construction will run from eighteen months to two years.

Student Recognition, 2003/04

Graduate

Robert Corson was selected as a member of the U.S. student delegation to the 54th Nobel laureates meeting in Landau, Germany, June-July, 2004. Rob works with Dr. Guruswamy on FeGa magnetostrictive alloys. He was the only graduate student in the engineering discipline selected by NSF/DOE for this meeting, a distinct and well-deserved honor for him, Dr. Guruswamy’s group, and the department.

David Harding spent two weeks in the Philippines in February as an Education Team Leader for Operation Smile, assisting at a hospital, visiting children at local schools and orphanages, and doing basic health-care presentations. Operation Smile is an international organization that provides free reconstructive surgeries for childhood facial deformities such as cleft lips and cleft palates, trains local surgeons, and educates public health organizations. Last year Dave was President of the U. Operation Smile Student Association, which raises awareness and money to support Operation Smile’s goals. Dave is part of Zak Fang’s research group.

Jose Angel Delgadillo won Outstanding Teaching Assistant Awards from both the department and (in a tie) the College of Mines & Earth Sciences. Jose was Dr. Rajamani’s T.A. Spring 2003 for Process Engineering Statistics and Fall 2003 for Fluid Flow and Statistical Methods in Earth Sciences & Engineering. Students said he stayed for the entire lab sessions, was easy to work with, always willing to help, and enthusiastic about teaching. Jose is from Mexico and is working with Dr. Rajamani on computational fluid dynamics in hydrocyclones for his Ph.D.


(Continued on page 2)
Michael Oja, doing an M.S. under Dr. Chandran, received the Utah Engineering Experiment Station’s Team of Excellence Award, with a cash prize of $100, for demonstrating outstanding dedication to team building both as a leader and a follower.

Pinai Mungsantisuk, another student of Dr. Guruswamy’s, was selected as a University Graduate Research Fellow for 2004/05.

Undergraduate

Rebecca Chandler, an undergraduate researcher in Dr. Guruswamy’s group, published a paper in the 2004 TMS meeting proceedings and made a presentation at the University of Utah Undergraduate Research Conference.

David O. Tibbits won the Oblad Medal of Excellence in Metallurgical Engineering as well as the Outstanding Senior Student Award. Dave’s four-year cumulative g.p.a. was 3.6, and his senior year g.p.a. was 3.8.

Curtis Dixon Lee was the Outstanding Junior, with a 3.88 gpa. A 4.0 gpa garnered Brady Butler the Outstanding Sophomore Award. The Outstanding Freshman was Scott Middlemas, also with a 4.0.

Faculty and Staff News

The department support staff are our Office Support Coordinator, Ms. Karen Haynes, Executive Secretary Ms. Kay Argyle, Technician Mr. Jim Davis, and Ms. Dorrie Spurlock, who works with Dr. Miller. Kay is expanding her skills as our new webmaster. See the changes at www.mines.utah.edu/metallurgy!!

Research staff includes Mr. François Vos, Dr. Sanjeeva Latchireddi, Dr. Gilsos Han, and Dr. Xuming Wang.

New Faculty Appointments

Dr. D. Jack Adams joined the department this year as an Adjunct Professor and will be developing research programs in biotechnology and environmental engineering. Dr. Adams is a Research Professor at Weber State University. He has taught classes in environmental and industrial microbiology, and lectured in the Microbiology, Botany, Zoology, Environmental Engineering and Metallurgy Departments. He has worked in environmental biotechnology for over 25 years in industry and state and federal governments. He headed U.S. Army and U.S.B.M. biotechnology programs and directed the Bioremediation Center at Weber State University. He is the founder and manager of Bioremediation Consulting, in Park City, Utah, and serves as a consultant to private industry and all levels of government.

He received his B.S. from the U, and M.S. and Ph.D. degrees from Utah State University. He has authored over 150 publications, presentations, and formal reports, organized several symposia, and organized or chaired sessions for numerous conferences. He is a member of several interstate technology regulatory councils. Welcome aboard, Jack.

Dr. Zhorro Nikolov was appointed Research Associate Professor in January 2004 after working as a Research Associate since July 2000.

Prof. Nikolov developed and teaches a graduate course in surface vibrational spectroscopy. He established a new nonlinear optics and spectroscopy laboratory employing SFS and SHG and manages research in the vibrational spectroscopy laboratory, with mid-, near-, and far-FTIR spectrometers, and FT-Raman and IR microscope attachments; trains graduate students; writes reports and proposals for projects with NSF and DOE; and collaborates with academia and industry.

He is involved in sum-frequency generation vibrational spectroscopy (SFS) studies of interfaces; second harmonic generation (SHG) studies of surfactant adsorption; FTIR studies of water structure in salt solutions, flotation systems, Langmuir-Blodgett films, and self-assembled films; and synthesis of nanoparticles in reverse micelles.

Dr. Nikolov has a Ph.D. degree in Physics from Sofia University, Bulgaria. From 1982 to 2000 he (Continued on page 3)
between hydrophobic surfaces in a particle separation system.

Dr. Wlodzimierz Z. Zmierczak joined the department this year as a Research Associate Professor and will be performing research in energy-transfer-related catalytic processes.

His research interests embrace lignin conversion into biogasoline, application of superacid catalysts to produce high-performance rocket/jet propellants, electrocatalytic splitting of water, use of synthesis gas to produce synthetic fuels, and development of catalytic gas-sparged cyclone reactors.

He received his M.S. and Ph.D. from Adam Mickiewicz University, Poznan, Poland. From 1970 to ’96 Dr. Zmierczak taught at Adam Mickiewicz University and did research on catalysis and catalytic processes for the development of hydrocarbon fuels. During sabbatical leaves, he was involved in research projects at the U.

In 1994 Dr. Zmierczak moved to the U.S. He was a Visiting Associate Professor and then a Research Associate Professor (1997-2004) in the U’s Department of Chemical and Fuels Engineering. He received American citizenship in 2001. Dr. Zmierczak is an author/co-author of over sixty publications and patents.

Visiting Professors

Dr. B. K. Mishra (PhD 1991) took on the duties of teaching Dr. King’s courses, *Mineral Processing I and II*, Spring Semester 2004. Dr. Mishra is currently a Professor at the Indian Institute of Technology, Kanpur, India. He also assisted Dr. Rajamani in his graduate class, *The Discrete Element Method*. Dr. Mishra brought fresh ideas to the well-established curriculum of minerals processing. His wife and children accompanied him. His children enjoyed the different atmosphere in the public schools here.

Professor Rafael Padilla (MS 1977, PhD 1984) was a Visiting Professor here from the University of Concepcion, Chile from September ’03 to March ’04. He conducted joint research on the conversion of sulfur dioxide to elemental sulfur with Professor Sohn.

Dr. Anh Nguyen, University of Newcastle, Australia, taught a short course, “Colloidal Science of Flotation,” March—April ’04.

Dr. Tilak Raj Mankhand, from Banaras Hindu University, Vara-
nasi, India, is here as a Visiting Professor, Sept.–Oct. 2004.

Faculty Honors

Dr. Ravi Chandran’s work on titanium boride materials was selected as one of the three finalists for the Steol Rives Utah Innovative Award for 2004. He also edited a special focus issue of *JOM* (May ’04) covering in-situ titanium metal matrix composites, editing and publishing articles contributed by leading groups.

Dr. Zak Fang was a primary organizer of a symposium on cemented tungsten carbide during the annual International Conference of Powder Metallurgy. The symposium attracted participants from the U.S., Europe, and Japan and other Asian countries.

In April of 2004, Dr. H.-Y. Sohn was selected by the students for the Mellow Met Award for Excellence in Teaching Metallurgical Engineering for the second year in a row. Dr. Sohn taught MetE 5750/6750 Rate Processes and MetE 7460 Advanced Fluid–Solid Reaction Engineering, Spring 2003, and MetE 5710/6710 High Temperature Chemical Processing and MetE 7910 Quantitative Rate Phenomena, Fall 2003. Students gave him straight A’s in three of those classes. He was praised for getting students to think about a situation from many angles.

Dr. Sohn traveled to Korea in May 2004 for research collaboration and technical exchange, where he presented nine lectures on various subjects, including “Chemical Vapor Synthesis of Nano-Sized Metallic and Composite Powders” and “Computer Modeling of Flash Smelting/Converting Processes.” He served on the Review Panel of the NSF Small Business Programs, Advanced Materials, Manufacturing, and Chemical Processes (SBIR/STTR) in the field of Powder Material Processing, 2004.

List of Faculty

The faculty now totals twenty-nine, with seven academic, seven research, ten adjunct, and five emeritus appointments.

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J. Gerald Byrne
Professor Emeritus
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Dr. Zak Fang will work with him on two from DOE, “Metal Hydride-based Hydrogen Storage,” $2,74 Million in Funding for New Research.

Dr. H. Y. Sohn was granted funding for six new research projects this year, totalling $2.74 million. Dr. Zak Fang will work with him on two from DOE, “Metal Hydride-based Hydrogen Storage,” $2.74 Million in Funding for New Research.
U.C. Berkeley Equipment Comes To Utah

Many of you know Prof. Douglas Fuerstenau, now retired from active service at the University of California, Berkeley. His research in comminution has spanned over fifty years. His students dot the landscape of American universities: P. Somasundaram, Columbia; Richard Hogg and Subhash Chandler, Penn State; John Herbst, a Research Professor with our department; and Kal Sastry, UC Berkeley, among others. Currently, Dr. Fuerstenau occupies a spacious office in the newly renovated and earthquake-proofed Hearst Mining Building on the Berkeley campus.

Doug has kindly offered almost all his collection of equipment to our department. Among the twenty or so items are a 20" ball mill with torque sensor, a Frantz isodynamic separator, and a single-particle roll crusher. In addition, a massive volume of closed-size mineral samples will be of great value for future experiments. There is no doubt Utah will benefit a lot from this transfer, and our faculty thanks Prof. Fuerstenau for the generous contribution.

In addition, the department’s high-pressure grinding roll, or HPGR as it is commonly called, on loan to Dr. Fuerstenau for many years, will be coming home. HPGR is set to replace crushing and semiautogenous milling in the near future.

As a last note, Dr. Fuerstenau mentioned with a chuckle that he is retaining a few items just in case he takes on one more student.

Collaboration on Flotation of PGM & Colloid Transport Processes

Previous research programs of Prof. J. D. Miller’s continue, including study of design and operating variables for improved heap leaching technology; trona flotation technology; and magnetic activated carbon for gold recovery, water treatment, and treatment of gaseous effluents.

New projects include NSF- and industry-supported research on the flotation of PGM minerals, collaborating with the University of Pretoria, and with industrial partners Impala Platinum, Newmont, Bateman, and BOC. It involves flotation chemistry issues such as use of trithiocarbonate collectors and gas-phase composition.

A new CAST project on 3D mineral liberation analysis using x-ray microtomography is under Dr. C. L. Lin’s supervision. This project will compare XMT to traditional polished-section analysis.

A collaborative NSF research project with Dr. Bill Johnson of Geology concerns colloid transport processes fundamentally influencing the transport of colloids in porous media. As part of this project, three labs have been renovated to accommodate a new atomic force microscope, a molecular imaging Pico Plus, and a total internal reflection fluorescent microscope to image colloidal particles at the solid/liquid interface and to measure attachment/detachment during flow.

New Clean-Room Facility

Prof. Sivaraman Guruswamy’s research group is developing high-performance magnetostrictive alloys for sensors, actuators, and other novel applications, and solid-state thermal diode structures for hybrid thermoelectric/thermionic devices. A patent application was filed in the area of magnetostrictive materials.

Experimental facilities have expanded with the addition of a clean-room facility for magnetic materials and thin-film development work, and the high-temperature metallic single-crystal growth facility. Thanks to the contributions of past and current students, the magnetic materials laboratory now has an impressive array of facilities for processing magnetic, electronic, and structure materials, materials characterization, and device development.

Surfactant Aggregation & Corrosion Inhibition

Prof. Michael Free’s research group is investigating fundamental aspects of surfactant aggregation phenomena and their connections with corrosion inhibition of steel, copper, and aluminum metals. The corrosion studies have led to the development of new models to predict surfactant adsorption phenomena and their effects on corrosion inhibition. Work is also being performed in metal recovery from dilute solutions by pulsed plating on high surface area electrodes. The metal recovery work shows promise for industrial and municipal processing applications in which metal removal is important. New investigations in the areas of electrodeposition morphology, improved copper extraction technology, and metal recycling are set to begin this fall.

Nanocrystalline Cemented Tungsten

Over the past year, the Powder Metallurgy Laboratory under the direction of Prof. Zak Fang continued to grow. The group currently consists of seven graduate students and two undergraduate research assistants. Research labs and equipment are spread in four different buildings. All students are supported by externally funded research programs.

Most notably, DOE has awarded Dr. Fang, in collaboration with Prof. Sohn, a major project to develop a novel powder synthesis process, based on vapor-phase chemical reactions and ultrahigh-pressure rapid heating and HIPing, that promises to produce cemented tungsten carbide with true nanoscale grain size (<100 nm). The consolidation process will be one of the first of its kind for producing bulk nanocrystalline materials for industrial applications. The project will also study the material’s mechanical properties. One of the applications for nanocrystalline tungsten carbide is micro drills used for printed circuit board production.

Total project funding including industrial cost shares is $1.9M for three years. Industrial partners include Idaho National Engineering and Environment Laboratory, Kennametal, and Smith International.

New State Center of Excellence

The Utah State Center of Excellence for Titanium Boride Materials has been established in Dr. Ravi Chandran’s group, working on applications of titanium boride hardening to enhance the surface properties of titanium and its alloys, to prevent the intrinsic contact problems causing galling and seizure in titanium surfaces. The center is jointly funded by the State and private industry.

Dr. Chandran’s group has started new research to understand mechanical behavior of materials from first principles computational calculations on the basis of density functional theory. Work is in progress to predict elastic constants of titanium borides and understand the atomic origins of high hardness and stiffness in borides.

The group is also working with Vextec Inc., using DARPA funding, on developing models to predict fatigue life for aircraft engine materials. Students use orientation imaging microscopy to understand the crystallographic relations involved in nucleation and propagation of fatigue cracks.
Alumni Activities

Wilbur L. Kennicott (BS ‘39) sails competitively, cruises, and travels frequently on business to industrial centers on five continents. He is a Life Fellow in the American Society of Mechanical Engineers and in the Society of Manufacturing Engineers and received an ASME 75th Anniversary Medal. He retired in 1980.

John P. Colton (BS 1963) and his wife were LDS missionaries in Cambodia, Vietnam, Laos, and Burma from 2000 to 2003, where he was mission president and was responsible for humanitarian and church activities. Now they take responsibility for ensuring their kids take good care of their ten grandkids. He retired from the U.S. Army as a Colonel, from the International Atomic Energy Agency, and in 2000 from the U.S. Department of State as Senior Scientist. He received Meritorious Awards from the State Department and IAEA and the Legion of Merit and others from the Army.

Curtis Nielson (BS ’76) joined AMEC Energy & Mining in Phoenix, Arizona, in February. AMEC is a global leader in the provision of services and engineering solutions to the world’s infrastructure, manufacturing, and process industries.

G. Thomas Tripp (BS ‘77) is Technical Service Manager for U.S. Magnesium. He supervises and directs process engineering, R&D, quality assurance and analytical, technical sales support, raw material production, and purchasing functions.

Yang-Ki Hong (PhD 81) is Professor and Director of the Magnetic & Electronic Materials Lab in the Department of Materials Science & Engineering at the Univ. of Idaho, Moscow.

Abdulhaﬁd Ali (BS ‘87) is working in the Projects Department at the Brega Refinery, Tripoli, Libya.

Jose Parga (PhD ‘87) was named 2004 Distinguished Coahuilan by the Coahuila (Mexico) State Council of Science and Technology, for his important contribution in aid of science and technology in the State of Coahuila.

Laurie G. Poulson (BS ‘88) works as a full-time mother. This past August her family relocated to Lebanon, Maine, when her husband accepted a position at Albany International Techniwave.

They are enjoying life in New England. Their sons Marsh IV and Murray have adjusted to their new schools, and son Miles is excited to start school. She is enjoying meeting people in the area through community and church service.

Paul Cook (BS 95) is Senior Engineer in applied research at Phelps Dodge Process Technology Center in Safford, Arizona, where he develops improved techniques and equipment for copper solvent extraction and electrowinning.

Srinivas Veeramasuneni (PhD ‘97) was named Program Manager, Performance Substrates Laboratory, at U.S. Gypsum’s Libertyville Research & Technology Center, Illinois, July 2004. He has been with USG since 1998. Vas was among 86 of the nation’s young engineers, performing cutting-edge engineering research and technical work, who were selected by the National Academy of Engineers to participate in NAE’s 10th Annual Frontiers of Engineering Symposium, September 2004, in Irvine, California. His team at USG Corporation won USG’s 2002 Technology Award (with a prize of $25,000), awarded for technologies that result in successful new product releases or cost reductions of at least $1 million during the year. The team discovered a new additive that makes gypsum panels resistant to mold and mildew while maintaining the product’s strength and fire-resistant qualities.

Amlan Datta (PhD ’99) is working for James Hardie R&D in Fontana, California.

Nakorn Srisukhumbowanchoi (PhD ‘01) is a proud papa to his son Panai, born in October 2003. Nakorn teaches at King Mongkut’s Univ. of Technology, Thonburi, in Bangkok, Thailand.

Christian Roldan (BS ’04) is the plant metallurgist at San Martin Mine, owned by Entrameres Honduras, a subsidiary of Glarms Gold Ltd. It is an open-pit mine with a mini-lift (four lifts of eight meters) heap-leaching operation. The recovery of gold is made in an ADR circuit, where they get a concentrate of 70 to 80% gold. The concentrate is sold to a refinery in Salt Lake.

Let us know what’s going on in your life – ﬁll out the alumni activity questionnaire at the back of the newsletter.

In Memoriam

Leon Allen Monson (BS 1946), of Payson, Utah, died Monday, November 19, 2001 at the age of 76. He was born November 22, 1924, in Salt Lake City to James Ferdinand Monson and Ivy Gertrude Hunsaker Monson. He married Wilma Mooring in 1946.

He retired in 1986 after a career as a chemist for Combined Metals Reduction Co.; an instructor at the University of Wisconsin; a special lecturer at the University of Delaware; a chief investigator on an Air Force contract; and a research chemist, research metallurgical engineer, senior engineer, and metallurgical consultant at E.I. DuPont.

He is survived by his wife, five children, twenty grandchildren, and two great-grandchildren.

Ivan LeRoy Nichols (BS 1948) died October 17, 2004 of heart failure. He was born in Payson, Utah, October 11, 1924, the son of Clarence Ivan Nichols and Hazel Lindsey Nichols. He married Elaine Cannon March 22, 1948.

He served in the U.S. Navy during World War II. He retired from the U.S. Bureau of Mines. He was active in his church, serving a genealogical mission with his wife.

He is survived by his six children, a niece, 22 grandchildren, and seven great-grandchildren. He was preceded in death by his wife Elaine, his three sisters, and three infant great-grandchildren.

Khin Maung Win (MS 1962, PhD 1965) passed away June 16, 2003. He had been ailing for some time.

National & International Visitors & Speakers

Visitors to Dr. Guruswamy’s Magnetic Materials Laboratory this year included Mr. A.P. (Dave) Devecha, Naval Surface Warfare Center, Carderock, Maryland, and Prof. Katherine Faber, Northwestern University, March 2004.

Some of Dr. Miller’s visitors were Lucy Esdaile, Rio Tinto, Melbourne, Australia, Aug. 03; Bruce Fraser, Australian Mineral Industry Research Assn., Melbourne, Oct. 03; Jaime Sepulveda, Moly-Cop Grinding Systems, Santiago, Chile, Jan. 04; Robert Cuttriss and Paul West-Sells, Placer Dome, Vancouver, B.C., Canada, July ‘04; and Hassan A. Hamza, CANMET Energy Technology Centre – Devon, Alberta, Canada, July ‘04.


Dr. Marcelo Esquivel, Centro Atómico Bariloche, Bariloche, Río Negro, Argentina, visited for three weeks in February ‘04 and collaborated with Prof. Sohn on the analysis of the chlorination reactions of nuclides.

Dr. Hun S. Chung of Korea Institute of Geosciences & Mineral Resources, Daejeon, Korea visited Prof. Sohn’s laboratory on March 19, 2004 to discuss research collaboration between the two institutions.

(Continued on page 6)
Give Us a Hand – Donations and Accreditation Questionnaire

Donations to scholarships or other department programs may be made by credit card at the secure website, www.ugive.utah.edu (designate the specific program you wish to support) or using the enclosed card and U.S. business-reply envelope. The Accreditation Board for Engineering and Technology (ABET) requires us to do a questionnaire on our Bachelor’s degree program every year. You may complete it on-line at www.mines.utah.edu/metallurgy/, or fill out the enclosed copy and return it to us in the business-reply envelope. Ask your employer if s/he would help us by filling out the on-line employer survey.

To receive notices for our weekly graduate seminar, contact Kay at (801) 581-6386, fax 581-4937, or argyle@mines.utah.edu.

Alumni Questionnaire — October 2004

Name: _________________________ U of U ____________ ____________ G. B. S. ____________ ____________ G. M. S. ____________ ____________ G. Autumn/Fall G. Spring Metallurgy: ____________ ____________ ____________ ____________ ____________ ____________ G. M. E. ____________ ____________ G. Ph. D. ____________ ____________ G. Winter G. Summer Year: ________

Privacy Policy: We use your contact information to send our department alumni newsletter and occasionally other mailings related to the department. We may provide your information to other entities within the university such as the Alumni Association. We do not sell or otherwise release the address list outside the university for purposes of mass mailing. Unless you have instructed otherwise, we may provide your contact information to an individual or organization requesting your individual information. We reserve the right to modify this policy.

Work Address

☐ Retired, year: ______

Title or Position

Company Name

Street or PO Box

City, State ZIP/Postal Code

Are these address corrections? ☐ Yes ☐ No

If someone wants to get in touch with you, may we tell them your address? ☐ Yes ☐ No

Please send me weekly graduate seminar notices by ☐ email @ _______ or ☐ fax (801) _______—______ (local calls only).

(Sorry, not available by post.)

Yes

no

What news would you like to share with your classmates? Suggestions to get you started are present position and responsibilities, accomplishments, awards, achievements, special recognition, family news, hobbies and activities, volunteer work, and interesting experiences. We reserve the right to edit if necessary. What type of news do you enjoy in the Mellow Met Newsletter? Other comments or suggestions? Please write legibly, type, attach printout, or email.

Please send to Ravi Chandran, University of Utah, Department of Metallurgical Engineering, 135 S 1460 E Rm 412, Salt Lake City UT 84112–0114, U.S.A.; or fax 1 (801) 581–4937; or email ravi@mines.utah.edu.