The Magazine of Colorado School of Mines

MINES

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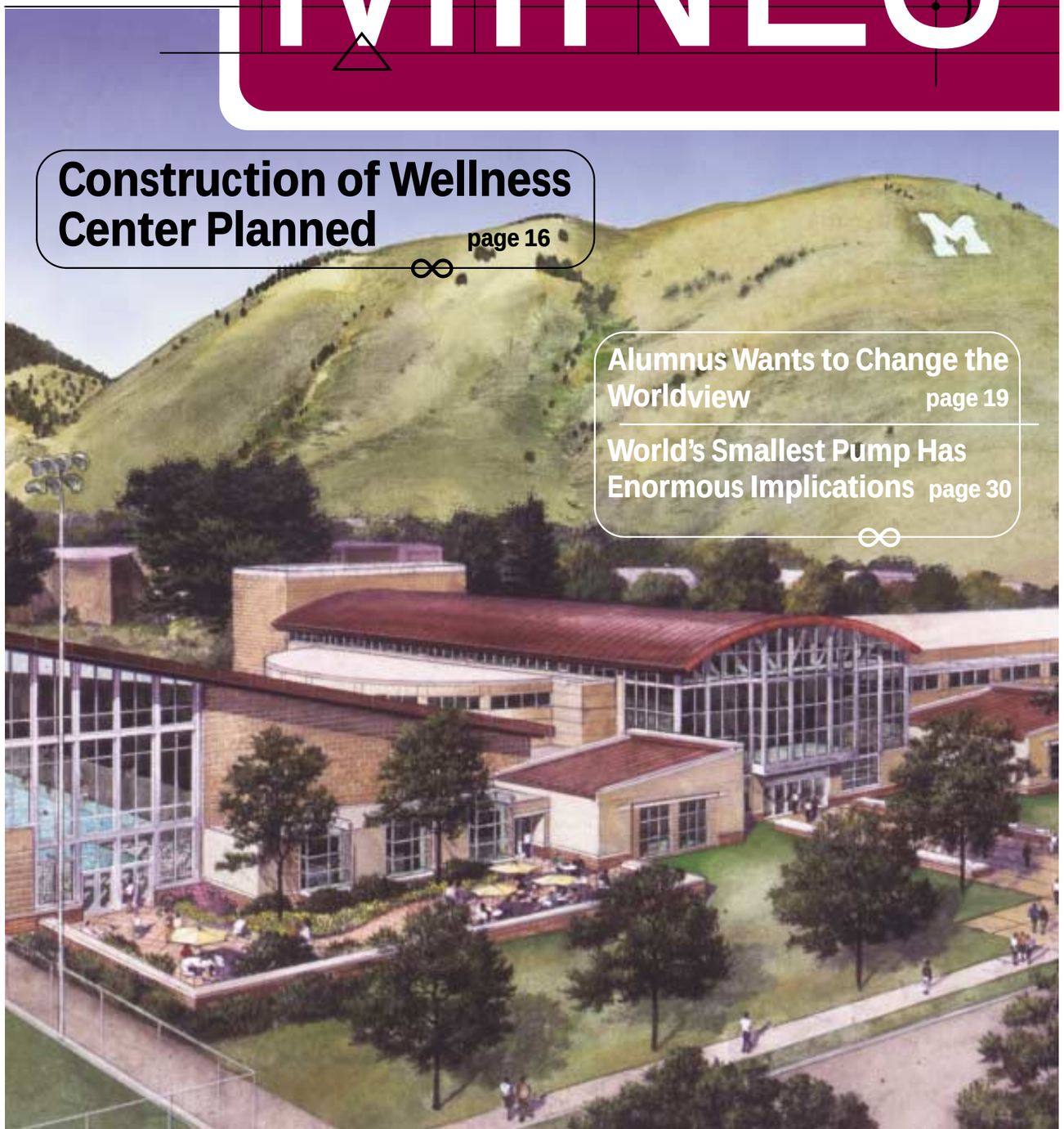
Fall 2002



Construction of Wellness Center Planned

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Alumnus Wants to Change the Worldview

page 19

World's Smallest Pump Has Enormous Implications

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About Our Cover:

Preliminary architectural plans for a new Wellness Center have been drawn up. Once remaining funds have been secured, the state-of-the-art athletics complex depicted here will be constructed on the west side of Elm Street, a few hundred yards southwest of the Ben H. Parker Student Center (full story p. 16).

MINES
FALL 2002

Mines is published quarterly by the Colorado School of Mines and the CSM Alumni Association for alumni and friends of the School. The magazine is a merger of *Mines Magazine* (founded in 1910) and *Mines Today* (founded in 1986). The merger took place in 2000.

Comments and suggestions are welcome. Contact us by writing to MINES, P.O. Box 1410, Golden, CO 80402; or call 303-273-3294 or 800-446-9488, ext. 3294, between 8 a.m. and 5 p.m., M-F, MST; or email *magazine@mines.edu*.

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Letters to the Editor

A tribute to John Robertson Jr. EM '49

I first met John when I came to Pueblo to be interviewed for a job with the then Colorado Fuel and Iron Corporation as a junior mining engineer in May 1954. He had gone to work for the Mining Department on June 21, 1949 and was then one of the assistant mining engineers in the department. John was assigned to take another prospective employee and myself to lunch and I learned at that time that he had been at Colorado Mines for two years when I was there. He was a gracious host and when I subsequently went to work in September of that year, I was, so-to-speak, put under his wing. He was an excellent mentor and I worked with him until the following April when I was sent to the Sunrise Mine in Wyoming.

In 1956 he was transferred to CF&I's Utah operation as the resident engineer. I joined him there in 1960, working for him for about three years at which time, in 1963, he was transferred to the Allen Mine at Weston, Colo., as the assistant superintendent under Lloyd Ingalls. Upon Ingall's retirement in 1964, John became the mine superintendent, a position he filled with very great competence until 1971.

As a result of his excellent work, he was brought back to the Pueblo office as manager of mines and quarries under R. R. Williams, Jr. (Class of 1929) who was director of mines and quarries. When Williams retired in January of 1973, John assumed the duties of head of the department. He left CF&I for greener pastures at the end of April 1978 and subsequently had a fine career in his chosen field of mining. Most notable was his work with the Educational Foundation of The Colorado Mining Association.

I will always treasure my friendship with John who did so much for me over the many years that I knew him. He was a gentleman and a fine mining engineer. May he rest in peace.

R.W. MacCannon Met E '51, EM '54

Hang in there, Miners

I thought it was ironic that the articles on CU being one of the top 10 party schools in the nation ran at the same time the Julie Poppen article *(Rocky Mountain News)* "Mines wants its students to get a life." I went to Mines and have always believed it was one of the best things I ever did in my life. It prepared me for a career that led to world travel and gave me the background to tackle challenges well beyond what I ever in my wildest dreams thought possible. Yes, Mines was tough, but so is everything in life worth achieving. We had a motto at Mines when I went there: "Work hard and play hard." I have followed that credo for my entire life. When you set out to do something, give it your all.

With tongue in cheek, I wonder if this is another attempt by Colorado University to take over Mines, as they have unsuccessfully attempted a number of times in the past. If they were successful, then the poor stressed Mines students would join CU and be part of one of the best party schools in the nation – and that will not be the credential that will get them that first great opportunity in life. My advice to Mines students: Hang in there, it will all be worth it. And when you get a break, go to Boulder and have some fun, like we at Mines have always done. By the way, don't pay any attention to that song the CU people sing to you that starts, "There's a heck-of-a situation up at Mines."

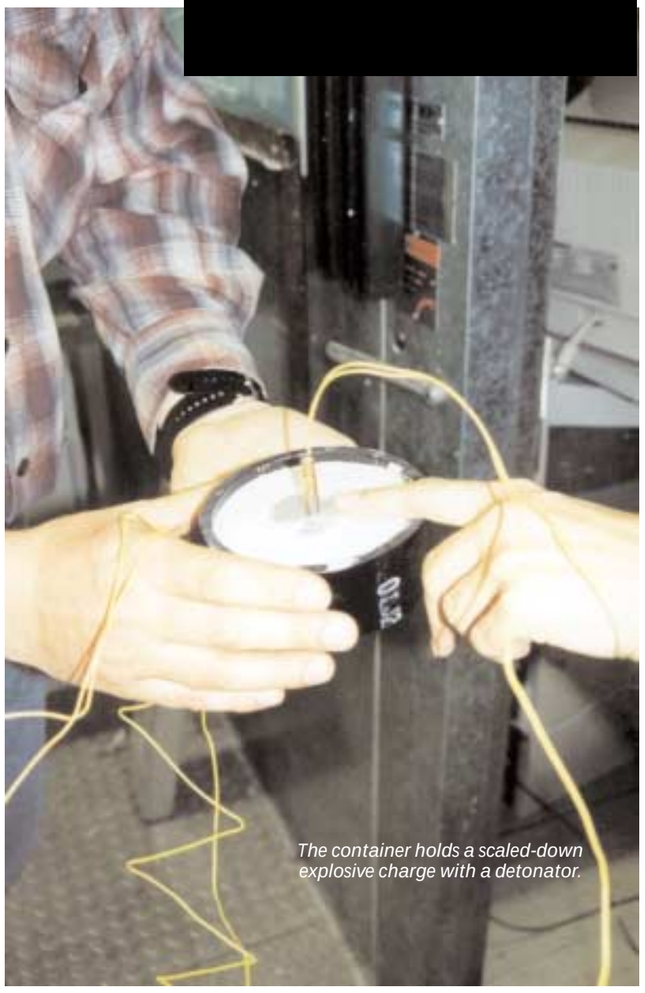
Glenn Vawter PE '60

Research with EXPLOSIVE Potential

Dr. Petr studies the fracture pattern on a model of a plexiglass target.

To Benefit the Environment, Industry and Mankind

By Marsha Konegni and Carolyn Reed



The container holds a scaled-down explosive charge with a detonator.

"Our research promotes both industry and the environment," says CSM's **Vilem Petr PhD Min '01.** It might also promote a safer world. In his Mining Engineering Department laboratory, Petr, an assistant research professor, conducts research on concrete structures of the future. His experiments have demonstrated the effects of explosions on concrete.

When Petr detonates an explosion to test the strength of a slab of conventional concrete, the damage is significant. The impact causes pieces of concrete to break off and fly from the slab. This high velocity fragmentation, called spalling, produces extensive collateral damage. Conventional concrete materials used for structures, barriers and other applications are known to spall when applied tension exceeds their strength. To reduce the spalling, Petrhas developed an advanced material with increased capacity to maintain structural strength.

In another experiment, using this new composite concrete with 30 percent to 40 percent of its natural aggregates replaced by recycled tires, Petr again sets off an explosion. This time the concrete stays almost entirely intact. Fragmentation (spalling) is greatly reduced. The recycled tire scraps have affected the number of spaces and spall regions in the concrete material and made it stronger. According to Petr, conventional concrete materials are four times to 15 times weaker than the new composite material he is studying.

This advanced material could provide protection for both personnel and structures subjected to high velocity impacts or explosions. As a counter-terrorism measure or for other military purposes, this resilient concrete shows great promise. The use of recycled tires within the composite concrete also makes this an environmentally friendly concrete.

Petr conducted the first phase of the research while working on his Ph.D. under the direction of a faculty advisory committee led by Tibor G. Rozgonyi, head of the Mining Engineering Department.

For his thesis, Petr developed experimental and numerical studies of shock waves transmitted through brittle materials, such as concrete. He found that the introduction of soft particles—in this case, recycled tire particles—reduced the magnitude of the shock. Soft particles quickly dissipate energy.

Experiments are conducted in the testing chamber located in Dr. Petr's laboratory.

Petr has been working with the concrete industry to develop the environmentally friendly concrete. For a year, Ready Mixed Concrete Company has donated all aggregates, cement, sand and manpower, and Applied Research Associates, Inc. has provided *pro bono* help.

Petr says that there is a limit to how much aggregate can be used in order to maintain adequate strength. For example, the material could be used for walls but not for pillars. The concrete/recycled tire material could also be used as:

- Insulation
- A subbase for roads
- Barriers on freeways and for high speed trains
- Runways
- Driveways and sidewalks.

An expert on explosives, Petr and experts from Los Alamos National Laboratories and the University of Rhode Island directed a course on Explosives Engineering in October at CSM. The course was an introduction to the main topics in the field of explosive engineering: detonation, explosive performance and chemistry, shock-wave physics in condensed matter, shock modeling, and explosion measurements and instrumentation. More than 50 experts from around the world attended the course.

Results show conventional concrete (with 0% replacement of aggregates) after a test using one gram of plastic explosives.

Results show composite concrete (with 37% replacement of aggregates) after an identical explosive charge.

EXPLOSIVE Potential

Alumni Association to Elect New Officers

Active Association members receive a ballot in the mail along with the membership drive. Several positions on the CSMAA board will be filled in February 2003. Candidates for the open positions are profiled below. The only contested position is secretary. Please return your ballot in the ballot envelope to the CSMAA office by January 31.

President-Elect (one-year term)
Arthur T. Biddle Met E '61 is a retired attorney who also sits on the board of directors for Conciliation Ministries of Colorado, an organization that provides dispute-resolution education and services. He recently served as its executive director. Previously he served in a number of legal and management positions involving mining exploration and development projects for Amax, Inc., several of which won national environmental awards. More recently he was a senior attorney with the Denver city attorney's office where he was involved with the design and construction of Denver International Airport for more than eight years. Biddle has been an active member of the Alumni Association since graduation. He is also chapter counselor for the Sigma Phi Epsilon house on campus.

Treasurer (one-year term)
Alan Mencin BSc CPR '79 is a planning services specialist with CapWest Securities and Blake Street Investments and is president and CEO of ACM, Inc., a computer-network design company. He is also a licsensed Professional Engineer. Mencin is actively involved with the Metro-Denver section committee and is currently secretary of the Alumni Association. He received his MBA from University of Denver in 1989, where he was a founder of DU's Graduate Business School (now Daniels Business School) alumni association.

Secretary (one-year term)
Lori Stucky BSc Eng '97 is an instrumentation and control systems engineer for Washington Group International in Denver, a job she has held since graduation. While at Mines, she was active on various committees including those planning E-Days and Homecoming, and was a member of Sigma Kappa sorority. She also was a head ambassador for the admissions office. Stucky is active in the Society of Women Engineers and acts as liaison between Mines students and professional women. She has been a member of the Alumni Association since graduation.

Kathleen A. Altman BSc Met '80 is a consulting metallurgical engineer in Denver. She has worked for numerous companies including CF&I Steel Corp., Climax Molybdenum Co., Barrick Goldstrike Mines, FMC Gold and SNC-Lavalin America. Altman holds master's and doctorate degrees from the Mackay School of Mines at University of Nevada, Reno, and has worked internationally on five continents. She was on the committee that wrote the history of women at Mines as part of the Caldwell Centennial Celebration. She is a member of the Society of Mining Engineers and has been a member of CSMAA since graduation.

Metro Director #3 (three-year term)
Patrick E. Phillips Met E '61, who also holds an MBA in finance from University of Colorado, is retired after 37 years in metallurgical and financial positions in the mining industry. He currently is chairman of the Colorado Mining Association Education Foundation and is past chairman of the Colorado section of the SME-AIME and extractive metallurgy Colorado subsection. Phillips' CSMAA activities include serving as secretary for the 1995-95 term. More recently, he served as chairman of the financial subcommittee to the umbrella committee on CSM/CSMAA relations. He also was a member of the alumni fund advisory and finance committees and is an active member of CSMAA.

Metro Director #1 (three-year term)
Stefany B. Stokley BSc Geop '99 is a geophysical analyst for Western Geco in Denver. She has been an active member of the Alumni Association since graduation and attends many association functions. While at Mines, Stokley was a Sigma Kappa and remains active in its alumni group. Currently she is coordinating a fundraising event to benefit the Alzheimer's Association. Stokley lives in Lakewood, Colo., with her husband and two dogs.

West Regional Director (three-year term)
Laurence G. Preble PRE '61 is director of development for KUD International LLC. KUD (Kajima Urban Development) is an affiliate of Kajima Corporation, the construction and development firm based in Japan. KUD develops complex, mixed-use, public/private real estate projects. Preble currently has primary responsibility for Silvertown, a 60-acre redevelopment project in the Docklands, east of London. Prior to joining KUD, Larry was the senior real estate partner at O'Melveny & Myers, a national and international law firm based in Los Angeles. Preble received his law degree from Loyola Law School in Los Angeles in 1968. He is a member of the American College of Real Estate Lawyers, the Anglo-American Real Property Institute and the Urban Land Institute. He has served on the board of several charitable and civic organizations including the Board of Trustees of Harvey Mudd College and the House Ear Institute. He is a member of the Board of Directors of the Mines Alumni Association.

CSM Foundation Board (two-year term commencing in June 2003)
Marshall C. Crouch III Geol E '67 is president and geological engineer for White Eagle Exploration in Denver. He has worked in the oil and gas industry since 1964 starting with Plains Exploration and then Kansas-Nebraska Natural Gas, and in 1974 founded White Eagle Exploration. Crouch has long been an active member of the Alumni Association and was awarded an honorary membership in 1990. He served on the CSMAA board in all officer positions, including president and was chairman of several committees. He also served on the CSM Foundation Board for two years. He has been active with the Rocky Mountain Association of Geologists and other geological and petroleum-engineering societies, serving on numerous committees as a member or as chair. He received a Distinguished Service Award from the RMAG in 1995. Crouch has been on the board of directors of CSM's Potential Gas Agency for over 10 years. He is currently a member of the Foundation's Denver President's Council calling committee.

An Update from the CSMAA President
Dear Alumni and Friends,

Some of you may not realize that CSMAA is an independent organization from CSM. Two years ago, our Board of Directors began strategic planning to redefine our mission and priorities, and better utilize our limited resources. Our new mission statement explains our job as nurturing strong connections throughout the Mines family, providing goodwill and support, promoting the School's traditions and excellence and helping alumni with professional development.

To this end, our programming includes reunions, homecoming, local section development, alumni career services, and student financial assistance. Our planning efforts also led to greater cooperation with the School in co-editing *Mines* and sharing an alumni database. A joint CSMAA/CSM task force is exploring other cooperative efforts.

CSMAA would like to provide other services: assisting with student recruitment, working more closely with student groups, increasing ties between young alumni and the School. However, these are tough financial times and we have been forced to cut back instead of expand.

Therefore, I encourage you to remember your alma mater and support the School in any way you can:

- Become a sustaining member of CSMAA.
- Make a contribution via the Annual Fund or other program.j10
- Volunteer with CSMAA or the School, attend local section meetings, or start a section if one does not exist!

You can support Mines and remain connected in many ways. I sincerely hope you find the way that's right for you. Have a safe and happy holiday season!

Jodi Menebroker CR '91

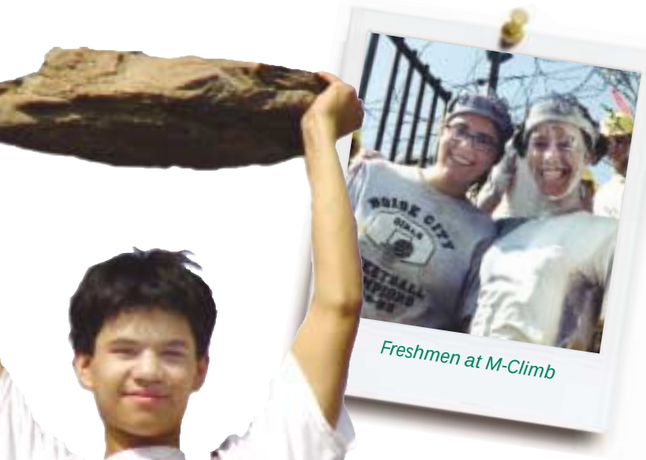
M-Climb

Adhering to tradition, more than 550 freshmen each carried a 10-pound boulder up Mt. Zion to place it on the "M," then coat the "M-Blem," and typically themselves, with a fresh coat of whitewash. Board of Trustees member Terrance Tschatschula carried a rock that weighs "more than 10 pounds on Jupiter."

Classes started Aug. 20. The 2002-2003 statistics for entering freshmen include:

- Average ACT/SAT scores of 27/1230
- Average GPA of 3.7
- 50 percent in the top 10 percent of high school graduating classes.

Terrance Tschatschula



Freshmen at M-Climb

Richard Olson

Hennebach Professor

Professor Richard Olson, the 2002-2003 Hennebach Professor in Liberal Arts and International Studies, joins the Mines community from the Department of Humanities and Social Sciences at Harvey Mudd College in Claremont, Calif.

Olson has authored six books and published more than 100 articles and reviews. His research focuses on the interactions between natural scientific knowledge and its producers and other cultural domains. Recently he has concentrated on:

- The interactions between scientific developments and religious developments in Britian during the 17th and 18th centuries
- The permeation of 19th century social thought by concepts and methods from the natural sciences.

At Mines Olson plans to present lectures on:

- Astronomy, astral religion and the emergence of a transcendental divine in the ancient near east
- Early Christianity and the preservation and promotion of natural knowledge
- Christian humanism and the rise of "modern" science
- Mutual aid: the interplay of English natural theology and natural philosophy
- Science and secular religions in 19th century Europe.

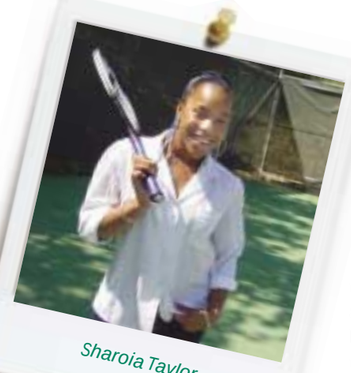
Both the lecture series and professorship were established in 1991 by **Ralph L. Hennebach Met E '41**, ASARCO, and the National Endowment for the Humanities, to bring exceptional humanities and social science talent to campus.

Inspiring Young Minds

Women in Science, Mathematics and Engineering (WISEM) recently partnered with Girls Inc. of Metro Denver to bring the Eureka! summer program for seventh-to-10th-grade girls to the CSM campus.

The Eureka! program incorporates skills in science, math, computers, leadership, health, and sports and adventure. The teens built solar cars at the National Renewable Energy Laboratory, explored how computers are created at CSM's Center for Technology and Learning Media and studied earthquakes at the United States Geological Survey.

Sharoia Taylor, nicknamed JoJo, is a good example of the type of girl that participates in Eureka! She is a taekwando state and national champion who is being raised by her grandmother. "I love my grandmother," she said. "She taught me the consequences of drugs and tries to expose me to lots of everything so I know what to do in every situation."



Sharoia Taylor

Speaking of her experience at Mines, Taylor said, "The computer programs here are excellent. The teachers are wonderful and facilities top notch. I wake up at 4 a.m. to take the bus, so I won't have to wake up my grandma, and get home around 7:30 p.m., just so I can come," said JoJo.

"By spending time on the Mines campus these girls are encouraged to study and pursue careers in math and science. They see what it's like to be a college student and begin to see that a college education is possible. The Eureka! program is particularly successful since it focuses on the whole person, integrating the importance of science and math with life skills," said Deb Lasich, director of WISEM.

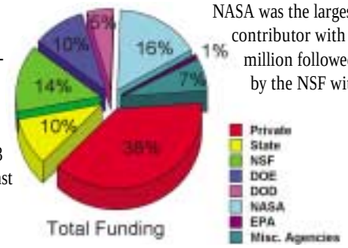
SHORT STAKES

$30.3 Million: CSM's Largest Research Funding Year

Colorado School of Mines researchers recorded the largest funding year ever for fiscal year 2002 with a total of $30,301,850 in 475 awards from federal, state and private sources.

The most awards, more than 250, came to CSM from the private sector and amounted to $11.6 million.

It was a record-breaking year with total research monies up $2.3 million from last year.



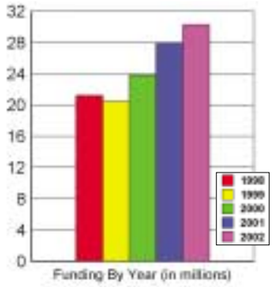
Total Funding

Top consortiums for fiscal year 2002 include:

- Reservoir Characterization Project, $1,174,731, 24 sponsors.
- Center for Wave Phenomena, $1,055,500, 26 sponsors.

The top cost center for fiscal year 2002 was the Center for Commercial Applications of Combustion in Space with $4,611,470 in funding.

NASA was the largest federal contributor with $4.9 million followed closely by the NSF with $4.1 million in funding. Other federal awards were received from the Department of Energy, Department of Defense and the Environmental Protection Agency.



Funding By Year (in millions)

CSM Hosts U.S. Coast Guard Delegate

Dr. Carla Egelhoff, a senior representative of the U.S. Coast Guard Academy, visited Mines this summer to learn more about the School's diversity programs with the goal of increasing the admissions, retention and graduation numbers of underrepresented minorities and women in engineering at the Academy.

Based on Mines' student diversity profiles and the quality and reputation of its engineering programs, the Academy chose Mines from among engineering schools nationwide for its "best practice" commitments, including the CSM Diversity Committee, Women in Science, Engineering and Mathematics program, and Minorities in Engineering program.


Candace Ammerman

Ammerman Recognized as Outstanding Adviser

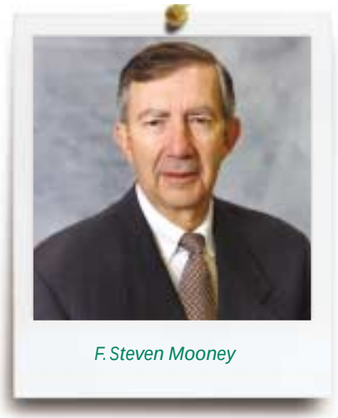
For the third consecutive year, **Candace Ammerman BSc BE '81**, lecturer of engineering, has received the 2002 Zone III Outstanding Student Chapter Faculty Adviser Award from the American Society of Civil Engineers (ASCE).

CSM student chapter officers nominated Ammerman for her outstanding work and dedication. She was praised by the ASCE chair of the committee on student activities, who noted, "It is the enthusiasm and commitment of faculty advisers like you that produce excellent student chapters such as yours."

ASCE awarded the CSM ASCE student chapter a 2002 Certificate of Commendation for its outstanding activities, which were recorded in the chapter's 2001 annual report.

Mooney Elected President of CSM Board

F. Steven Mooney Geol E '56 was elected to serve a two-year term as president of the CSM Board of Trustees. Mooney has been a member of the board since 1996.


F. Steven Mooney

International Agreement Renewed

Rector Wolfgang Poehl and Second Vice Rector Brigitte E. Weinhardt of Montanuniversitat Leoben (MUL) recently visited CSM to renew an international exchange agreement of cooperation. MUL is located in Leoben, Austria, and focuses on applied earth sciences and engineering.


President John U. Trefny and Rector Wolfgang Poehl

Originally initiated in 1989 by CSM's and MUL's petroleum engineering departments, this international studies program was the first in Austrian history to be taught in a language other than German. In order for MUL to teach petroleum engineering classes in English, the Austrian Parliament changed the constitution.

As a result of the program's success, the Austrian Constitution was again revised to allow all departments at MUL to teach in English.

"Over the years there have been many visits between petroleum engineering and environmental science and engineering faculty that have led to a strong exchange program for both undergraduate and graduate students," said K. Godel-Gengenbach, director of international programs. "This success is tied to the efforts of Craig Van Kirk, department head of petroleum engineering; Ramona Graves, associate professor of petroleum engineering; and Weinhardt, who have worked tirelessly to encourage student participation."

According to Godel-Gengenbach, approximately 50 students from Leoben have studied at CSM and an equal number of CSM students have studied in Leoben. Many MUL students have also stayed at CSM to complete a master's degree following completion of the exchange program.

SHORT STAKES

And the Winner is…CTLM

"From the outset, I set a goal for the project to be state-of-the-art in terms of both instructional technology and sustainability," said Paul Leef, CSM's manager of planning and construction.

The project was CSM's new Center for Technology and Learning Media (CTLM), and it's been winning awards ever since.

The Colorado Renewable Energy Society recognized CTLM with a 2002 Renewable Energy in Buildings Award. Michael Bowker, mechanical engineer with the Office of Planning and Construction, accepted CSM's award, which celebrates the most creative use of renewable energy in design and construction of new residential, commercial and institutional buildings in the state.

At the 2002 Society for College and University Planners conference, CTLM received an award in the category of Architecture and Design in Education.

In its annual Education Design Showcase, *College Planning & Management* awarded CTLM a 2002 silver medal honorable mention in the colleges and universities category.

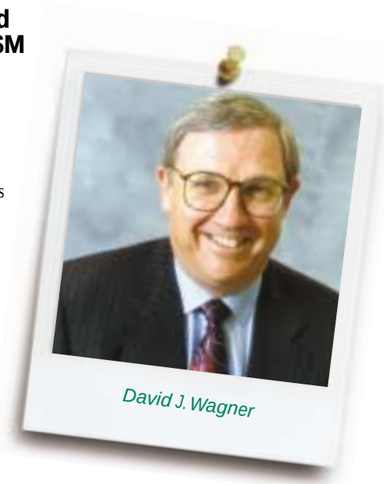
In addition, *Architectural Record*, a leading industry magazine for architectural design, featured CTLM on its Web page throughout August.


CTLM


A CTLM hallway

Wagner Elected President of CSM Foundation Board

CSM trustee David J. Wagner was elected to serve a two-year term as president of the CSM Foundation Board of Directors. Wagner has been a member of the CSM Board of Trustees since 1999.


David J. Wagner

Office of Public Affairs Receives Awards

The CSM Office of Public Affairs received four People's Choice Awards in July at the annual conference of the Higher Education Association of the Rockies (HEAR) for *Mines* magazine, the newsletter *Update*, the new CSM Web site, and the School's mini-fact booklet in the category three- and-four-color brochures.

Leah Kolt, director of public affairs, served as the 2001-2002 HEAR president.

Mines Team Takes Third in ASCE Competition

CSM civil engineering students took on dozens of teams from across the country in the 2002 American Society of Civil Engineers' National Student Conference in late June.


CSM's team at the K'NEX competition

The team of Mary Hamann, Sonia Hesseltine, Robert Marquez, Nick Rogers, Casey Spicer, Ellen Taylor and Christopher White placed third in the K' NEX bridge building competition.

Students designed, contracted and built the 4-foot wide and 12-foot long bridge that held 10 pounds of weight and spanned an obstacle. Increasing the challenge was the primary building material–K' NEX toys (similar to Tinkertoys).


"CSM Then and Now", an 80-foot theme display at the 2002 Colorado State Fair, was featured in the Department of Natural Resources Building. This year's fair, from Aug. 17 to Sept. 1, drew a crowd of more than 600,000. The Geology Museum and Office of Public Affairs created the display with contributions from the CSM community.

Murphy Appointed Sports Information Director


Greg Murphy

Greg Murphy, a graduate of John Carroll University with a degree in communications, is CSM's new sports information director. Previously Murphy was the assistant sports information director at Washington and Lee University. To the job at Mines, Murphy also brings his experience as an intern for the Cleveland Indians Media Relations Department and as a regional public affairs coordinator in Ohio for the Muscular Dystrophy Association.

November

21 Denver-area Thursday Mixers: Gordon Biersch Brewing Company, 1 Flatiron Circle, Broomfield, CO, 6-8:30 p.m. No charge at door, pay own way. RSVP to Janet Blair, 303-273-3295.

RTOQ's Pub, 10133 West Chatfield Ave., Littleton, CO, 5-7:30 p.m. Free food from 5-6:30 p.m., drinks $2. RSVP to Janet Blair, 303-273-3295.

Wyncoop Brewing Company, 1634 18th Street, Denver, 5-7:30 p.m. No charge at door, pay own way. RSVP to Janet Blair, 303-273-3295.

22-23 Women's Basketball at Oakland, CA.

29-30 Men's Basketball at Brookings, SD.

December

5-6 Wrestling in Las Vegas, NV

12 Lunch Bunch, an informal alumni get-together, meets at the Buffalo Rose in Golden, Colo., 11:30 a.m.

19 Grand Junction, CO, section luncheon at Bookcliff Country Club, 2730 G Road, noon. For information call John Howe at 970-242-4903 or Del Tolen at 970-256-1118.

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20-21 Men's Basketball at Anchorage, AK

January

03 Wrestling at Omaha, NE

Men's and Women's Basketball at Anchorage, AK.

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2003 REUNION WEEKEND MAY 8-10

Classes of 1943, 1948, 1953, 1958, 1963, 1968, 1973, 1978, 1983, 1988, and 1993

Don't miss the opportunity to return to campus and reconnect with old friends. Spring will be here before you know it, so mark your calendars and book your flights now: May 8-10, 2003.

Committee involvement opportunities

Class Reunion Events Committees
—call Kathy Breit 303-273-3290
Class Reunion Gift Committees
—call Lisa Olson 303-273-3144

Planned Wellness Center may soon grace campus

By Nick Sutcliffe

Mines students work hard *and* they play hard. Despite demanding academic schedules, 85 percent of students regularly participate in athletic activities. With plans underway to build a state-of-the-art fitness facility just southwest of the Ben H. Parker Student Center, finding the time and motivation to exercise may become that much easier.

"The facility is going to add a great deal to the campus," says Vice President and Dean of Student Life, Harold Cheuvront. "Students have wanted this for years. Encouraging team sports, physical fitness, and balanced lifestyles is a part of our educational mission and a priority for the School."

Indeed, the Board of Trustees recently approved an official "Philosophy Statement on Athletics" that closely ties the overarching educational objectives of the institution to physical activity. Explaining this philosophy, President John U. Trefny points out, "We have four short years to turn high school graduates into professional engineers of the caliber expected from Mines. The entire fabric of campus life must support this undertaking. Athletic programs teach communication skills, teamwork, ethical conduct, and leadership–all critical professional qualities for a successful engineer. No less important, athletics help instill healthy lifelong fitness habits."

This philosophy is a major factor behind the Wellness Center project. Volk Gymnasium and Steinhauer Field House are presently the only indoor athletic facilities on campus. Constructed in 1937, Steinhauer continues to provide valuable space for athletics, but the surfaced concrete floor is unsuitable for many activities. Volk Gymnasium, constructed in 1958, offers a much wider variety of facilities, but it was designed for a student body of 1,000 students, all male. The student population is now approximately 3,300, a quarter of whom are women.

Another concern is that the varsity basketball and volleyball teams must currently share the one basketball court in Volk. They rotate two-hour practice slots each day between 4 and 10 p.m., so no one team is permanently saddled with the late-evening practice. With a large gymnasium that accommodates two basketball courts, the new Wellness Center will alleviate these scheduling pressures.

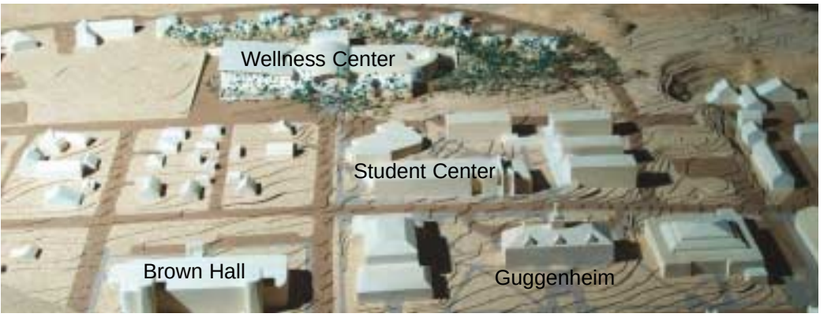
The planned $25 million facility will also include a 25-meter pool, a climbing wall, a jogging track that encircles the gymnasium, a cardiovascular and weight room, and space for group activities such as aerobics, martial arts and yoga. Plans also include classrooms for health and fitness instruction.

The location and design of the Wellness Center are the result of an extensive planning process headed up by a CSM program committee in consultation with Denver-based Christopher Carvell Architects. To ascertain community needs, SportsPLAN Studio, an independent consultancy specializing in collegiate athletic facility design, conducted detailed surveys and interviews with students, faculty and staff throughout the School. From this data, space requirements for specific activities were derived. And based on this information, the input of the CSM program committee, and their own detailed analysis of the Mines campus and

Graphics courtesy of Christopher Carvell Architects

community, Christopher Carvell Architects generated preliminary plans for the Wellness Center.

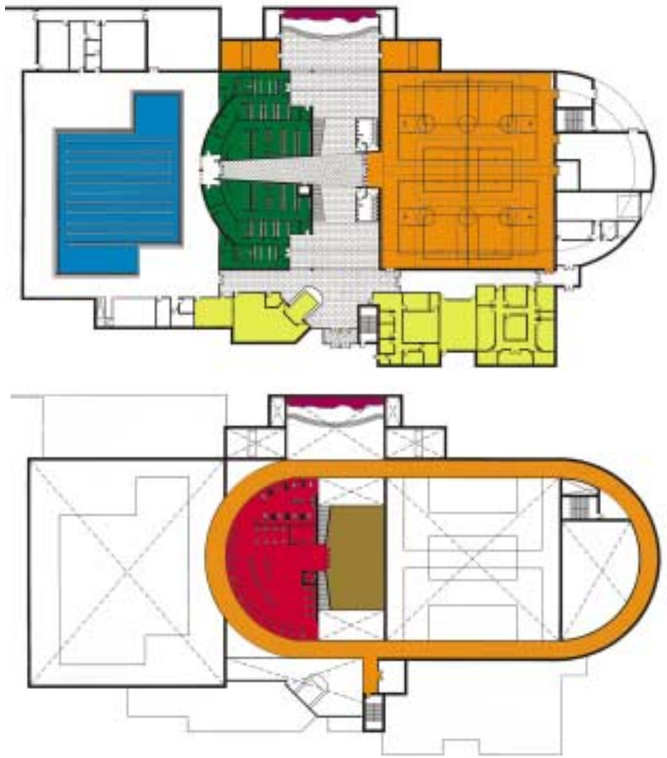
The proposed location offers a number of advantages. It is conveniently accessible from Weaver Towers and neighboring fraternity and sorority houses. It is adjacent to intramural fields and close to the Ben H. Parker Student Center. SportsPlan's surveys revealed a strong demand for more informal recreational spaces on campus. In addition to serving as a center for athletic activities, it is hoped that the central location will make it a convenient meeting place for students. Current plans are for a student lounge to be included inside the large atrium, which will command a spectacular view of Golden.



After several years of planning, breaking ground is significantly closer thanks to a generous challenge grant of $2 million from the Adolph Coors Foundation. Acknowledging this extraordinary gift, Trefny said, "The goodwill and generosity of the Coors family and the Coors Foundation have had an important and tangible impact on all aspects of academic and student life at Mines. We are very grateful for this latest instance of the special relationship we share with them. This commitment is a major step toward reaching our philanthropic goal for the project."

The funding plan includes philanthropy, bonding and state financing. One critical component of a bond issuance involves a mandatory student fee of $55 per semester. Mines students overwhelmingly approved the fee in a campus-wide vote this spring. The fee will begin once the Wellness Center is ready for use. A request for capital construction funding has been submitted to the state, but recent budgetary cutbacks for higher education have been severe. In light of this uncertainty, philanthropic donations are likely to play a more critical role. With the Coors gift, approximately $10 million must still be raised through philanthropy. Cheuvront is optimistic about securing funding. "This is going to be the largest building on campus–a landmark," he points out. "It is going to make a significant contribution to the quality of life for every student passing through Mines for many years to come."

Alumni, corporations and foundations are being asked to support the center, which is a priority in a major campaign soon to be announced. The target for completion is 2005.



People Watch

Weege '84 Finds Possible New Dinosaur Species

A petroleum engineer by day and a paleontologist by night and on weekends, **Chris Weege BSc Pet '84** has expanded a childhood interest into an adult fascination with dinosaur bones.

Weege, left, and fellow dinosaur enthusiast Dave Schmude, with a dinosaur bone

"I've been collecting fossils since I was a kid," says Weege, whose first find was a brachiopod in Michigan, followed by a trilobite in Wisconsin. When he moved to Colorado to attend Mines, he bought a Jeep and began roaming the West in search of fossils. "I wanted to see if I could find a piece of bone. Then I wanted to find a whole bone, then a whole skeleton."

Eighteen years later, he has succeeded beyond his wildest expectations. He began focusing on an area in Wyoming near Medicine Bow. He obtained rights to search and later purchased a parcel there. In 1995, he uncovered what is probably a new species, an *Allosaurus* that's never before been described. It's a distant relative of *Tyrannosaurus rex*, though about 85 million years older.

"Carnivorous dinosaurs are rare to find because there were fewer of them," says Weege. "Usually, skeletons are disarticulated. You might find an occasional bone." But his *Allosaurus* was "pretty much complete." And the site, an ancient streambed, promises to yield more complete skeletons. In 1996, he found a *Stegosaurus* and last year found three more *Stegosauruses*, an *Ankylosaurus* and a *Coelosaurid* dinosaur.

People have been collecting Jurassic dinosaurs for about 130 years but most are from the upper Morrison formation. Weege's finds are from the lower Morrison formation, about 3 million to 5 million years earlier.

Weege is mostly a self-taught palentologist, gleaning his knowledge from books, courses at the Denver Museum of Nature and Science, and hands-on experience. But unlike most amateurs, he has published papers on his finds. He also works with Western Paleontological Laboratories, Inc. in Orem, Utah, which is helping him prepare his finds for display. When cleaned and assembled, skeletons may be donated to a museum.

"There's not much of a market for most dinosaur bones," Weege says, but he doesn't excavate for financial reward. "It's fun science. It's part of the story of how the present world came to be. For me, it's an adventure. I like remote areas and this gets me there."

Hedlund '75 Wants to Change the Worldview

Bob Hedlund BSc Min '75 fell in love with Uzbekistan while there on business and the world is becoming a better place because of it. The former gold-mining engineer now uses his Mines education to help the Central Asian countries of Uzbekistan, Kazakhstan and Afghanistan improve their standard of living.

In 1992, he and his family moved to Uzbekistan and established Joint Development Association International (JDA), a non-profit institution that operates in the three Central Asian countries, to help with community and economic development. Hedlund's approach is to change people's worldview.

"It's not a lack of resources that causes poverty," says Hedlund. Neither Japan nor the Netherlands have natural resources yet are affluent nations, while Somalia, with great natural resources, is among the poorest. "It's because of their worldview." In the United States, for example, we believe that new resources appear through creative and innovative processes (i.e., sand being used for computer chips). Hedlund's goal is to help the people of Central Asia realize that "their greatest resource is their own creative mind."

Afghanistan today

Hedlund calls this "transformational development." He sees himself as the catalyst to help others help themselves. He describes workshops in Central Asian villages where he discusses problem-solving. The first day he asks community participants to list their problems. The second day he asks for solutions and everyone thinks foreign money is the only answer. By the third day, though, Hedlund says participants are discussing solutions to their problems using the resources that exist within their own communities. "The goal is adequacy, not affluence," he says. The region of Central Asia and Northern Africa is one of the poorest in the world with 35,000 children daily dying of malnutrition. To just boost the standard of living is enough for now.

The JDA has a staff of 135, only 18 of whom are Westerners. Last year, the organization helped develop 400 fresh-water wells that now serve 85 villages. This year it is helping to rebuild irrigation systems, roads, homes and schools in Afghanistan.

Change from Baseball to Football… Good for Sump, Good for Mines

Colorado School of Mines senior Brian Sump began playing baseball as a third grader. For the next nine years, Sump celebrated a brilliant baseball career, but the thought of playing football occasionally crossed his mind. However, Sump never believed that he was big enough or strong enough to play on the gridiron. That was all about to change as Sump concluded his junior year at Thomas Jefferson High School in Denver.

"After my junior year of baseball, I started talking with some of the guys on the football team," Sump said. "I started working out with the receivers over the summer and realized that they were all fast and strong. But I kept working at it and when the season rolled around, I was the number two receiver.

Sump's one season of high school football proved to be a successful one as he earned Honorable Mention All-Conference honors. In addition, Sump caught the eyes of several college football programs, including School of Mines. When all was said and done, Sump decided to become an Oredigger

"I thought that was the best opportunity for me," Sump said. "I was offered money to play football and Mines has an excellent academic reputation. I felt that it was a school that was a great fit for me and a place I would be able to succeed at."

When Sump arrived to campus for his first preseason training in 1999, he was a mere 150 pounds and in an ankle brace due to an injury he suffered while playing baseball his senior year in high school. However, Sump was determined to prove that he belonged.

"I worked out with several of the older receivers during the summer and saw that there were some quality receivers on the team," Sump recalled. "But I knew that I had a place on the team and was determined to work hard and prove myself."

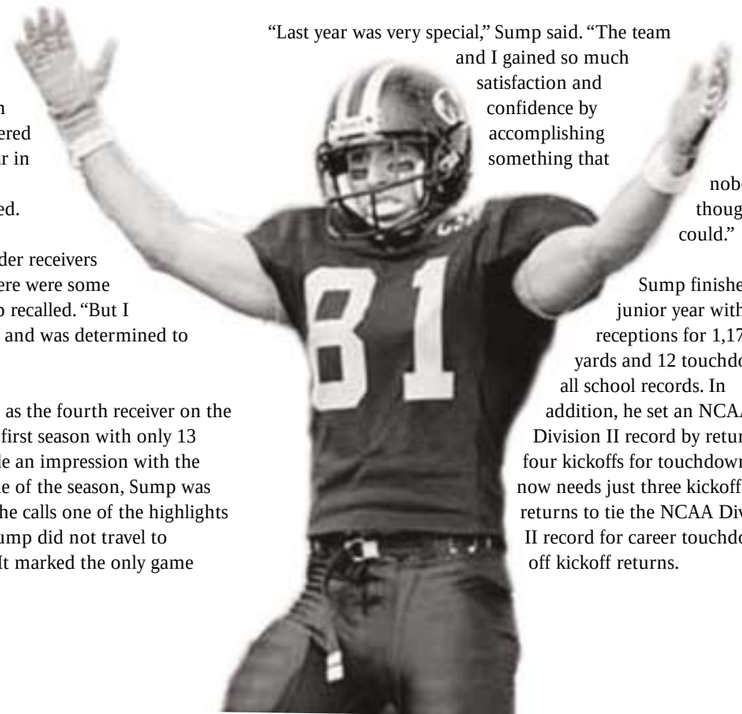
Sump did just that and ended camp as the fourth receiver on the depth chart. Although he ended his first season with only 13 receptions for 136 yards, Sump made an impression with the CSM coaching staff. In the first game of the season, Sump was called upon to return a kick, which he calls one of the highlights of his career. The following week, Sump did not travel to Montana Tech for an away contest. It marked the only game Sump has missed during his time in Golden. By week six of his freshman season, Sump had played his way up the depth chart and was seeing time as a full-time receiver. He has not looked back since.

Sump followed his first season by catching 28 passes for 304 yards and five touchdowns. More importantly, he made his mark as a return specialist as he set CSM records in kickoff returns (38), kickoff return yards (1,082), punt returns (19) and punt return yards (294). He also returned one kickoff for a touchdown. Sump's efforts helped him earn First Team All-RMAC honors as a kick returner.

Then came last year's magical season in which Sump became the first Oredigger to earn All-American honors since 1998 as he helped CSM post a 7-4 record and a 4-4 mark in the RMAC. It marked the Orediggers' first winning season since 1991.

Included in Sump's individual accolades were First Team All-RMAC as a wide receiver and kick returner, d2football.com First Team All-West Region and All-American (Special Teams), Daktronics Division II All-Region and All-American as an all-purpose player, as well as the RMAC and d2football.com Special Teams Player of the Year.

"Last year was very special," Sump said. "The team and I gained so much satisfaction and confidence by accomplishing something that nobody thought we could."



Sump finished his junior year with 59 receptions for 1,175 yards and 12 touchdowns, all school records. In addition, he set an NCAA Division II record by returning four kickoffs for touchdowns. He now needs just three kickoff returns to tie the NCAA Division II record for career touchdowns off kickoff returns.

"It would be really great to get the record," Sump said, "but that won't be one of my main goals this season. I just want to go out and be the most complete player I can be and it helps that I have positive reinforcements around me in my teammates."

As for his senior year, Sump and his teammates are hoping to make history. "We want to do something week in and week out that has never been done in School of Mines football history. There is a rich tradition of football here and we want to add our chapter to that."

Following his senior season, Sump said that he would love to continue to play football on the next level. Several NFL teams have been taking a look at the six-footer.

"I want to keep playing football," Sump said. "I feel that I am in a rare position and am just going to keep the same mindset I have maintained over the years. If the opportunity arises to talk to some teams, then I will take it as it goes."

By Greg Murphy

Colorado School of Mines Fall Sports Updates
(as of October 21)

FOOTBALL The Mines football team opened the season 4-1 and was ranked as high as seventh in the West Region and 33rd in the country. CSM lost its next two games and is 4-3 overall and 1-3 in the RMAC. The early season highlight came when senior quarterback Nate Jackson tied an NCAA record by throwing a 99-yard touchdown pass to Jonny Chan against South Dakota Tech. Senior wide receiver Brian Sump continues to be one of the top players in the RMAC and the country as he is ranked in the top-30 of six statistical categories.

SOCCER The Oredigger soccer team won its first five games of the season and was ranked as high as fourth in the country and first in the Midwest Region. Included in the win streak was a 5-2 season opening victory over the University of Tampa, the defending Division II National Champions and a 4-3 overtime win at Fort Lewis which marked CSM's first victory over the Skyhawks since 1996. Mines, now 10-4-1 overall and 5-2-1 in the conference, has been led by sophomore forward Scott Phipps, who has tallied a team-high 19 points on nine goals and one assist.

VOLLEYBALL The Mines volleyball team has played a very rugged schedule with a young squad this season and is 1-21 overall and 1-12 in the conference. CSM notched its first victory of the season with a 3-2 triumph at CU-Colorado Springs on Oct. 19. Senior outside hitter Laurie Alzheimer continues to be one of the premier players in the RMAC and leads Mines with 259 kills, 193 digs, 25 blocks and 10 aces this year. Senior middle blocker Lauren Ramsay has contributed 148 kills and a team-high 65 blocks.

CROSS COUNTRY The CSM cross country teams have performed extremely well this season and will run at the RMAC Championships in Gunnison, Colo., on Oct. 26. Senior Michael Sharkey has been the top CSM men's finisher in three of the four races this season, while Heather Beresford has led the Mines women in all five races this year.

GOLF The Oredigger golf squad had a very successful fall season which was highlighted by a seventh place finish at the RMAC Championships at Antelope Hills Golf Course in Bennett, Colo. Freshman Travis Reilly was the top CSM finisher as he fired a three-round total of 221 to tie for 17th place.

Learning About Learning

By Marsha Konegni

Dr. Michelene Chi

With the Help of Experts...

Why are some science and engineering concepts so consistently difficult for students to learn? According to Dr. Michelene Chi, professor of psychology at the University of Pittsburgh, it's the way students think about and categorize these concepts that make them formidable to understand. Students may know "how to work the problems," Chi has discovered, but that doesn't necessarily mean they grasp the underlying concepts.

So, when teaching concepts such as heat, electricity, and equilibrium, how can educators design their instruction to improve comprehension? In a seminar sponsored by CSM's Center for Engineering Education, Mines faculty gathered in a campus classroom this summer to learn about learning from Chi. The senior scientist in the University of Pittsburgh's Learning Research and Development Center has published more than 100 scientific articles, one of which is considered a "classic" work in cognitive psychology.

Chi pointed out that more than 6,000 studies have been done that document misconceptions in science alone.

"Unlike incorrect, missing, or incomplete knowledge, misconceptions are difficult to remove, resistant to instruction, and persist in the face of confrontations," Chi told the faculty. The goal of her research, she said, is to explain why misconceptions are common, determine how they might have arisen, and discover how they might be repaired.

"Knowledge," she pointed out, "is not just individual pieces of facts or equations. Rather, it is a connected set of facts and equations, and we have to worry about how they are connected." Connections begin with the knowledge that students already have.

"We learn by assimilating new ideas with old ideas, and we are not good at making radical changes," Chi explained. Her lighthearted example involved a fish—which, of course, had never lived above water—listening to a frog describe birds and people. The bird? In the fish's mind, it was a fish with wings. People? Fish with feet and hats.

A particular concern is that misconceptions may be a part of prior knowledge. So, when a student learns a new correct idea by integrating it with an old misconception, the misconception is perpetuated, and the student's understanding of the new material is distorted.

Simply summarized, Chi's research shows that correct general frameworks must be learned first. "Once learned, understanding of other similar concepts can take place," she said.

Many scholars at CSM and around the world believe this research could transform the way engineering is taught.

See Dr. Chi's Website *www.pitt.edu/~chi/* for more information about her work.

...and a $10 Million Grant from the NSF

Mines will partner with the University of Washington, Stanford University, Howard University and the University of Minnesota to develop a national center for engineering education. The $10 million center is one of only two funded nationally by the National Science Foundation's Higher Education Centers in Learning and Teaching Program.

The center proposed by this consortium of universities competed against 30 other proposals in the grant competition. The project will be known as the Center for the Advancement of Engineering Education, while the second center will focus on mathematics and physical sciences. The grant takes effect in January of 2003 and will run through December 2007.

"Mines provides a unique environment for this study, because students here learn open-ended problem-solving skills, rather than work on 'canned' laboratory experiments. Among other things, we are interested in learning how this relates to their abilities to work in teams and collaborate," said Dr. Ruth Streveler, director of the CSM Center for Engineering Education

Goals of the center include gaining significant insight into how engineering students learn – across diverse student populations and environments – to help current and future educators provide effective learning experiences for all engineering students. CSM will participate in two research projects and instructional development activities.

The research projects include a longitudinal study of engineering students, as well as a study of "difficult concepts" and how to measure student understanding of them. The longitudinal study will identify what creates a "successful learning environment" by tracking groups of students at Mines and four other engineering schools, from freshman through senior year, to identify what challenges students face and how they overcome them. The "difficult concepts" portion of the research will focus more on the cognitive aspects of learning, in areas such as solids mechanics and electrical engineering.

In addition, an engineering portal will be developed, providing educators with access to resources and tools developed during the project, as well as existing resources already available on the Web.

"This grant from the NSF is strong evidence that Mines is a key national player in engineering education. As science and engineering curricula become ever more complex, it is critical that we gain insight into how engineering students learn, so faculty can enhance the learning process," said CSM President John Trefny.

- For more information on current engineering education research projects at Mines, go to *http://www.mines.edu/research/cee/*.

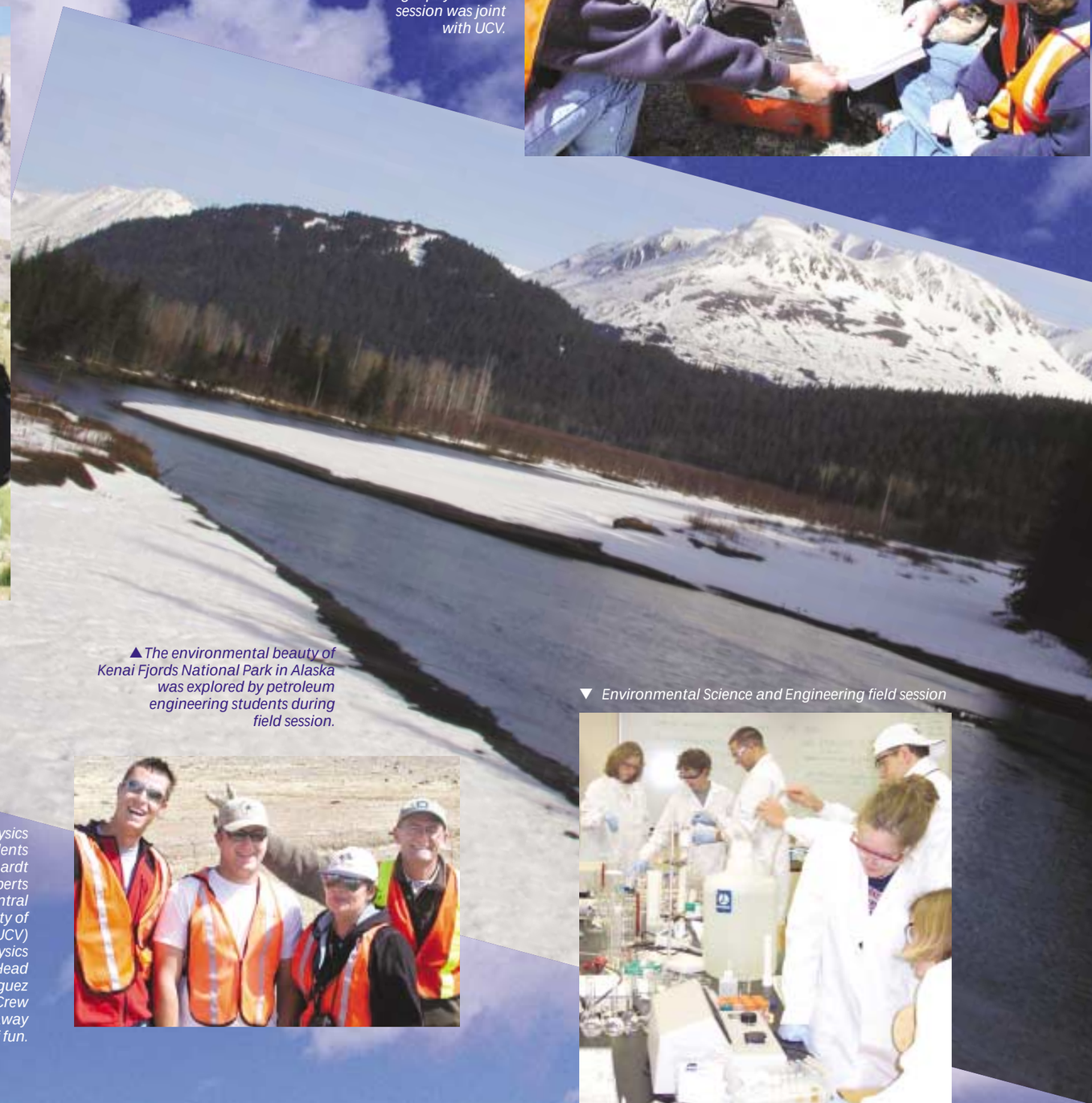
FIELD SESSION 2002

Compiled by Misti Brady

◀ *Geology and geological engineering students Jess Brown, Sarah Coker, Rachel Holland and Stacy Spera take a break from unraveling the geologic history of Molas Lake.*

▶ *Distinguished Senior Scientist Pieter Hoekstra explains time-domain electromagnetic soundings to a group of students from CSM and UCV. This year's geophysics field session was joint with UCV.*

▶ *Geology student Robyn Brown uses a Brunton compass to measure the thickness of sedimentary rocks during field session near Silverton, Colo.*



▲ *Petroleum engineering students Josh Chevalier, Travis Lauer and Steve Henning return on a helicopter ride from Forest Oil's Osprey Platform in Cook Inlet, Alaska.*

▲ *The environmental beauty of Kenai Fjords National Park in Alaska was explored by petroleum engineering students during field session.*

▶ *Geophysics students Luke Bernhardt and Jon Roberts with Central University of Venezuela (UCV) Geophysics Department Head Inirida Rodriguez and Seismic Crew Chief Rod Kellaway have a bit of fun.*

▼ *Environmental Science and Engineering field session*

▶ *Engineering Instructor Candace Ammerman instructs students Jessie Shelley, Ryan Waterbury and Robert Marquez on how to operate the Total Station, an instrument that electronically measures distances and angles, in civil engineering field session. This station was purchased with student technology fees.*

Field Session

From improving knee implants... to improving third-world economics

By Leah Kolt

Joint replacements for the knee and hip are fairly common now. But the implants can shift around in the body over time, causing problems for the patient.

A team of Mathematical and Computer Science (MCS) majors has developed a graphical user interface for doctors and medical researchers, which will compare X-rays of a patient's joint–five years after surgery–to a model knee.

These pictures will enable physicians and bioengineers to measure differences in position, stresses and how the implant is holding up generally.

"Our program makes a 3D model of someone's knee implant, using 2D X-rays, which are cheaper but have the same data as MRIs," explained Maxi Von Eye, a senior MCS major from Michigan. "We can move and rotate the implant model, which can also be made transparent so the patient's bones actually show up beneath it for better comparison."

MCS field session students helped develop a graphical user interface to improve knee and hip implants. From left are Kate Slaga, Kim Huelson and Maxie Von Eye.

The group took on the challenge as part of their field session, a six-week hands-on summer program required by all undergraduate degree programs at Mines. "We try to find clients with actual business needs to provide real-world projects," explains Dr. Robert Underwood, an MCS associate professor who directs the field session.

Field session is very realistic, agreed the other two members of the team, Kim Huelson of Colorado Springs and Kate Slaga of Denver. "It's similar to what you do in industry, like interviewing the client, making status and final reports, meeting deadlines," they said.

The "joints" project is sponsored by the Rocky Mountain Musculoskeletal Medical Research Laboratory, under a grant from the National Science Foundation to principal investigator Dr. William Hoff of the Division of Engineering and former graduate student Dr. Mohamed Mahfouz.

In another field session project, students developed a "render farm" for client 3D Nature in Arvada, Colo. The firm itself develops terrain graphics software for civil engineers building bridges and highways, land planners, golf course designers, and occasionally a feature movie.

One problem with these kinds of programs is the time required for a single computer to render the animation, since there are typically 20 frames per second, which adds up to millions of frames for a movie. And each pixel must be assigned the right value to achieve a perfect picture that looks realistic, not cartoonish.

So the students created software to control a "render farm," basically multiple computers networked together which process the animation at night, when they would normally be idle. To make the project even more complex, the software had to be designed for compatibility with Windows, Macintosh and Unix/Linux platforms.

The software controller prioritizes jobs, runs several projects simultaneously, adds jobs while rendering is underway, reschedules uncompleted jobs, and sends projects to other computers if the first computer goes down.

"We are really thrilled with the product," says Chris Hanson, vice president of research and development at 3D Nature. "We've wanted to have this capability for years."

3D Nature President Gary Huber says he was amazed at how fast the students picked up the task and understood it, adding that

> **"We are really thrilled with the product. We've wanted to have this capability for years."**
> **Chris Hanson, vice president, 3D Nature**

they really "went to town." For more information, go to www.3DNature.com.

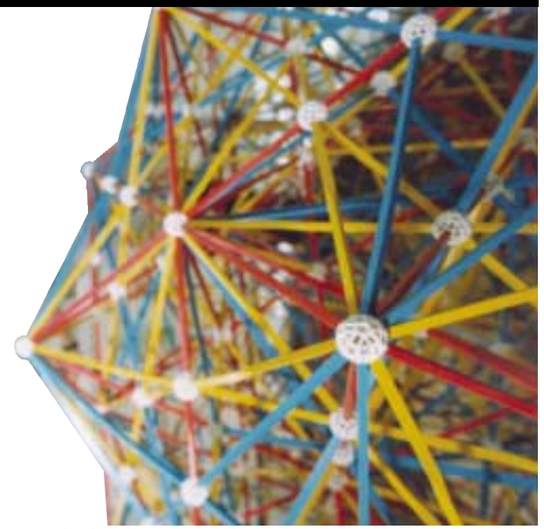
The real-world nature of MCS field camp also includes projects such as modeling artificial societies in Africa and developing educational toys.

The artificial society project involves agent-based modeling and other simulation techniques to present a range of strategies and their effects for dealing with emerging economies.

The MCS students modeled Ugandan society for the Alliance for Youth Achievement, in an effort to determine the most efficient allocation of aid-organization resources to raise the population out of subsistence-level farming.

Data the team had to work with as they modeled the social interactions of individuals and families included these facts:

- 8.3 percent of the adult population is HIV-positive or has AIDS
- 37 percent of the population lives on $1 a day
- Consequently, most children make it through only two years of primary school.



Currently, the Alliance provides $100 mini-grants to orphans and their guardians for an income-generating project. Many choose to buy a cow, which can provide $250 a year if all the milk is sold.

With the new model, the Alliance will be able to gauge the potential success of other income-generating possibilities, and even plug in socioeconomic data to help other countries, with an overall goal of helping create a middle class in underdeveloped economies.

Educational toys was the object of research for another field session team, which worked to create a Web-based applet that showcases the product of client Zome Systems of Denver.

Zome toys are sophisticated building kits that can be used to construct enormous, complex objects. The students developed a virtual representation of the toy's components to enable computer users to build a Zome project on their screens. The simulation had to be easy to understand and use by all age levels.

"The team far exceeded my expectations in creating a Zome software package. I asked them only to write product specifications, yet they came through with a Web applet which is not only fully functional, but a lot of fun to use!" said Zome founder Paul Hildebrandt.

The students also developed a user's guide, as well as a prototype for a marketable Zome Tools software package. To view Zome tools, go to www.zome.com.

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West

North Nevada

On June 15, 2002, the members and friends of Colorado Delta (CSM Chapter) of Sigma Phi Epsilon gathered in Reno, Nev., to tap a few kegs of beer and see some faces that had not been seen in some 30 years. Guests included 47 former Miners, from 1968 to 1980 and included **Stace Arnston BSc Min '76, Tom Atkinson BSc BE '78, Terry Barnes EM '70, Ron Belden BSc Min '74, Bill Brooks BSc Met '74, Chuck Butto BSc Phy '72, Bill Cain BSc Pet '83, Scott Carle BSc Min '78, Rod Cezeaux BSc Min '75, Craig Clemmens BSc Geol '71, Robert Crewdson BSc Geop '71, MSc Geol '76, PhD Geop '77, Bob Cuffney BSc Geol '72, MSc Geol '77, Duane Dixon BSc Phy '74, Eric Eckelberg BSC Pet '80, Gerry Feld BSc Met '75, Larry Fischer BSc Min '71, Gary Garlough BSc Met '70, Mike Gobla BSc Min '76,** Bruce Goff, **Fritz Gottron EM '69, Bob Handford BSc Min '76, Fred Heuman BSc Met '73, Ron Hibbert Met E '69, Robert T. Johnson BSc Min '72, Dennis Johnson BSc Min '82, Dennis Kerstiens BSc Met '73, Richard LaPrairie BSc Min '74, Khoi Le BSc Pet '76,** Duncan Lestina, **Gary Lubers BSc Met '73, Dave Mairs BSc Min '76, Vic Miller BSc Geol '73, John Otto BSc Math '71, BSc Met '72, Walt Pachucki BSc Min '78, Rich Rein BSc Geol '75, BSc Min '77, MSc Min Ec '86, Joe Rousseau BSc Geol '71, MSc Geol '80, Bill Ruppert BSc Met '72, Wayne Sadik BSc Geol '74, George F. Sanders BSc Geol '73, MSc Geol '75, Bill Warfield BSc Min '75, Gary Weihs BSc BE '78, Chuck Wentz Chem E '68, Glen Williams BSc Min '75, and Dean Willis BSc Min '88.** Festivities included a dinner at Louis' Basque Corner, beer, ping pong, a BBQ Chez LaPrairie, and the traditional "drowning of the cheap." A repeat performance is scheduled for June 2004.

*From left, **Rod Cezeaux, Richard LaPrairie, Fred Heumann, Steve Gimble, Bob Cuffney, Dave Scott, Tom Atkinson,** (front) **Stacey Arnston.***

*From left, **Bill Ruppert, Bill Warfield, Dean Willis, Dave Scott, Chuck Butto.***

International

Turkey

Ahmet Coskun Met E '66 hosted a garden party at his summer home in Turkey. With spouses, there were over 40 attendants of which 13 were Mines men and women, many from Istanbul, several from Ankara and one from the Black Sea region. It was a pleasant get together with old friends reuniting and new friends being made. The Mines graduates were from the class of 1942 through 1999.

Metro Denver

Beautiful weather and good food made for lots of fun at the annual Alumni Association picnic held in Golden in August. In addition to lots to eat and drink, the day provided the opportunity for old alumni and new to get together to network and socialize.

A group lines up for games.

*From left, **Rob Reeves '73** and **Dick Beach '66** cook hot dogs and burgers.*

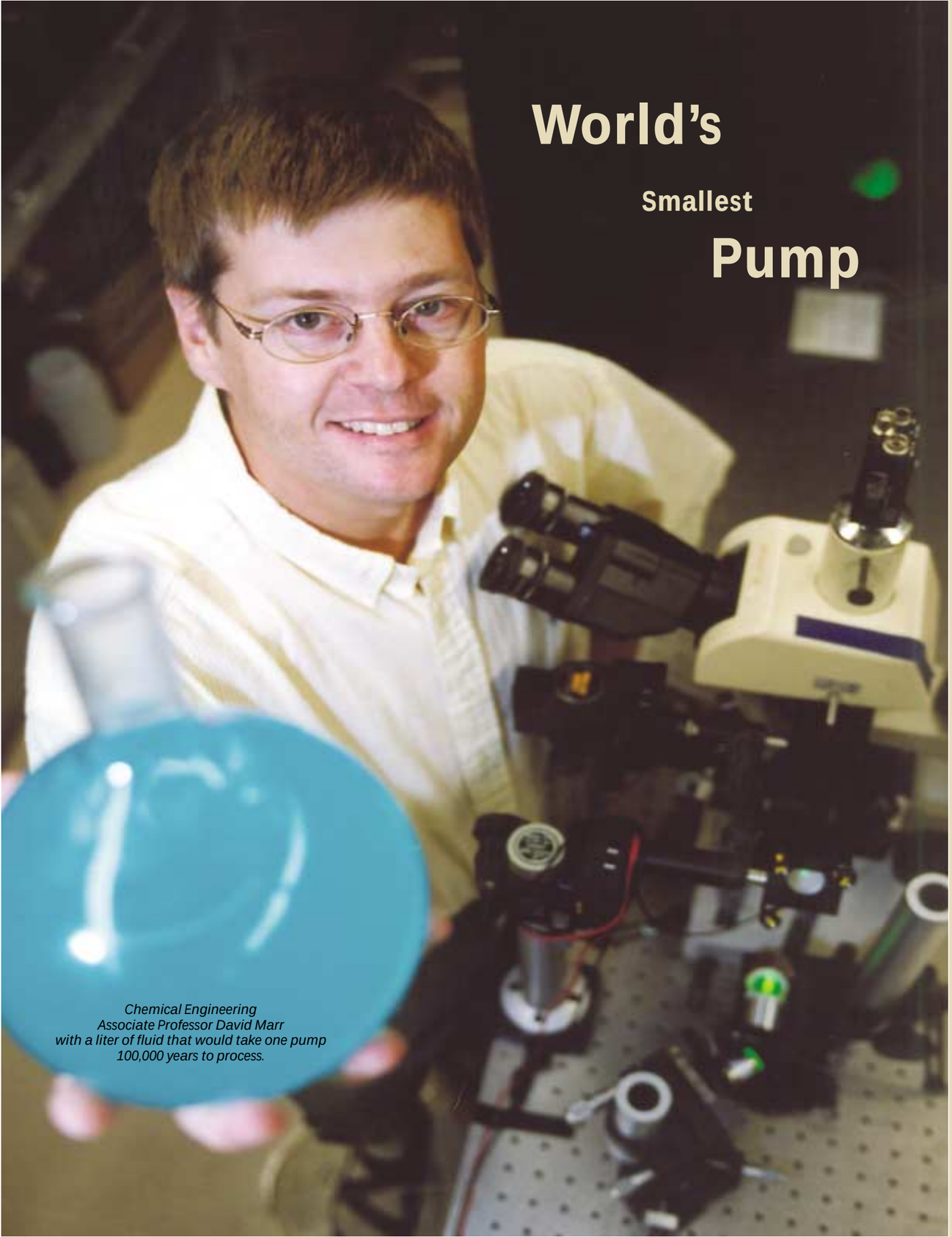
Central

Chicago

In August, CSMAA section coordinator **Bob Pearson PE '59** attended a Cubs game at Wrigley Field with fellow alumni and their friends. An after-game party was held at the home of **Jeff Babcock Met E '65**. At the party, two new coordinators for the Chicago section were introduced: **Terry Cirbo BSc CPR '92** and **Chris Ericksen BSc Met '94, MSc Met '96**.

Miners pose on the rooftop for photos.

World's Smallest Pump



Chemical Engineering Associate Professor David Marr with a liter of fluid that would take one pump 100,000 years to process.

David Marr, associate professor of Chemical Engineering, and graduate students John Oakey and Alex Terray, are making things smaller than ever before.

"We've created pumps much smaller than what anyone has ever created, about the size of a red blood cell. This truly represents a significant step forward for the field of microfluidics," said Marr.

Currently the holy grail of the microfluidics field is the Micro Total Analysis System (µTAS) where, by using a single drop of blood, for example, thousands of tests could be performed simultaneously. In such devices, the major hurdle becomes the ability to move small, not large, quantities of fluid with accuracy and efficiency.

The micro-pumps, valves and sensors under development in Marr's laboratory could be used to create such a µTAS, which would revolutionize a patient's visit to a physician.

Often, medical tests require several vials of blood and days of analysis time to make a diagnosis after a patient sees a physician. The µTAS approach would reduce the amount of blood to a drop and the test time to a few minutes.

"Within minutes of inserting a drop of blood into the µTAS, doctors will have the ability to simultaneously run thousands of blood tests. Before you leave the doctor's office, you'll know what's wrong. This will allow doctors to make diagnoses more rapidly and accurately. These devices will revolutionize medical diagnostics and therapeutics and benefit both the patient and the medical infrastructure," said Marr.

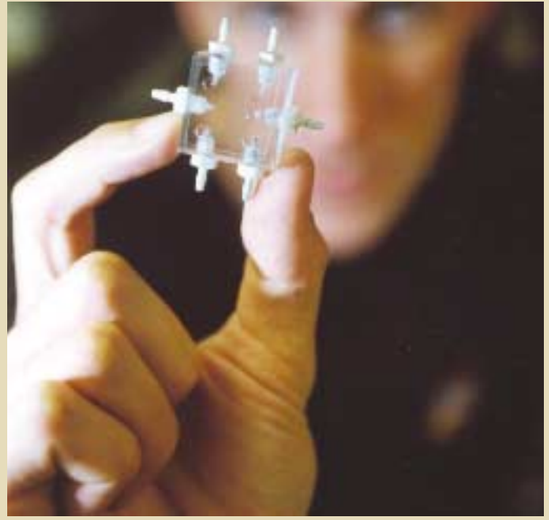
"We're about five to 10 years away from doctors giving their patients immediate answers," said Marr.

Another medical application for µTAS is an *in vivo* drug delivery system. Thousands of micro pumps, valves and sensors could be integrated into a drug delivery device the size of a pinhead. Such devices would possess the potential to deliver small doses directly to the point of need, for example a tumor, as opposed to current delivery methods that require saturating the entire body with a drug.

With automatic drug delivery, Alzheimer's patients would not forget to take their medicine and diabetes patients would not need to test their blood daily. A sensor would determine whether medications were lacking in the bloodstream, then send the information to the pump, which would administer the drug to the patient as needed.

The benefits of this technology stretch from healthcare to the next frontier, space.

NASA is interested in Marr's research. "It's much cheaper to transport items into space when they're small and light. We're



Graduate Student John Oakey with a prototype that could hold millions of pumps.

funded by the Human Exploration and Development of Space Program, which supports the idea that for humans to explore other planets we must equip them with the ability to accurately detect and decipher information on the molecular and cellular level," said Marr.

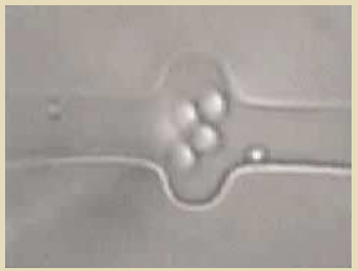
Such technology could be used to reduce the size of many devices required for deep-space exploration including those capable of monitoring the physiological conditions of astronauts and the chemistry of their environment.

"We're getting closer to technology reminiscent of Star Trek. We're taking steps closer and always moving forward," said Marr.

"Due to the medical implications for this technology, we are interested in funding from the National Institutes of Health (NIH). CSM doesn't traditionally have large amounts of NIH funding. This could open up broad new research opportunities for the School," said Marr.

Marr's work is funded with approximately $1 million from the NSF and NASA, and was recently published in an issue of *Science*.

By Misti Brady



A gear pump created from colloidal particles is the size of a red blood cell.

INDIVIDUAL GIFTS

Colorado School of Mines received gifts of $25,000 or more from each of the following individuals during the last fiscal year. However, due to an error, their gifts were not acknowledged in previous issues of Mines. We regret the oversight.

Charles Champion Geol '52 allocated his $25,000 reunion gift to the Brenneke Memorial Scholarship, the CSM History Project and the Champion Scholarship Fund.

S. D. Chesebro' PE '63 gave a $500,000 leadership gift to a campaign that will be announced in early 2003. Chesebro' has also agreed to serve as the co-chair of this upcoming campaign.

Colorado School of Mines received gifts of $25,000 or more from each of the following individuals between May 17 and Aug 31, 2002.

Jerome T. Broussard Met E '63 contributed an additional $50,000 to the Broussard Family Engineering and Technology Management Scholarship Fund.

Final distributions of $642,139 were received in August from the estate of **Bart, PE '30, and Helen De Laat.** Their bequest to Mines for the De Laat Scholarship Fund has totaled more than $2.1 million.

A principal distribution of $25,000 was received in August from the **Harriett L. Hares Trust.** Mrs. Hares was the widow of **Charles J. Hares,** a well-known petroleum geologist in the Rocky Mountain region.

Norbert Jr. Geol E '47, and Helen Hannon contributed $26,440 to the Mines Annual Fund in honor of his 55th reunion.

An additional distribution of $176,496 was received from the estate of **Cecil and Cleone Hansen.** More than $8.1 million has been received from the Hansen bequest, the single largest gift in Mines' history to support Mining.

Mrs. Carolyn V. Mann, whose husband John was a 1943 Geological Engineering graduate, contributed an additional $50,000 to the John and Carol Mann Graduate Fellowship in Geology.

Robert E. McKee PE '68 contributed an additional $35,546 to the McKee Scholarship Fund.

James D. Mulryan EM '54 gave $25,857, $5,000 of which supported the Annual Fund, and the remainder endowed the James D. and Lois H. Mulryan Endowed Scholarship.

J. Don Thorson Geop E '55 contributed $100,000 to the J. Don Thorson Endowment for Engineering Senior Design Fund.

Annual Fund Plays Critical Role

By Emily Paton Davies

"Expect the unexpected" is a good motto with which to navigate life's twists and turns. One way Colorado School of Mines prepares for the unexpected is through its Annual Fund, which provides for some of the School's most pressing needs.

The Annual Fund solicits gifts from alumni, parents and friends who wish to support Mines each year, with primary focus on unrestricted grants. In 2001-2002, more than 2,700 donors contributed in excess of $1.5 million in unrestricted funds.

"Discretionary funds are potentially the most influential resources because the money can be applied to an immediate need," says **Scott Dickson BSc Chem '95**. Dickson, who currently works in Silicon Valley, has given to Mines since he graduated.

"Donations to the Annual Fund play an indispensable role in the day-to-day running of the School. By providing the resources for urgent needs, many of which cannot be anticipated, these gifts provide vital support for academic programs at Mines," says Peter Han, Vice President of Institutional Advancement.

Colorado School of Mines
ANNUAL FUND

One of the Annual Fund's uses is to support both merit- and need-based financial aid for students. Approximately 85 percent of Mines students receive some type of financial assistance. Tuition, books, fees and living expenses for residents cost roughly $14,000 per year, whereas non-residents pay nearly $24,000 per year. The ability to offer scholarships allows Mines to admit a diverse pool of qualified students without concern for individual financial capabilities.

"Alumni need a conduit that allows them to give money and know they're effecting change at Mines," says **Mary Pott CPR '83**, who gives to the School annually. "The dollars need to come from outside sources," she continues. "Mines receives only about a quarter of its funding from the state. The Annual Fund allows donors to combine dollars and help Mines accomplish an awful lot."

Gifts to the Annual Fund help Mines grow in ways state appropriations and tuition alone cannot support. Library acquisitions, classroom and lab equipment upgrades, and general campus and facility maintenance are typically assisted by Annual Fund dollars. Programmatically, the Minority Engineering Program, the Office of International Programs and the McBride Honors Program in Public Affairs for Engineers have all received much needed support from the Annual Fund, as have other programs on campus.

"When I tell people where I went for my undergraduate degree, it's followed by 'excellent school,'" says Dickson. "Even though I didn't need financial assistance during college, I did need other help. In a way, I see it as repaying the School."

Pott agrees with this mindset. "If alumni want to see Mines remain at the same level as when they attended – or see it go to a higher level than when they were there – they need to contribute to the Annual Fund," she says.

For information about giving to the Annual Fund, contact Laura Mesack at the Office for Institutional Advancement: 303-273-3129.

Matching Gifts Leverage Donors' Dollars

By Emily Paton Davies

In today's economy, stretching the value of a dollar is paramount, particularly when it comes to philanthropy. Corporations and individuals want to make the most impact possible with their charitable donations. One way individuals and organizations can make their philanthropic dollars go further is with matching gifts.

"In recent years, corporate philanthropy budgets have become increasingly pressured," says Peter Han, vice president for Institutional Advancement at Mines. "Matching gift programs enable corporations to leverage the dollars they give by matching their employees' contributions." Individuals who give to Mines through matching gift programs are credited for their gifts as well as for the matching funds their companies provide.

Matching gifts have become a substantial stream of revenue for Mines in recent years – the School received more than $415,600 in matching gifts last fiscal year. Many companies match the gifts of both current and retired employees. While the amount of the match depends on company policy, it can be as much as 3:1, which is the case at the ExxonMobil Foundation.

"We encourage those considering giving to Mines to see if their employers have matching gift programs," says Han. "Such programs enable employers to make a difference in those areas most meaningful to their employees. It's a win-win situation for everyone involved."

For more information about matching gifts to Mines, contact Kim Keller at 303-273-3148

Mines' 2001-2002 Top 10 Corporate Matching Gift Programs

These amounts include individual gifts and the corporate match:

ExxonMobil	$74,165
Shell Oil	$41,370
Alcoa	$40,574
BP	$32,137
El Paso	$20,430
Williams Companies, Inc.	$17,751
Marathon Oil Company	$13,575
Unocal	$13,130
Ashland Inc.	$20,000
ChevronTexaco	$9,000

CORPORATE AND FOUNDATION GIFTS

Colorado School of Mines received more than $25,000 from each of the following corporations and foundations between May 17 and August 31, 2002.

BP and the **BP Foundation** gave gifts totaling $36,500 to support a graduate fellowship in the Department of Geophysics, the Minority Engineering Program, scholarships, and departmental support.

Conoco (now ConocoPhillips) gave a total of $50,000 to support the departments of Chemical Engineering, Petroleum Engineering, and Geophysics; Senior Design; the Minority Engineering Program; the Oil and Gas Exploration Workshop; and the Career Center.

ICI Technology gave a gift of $29,592 to support Professor Kim R. Williams' research in the Department of Chemistry and Geochemistry.

Infiltrator Systems contributed gifts totaling $99,999 to support Dr. Robert L. Siegrist's research and educational activities in the area of on-site and alternative wastewater technologies.

The **Mikkelson Foundation** contributed $28,000 to the New Engineering and Applied Technology Program.

The **Phelps Dodge Foundation** gave a gift of $30,000 to support undergraduate scholarships.

Phillips Petroleum Company (now ConocoPhillips) contributed a total of $113,000 to support the Phillips Scholars Program; a Geology graduate fellowship; undergraduate scholarships; the Geology Museum; the Minority Engineering Program; the Career Center; and the departments of Chemical Engineering, Petroleum Engineering, and Geophysics.

The **Torrey Foundation** gave a gift of $240,000 to support research conducted by Professor Jeff Squier in the Department of Physics.

Unocal Corporation gave a gift of $200,000 for the Unocal International Fellowship of Petroleum Studies

President's Council Committees Getting to Work

If you live in Denver, Houston, North Texas, Oklahoma or Southern California, you may have received a call from a member of your regional President's Council committee inviting you to participate in the program. The President's Council is a distinguished giving society made up of alumni who annually give $1,000 or more to the School.

Five regional committees are made up of 32 President's Council members who volunteer to invite other graduates in their region to support the School at this level. In 2002, these committees helped to raise $2.7 million. The President's Council encourages unrestricted gifts to the Annual Fund, but any gift made through the CSM Foundation can go toward President's Council membership, whether it is for a scholarship, bequest or reunion.

This year, five dedicated alumni are chairing the regional committees. Each of these individuals has personal reasons for giving, but a common thread runs throughout—a strong appreciation for the institution and a wish to see it advance.

Denver

Steve Sonnenberg PhD Geol '81, manager of EnCana Energy Resources' DJ Basin Business Unit says, "I'm honored to have a degree from CSM. My degree has served me well in both my career and involvement in professional societies, including my recent position as president-elect of AAPG. The least I can do is be active in alumni activities and fund-raising. I strongly believe every graduate should give something back to the School and I have found that the majority truly enjoy doing so."

Houston

Dave Drummond PE '75, owner and operator of PowerTuff Corporation in Houston, notes, "I had been looking for a way to get involved with the School, plus I wanted to help other folks recognize the benefits of being a Mines graduate. Working with the President's Council Committee helps me to achieve both of these goals. Even in tough financial times when I was starting my own company after being downsized, I've chosen to maintain my President's Council membership and keep Mines a priority."

North Texas

Dan Colston CPR '93, purchasing manager for Texas Instruments in Dallas, acknowledges, "A great deal of where I am and what I've accomplished is due to the skills and knowledge my Mines experience instilled. The academic challenge at Mines develops a work ethic that is pertinent for a young engineer. Because students are all on a similar track, Mines also provides a more inclusive environment in which students can thrive. As a result, a culture of high-quality, hard-working people is created. I give to the School because I believe that over time, I can make a significant contribution, and I can increase that contribution through my company's matching gift program."


Oklahoma

Greg Gordon CPR '85, vice president of information services for Williams Energy, also knows the benefits of matching gifts. "Being able to double or triple your gift through your company's matching gift program allows you to make a much larger impact at the School," says Gordon. "When I add this monetary contribution to my volunteer efforts, I am maximizing my ability to give through both time and resources."

2002-03 Committee Members by Region:

Denver
Steve Sonnenberg PhD Geol E '81
Megan Lovelace Geol E '96, Grad Student
Tom Reagan PE '53
Jack Haley PE'48
Marshall Crouch III Geol E '67
Dean Laudeman Geol E '55
Will Fehringer MSc Eng Sys '98
Tom Dimelow Geol E '66, MSc Geol E '73

Houston
Dave Drummond PE '75
Dave Culbertson CPR '86
George Bashen Geol E '48
Harry Briscoe Geol E '71, MSc Geol E '72
Harold Korell PRE '68
Will Westler Pet '00
Laura Westler CPR '00
Jeremy Zimmerman Geop E '86,
MSc Geophys E '89
Bill Schneider Pet '83

North Texas
Dan Colston CPR '93
Scott Darling Pet '87
Mark Vozar Geop '76
Bob Sutherland Geol '79
Bob Wittman Pet '78

Oklahoma
Greg Gordon CPR '85
Greg Floerke Pet '86
Dennis Caruso Geol E '82
Dick Banks Geophys E '53
Mike Carr PE '57

Southern California
Larry Preble PRE '61
Chet Love Geol E '55
Mike Starzer PE '83
Patti Starzer ME '83
Lonnie Kerley PE '85
Joe Nahama MSc PE '90
Beth Nahama PE '91
Bob Hohne Geol E '55


Southern California

Larry Preble PRE '61, director of development for KUD International, LLC, sums it up well: "Mines is much more than a manufacturing enterprise that turns raw material (freshmen) into finished product (graduates). It is an extended community that follows each graduate into industry and the general public. Challenges of energy, the environment and economics require us to continue to produce graduates with the talent and leadership to address them in a rapidly changing world. Therefore, Mines has an important role to play, as do we as its financial supporters. Being part of the President's Council allows me to share in the School's vision and contribute to its success."

For more information please call Karen Shaw at the Office of Institutional Advancement 303-273-3526.

IRS Requirements for Year-End Giving

As we approach the end of 2002, it's important to know how to make sure that your gifts to Mines and other charitable organizations are completed by December 31 for tax purposes. The following rules apply:

Check: Gifts by check are deemed complete on the date that:

- you physically deliver your check to our office;
- a private courier service (e.g., Federal Express) delivers your check to our office;
- you mail your check via the U.S. Postal Service (postmark date).

Credit Card: Gifts charged to a credit card are complete when our office processes the charge. If you decide to charge a gift shortly before December 31, please call (303) 273-3275 to give us your credit card information rather than sending it by mail. Or give online through our secure web connection. Go to *www.alumnifriends.mines.edu* and click "Give Online."

Securities: The completion date depends on how you deliver the securities.

- If the securities are transferred electronically from a brokerage account, the gift is complete when they are received in our account.
- If you direct the corporation or its agent to issue a certificate in our name, the gift is complete as of the date shown on the reissued certificate.
- If you send a stock certificate and an executed stock power by U.S. mail, they should be sent in two separate envelopes for security. The later postmark is deemed the date of gift. If the documents are sent by a private courier service (e.g., Federal Express), the gift is complete on the date that both of them have arrived in our office.

Securities gifts typically require extra time and planning. Please call the Office of Institutional Advancement at (303) 273-3275 for assistance.

THE GLORY YEARS OF ROTC

HOW MINES BECAME KNOWN AS "THE WEST POINT OF THE ROCKIES"

By Lorraine Wagenbach

Color Guard

One of the first courses taught at the Colorado School of Mines was military science. In 1873, George West, a Civil War veteran, first introduced military engineering and his program flourished. By 1911, President Victor C. Alderson granted credit toward graduation on satisfactorily completing a course in military training.

When the armory building in Golden was completed in 1913, it became the headquarters for the military students for nearly 50 years. This cobblestone building, still standing, with its castle design, reflects the insignia of the U.S. Army Corps of Engineers. Complete with living quarters, a rifle range, and a drill hall, this facility provided a home for the men. They paid only $20 a month to dine on t-bone steaks, roasts and Army beans while the average town boarding house charged $22.50. This group was the only one of its kind west of the Mississippi River.

When World War I was declared April 17, 1917, Mines men who had previously been recruited for the Colorado National Guard became the nucleus of Company A, 115th Engineers, 40th Division. This unit, which also included local recruits, saw action in France and was twice decorated. For many years the colors of this group were on display in the CSM military department.

In 1919, CSM became one of the first four colleges in the United States to establish a reserve officers training corps (ROTC). For more than 50 years, the two-year compulsory course in military training was a graduation requirement, and Mines was a branch material school, which entitled its four-year military graduates to be commissioned in the Army Corps of Engineers.

115th Engineers during World War I on Pont-a-Mouson bridge in France

Scabbard & Blade Day circa 1930

ROTC thrived at Mines and each year the unit received the highest rating at its annual federal inspection. In 1933, more than 90 percent of the students elected to take the advanced course and in 1932, 64 graduates were commissioned. Because of the high quality officers produced, Mines became known as "The West Point of the Rockies."

During the 1930s, the Mines ROTC rifle team was a consistent trophy winner in highly competitive national rifle meets. In 1932, the national honorary military organization Scabbard and Blade was organized.

At the onset of World War II, the value of the ROTC became abundantly clear. Highly qualified Reserve officers, the citizen-soldiers, were a ready supply of officers available to lead the troops.

Mines ROTC was the only program that commissioned men directly into the Corps of Engineers. Mines men served with distinction in every theater of operations worldwide. The chief of engineers at the time referred to the Mines graduates as "the backbone of the Corps of Engineers." But as the men went off to war, ROTC classes were reduced in size, and the annual federal inspection in April 1943 was the last one for the duration of the war.

In 1943, 500 carefully screened soldiers selected for leadership and scholarship arrived on the campus for regular Army discipline and training. This specialized unit was a two-year assignment that offered courses in electrical, mechanical, chemical and civil engineering. The troops were quartered in the fraternity houses and in the basement of Berthoud Hall.

The Armory

When the war was over, enrollment at Mines nearly doubled. In January 1946, the ROTC program was reactivated and some of the returning veterans enrolled in the advanced courses, were commissioned and served in Korea. By 1947, 76.6 percent of the enrolled students were vets.

These highly motivated, mature young men, eager to learn, created the golden age of teaching. Many came with wives and babies to housing conditions that were dismal. Makeshift trailers were set up in the Field House and at Brooks Field. Recycled flimsy barracks were erected in Prospector Park. The young, well-seasoned troopers and their wives adapted well and these graduates became highly successful professionals in the good years that followed.

The 1960s ushered in the baby boomers. They accepted willingly the two-year compulsory basic course as a requirement for gradation. Their initial concern was not the growing threat of war in Southeast Asia. Their issue was hair. Long hair was IN and they adamantly refused to be shorn of their flowing locks, which did not conform to Army standards. The solution: hairnets that held their hair tightly inside their headgear.

During this decade, many students from throughout the country enrolled in the successful ROTC scholarship program that paid for books, fees and a monthly stipend. One outstanding ROTC scholar from Ohio completed the first two years of the course, then requested to be transferred to a school near his home. William Knox Schroeder was one of the four students killed during the infamous uprising at Kent State.

As the war escalated in Vietnam, students completing the two-year basic course had a difficult choice to make. Should they continue and become commissioned as officers or should they be drafted as privates?

Many elected to continue and accept the mandatory two-year military obligation. The ranks soared and with the exception of only two students, all the men honored their commitment and made up the largest class of commissioned officers who were commissioned in 1970-71 when 64 engineers became second lieutenants.

In 1974, CSM marked 100 years of dedicated, patriotic Mines men who have preserved our country's freedom through their participation in World War I, World War II, Korea, Vietnam, the Gulf War and now the war on terrorism.

Lorraine Wagenbach worked in the military department at Mines from 1960-1975.

Michael C. Carosella Met E '34 of Valley Center, Calif., died May 17 at age 91.

After graduation, he worked for several mining companies eventually joining Union Carbide at its U.S. Vanadium Co., in Bishop, Calif. He transferred to Union Carbide Metals Co. in 1943 and moved to New York. From 1943-47 he was assigned to the Atomic Energy Commission to work on a chemical process for extracting uranium. He retired in 1973 as chief metallurgist. He held 14 domestic and foreign patents for the invention of ferroalloy processes. Carosella enjoyed fishing, gardening, sports and following the stock market. He was a lifetime member of the Alumni Association and attended numerous California functions. He is survived by his wife of 65 years, the former, Marcella Gyidik, a daughter, a son, three grandchildren and five great-grandchildren.

John J. Flynn Jr. EM '48 died June 12. At CSM he was a member of Alpha Tau Omega and after graduation, attended many Mines events including his 50th class reunion. In 1948 he worked briefly for Atlas Powder Company. He then earned his JD from University of Denver in 1951. Flynn established the law firm Inman, Flynn, Biesterfeld P.C., in Denver, and practiced until eight years ago.

Walter S. Forbes Pet E '50 of Casper, Wyo., died June 16 at age 83. Forbes was born and raised in Sacramento, Calif. In 1941 he joined the National Guard and married the love of his life, Virginia Simms. In 1942, he transferred to the Army Air Corps and served in various parts of the country during World War II. After the war, he enrolled at Mines and began working for Heinie Foss at Foss Drug Store. While at Mines he was senior class president. After graduation he worked for KEN Corp. in California. In 1951 he was transferred to Casper and fell in love with Wyoming. In 1952 he joined Bill Daniels in the insurance business and eventually the company became the Walt Forbes Company. He was a founding member of Casper Ambassadors and in 1984, was named Boss of the Year. Forbes managed the Henning Hotel softball team winning state and district championships. He enjoyed the outdoors, boating, skiing, gardening, music and stamp collecting. He also played a mean ukulele. Forbes is survived by his widow, three daughters, and seven grandchildren.

Robert L. Froemke PE '43 died June 19 of stomach cancer at his home in Florida. He was 81. Froemke was a scholar, retired Florida State University business professor, expert chess player and active community volunteer. In addition to his Mines degree, he held a master's degree from Georgia Institute of Technology, a doctorate from Columbia University, and a law degree from New York University. Froemke designed, installed and conducted a special master's degree program for engineers and scientists at Cape Kennedy to upgrade NASA's management capability. He pioneered the establishment of education programs far removed from university campuses to serve working students who could not leave their jobs. He chaired FSU's management department, was professor and chair of the graduate department of industrial management at the Polytechnic Institute of Brooklyn, was dean of the business college at Florida Atlantic University and was a visiting professor for 11 summers at Columbia University. In the 1970s, he was chief legislative analyst for the Florida House of Representatives' Minority Office. During World War II, Froemke was a lieutenant in the U.S. Navy and was stationed in Tokyo Harbor during the occupation. In addition to being ranked as an "expert" chess player, he organized chess clubs and ran youth tournaments. He also helped run Little League baseball games when his sons played. Froemke is survived by his wife of 57 years, Jessie, two sons and two daughters.

Joseph H. Hoage Met E '48 of Lakewood, Colo., died July 17 at age 77. His career included employment with General Electric, Battelle Northwest, Stearns Rogers, the City of Lakewood and Johns-Manville. In addition to his Mines degree, he held a master's in metallurgy from University of Idaho. As a graduate of North Denver High School, Hoage was a member of the alumni group and a supporter of the Black Masque Drama Club. Hoage loved gardening and belonged to the American Iris Society and served as vice president of Region 13. He was a lifetime member and senior iris judge and hybridizer and introduced several varieties of iris. He also served on the State Board of Washington State Children's Home Society. At Mines, he was a senior camp director at Ward, Colo., Boy Scout Camp. He was active in church wherever he lived and served as superintendent of Sunday school at Richard Lutheran Church, Wash. He was a Sensei (teacher) of Aikido with a brown belt and also had a black belt in Jiu Jitsu. Hoage is survived by his wife of 52 years, Margaret, two daughters, a son, 11 grandchildren and two great-grandchildren.

R. Craig Hyslop MSc Geop '39 of Calgary, Alberta, Canada, died April 11 at age 89. He was a graduate of University of New Brunswick in addition to Mines. During World War II he served in the Royal Canadian Air Force. Hyslop worked in the mining industry and later joined Imperial Oil as a geophysicist in 1948, retiring in 1978. He was an active participant in track and field as a competitor, coach and official. He loved the outdoors, including fishing and hunting. He also enjoyed painting and reading. Hyslop is survived by his wife of 60 years, Ruth, two daughters, three sons, and five grandchildren.

Robert J. Lamm Geop E '50 died July 12. He was a geophysical engineer for Atlantic Refining Company, later Atlantic Richfield. He retired in 1984. He was an active member of the Alumni Association.

Edwin F. Marker Geol E '47 of Aurora, Colo., died May 15 after a long illness. He was 79. Marker served in the U.S. Navy before attending Mines. After graduation he was a geophysicist for Schlumberger Well Servicing Corporation, district geologist for Phillips Petroleum Company, district geologist for Lario Oil & Gas Company and an independent consulting geologist. He enjoyed golf, skiing and hiking Colorado's backcountry. His friends and family remember his subtle sense of humor, his integrity, his love and devotion for his family and kindness for the less fortunate. Marker was a member of CSMAA, American Institute of Professional Geologists, Rocky Mountain Association of Geologists and an emeritus member of American Association of Petroleum Geologists. He is survived by his widow, Stella, a son, a daughter, a grandson and a brother.

Ernest C.W. Merkel III BSc BE '81 died Aug. 17, 2001 in Houston after a short but courageous battle with cancer. He was 42. While at Mines, Merkel was a member of the Oredigger football team and Kappa Sigma fraternity. After graduation, he moved to Texas to begin his career in the natural gas pipeline industry. He earned his MBA, was a licensed Professional Engineer, and worked in all areas of the industry including construction both on- and off-shore, engineering and design. At the time of his death, he was a trader for Occidental Energy Marketing Inc. Merkel had a great passion for woodworking, and left many beautiful pieces of furniture he designed and built, many from trees he felled and lumber he milled himself. He is survived by his wife of 19-years, Jennifer, their daughter Grace, his parents, two sisters and a brother.

William A. Riley BSc Geol '02 of Lakewood, Colo., died June 4 at age 31. According to his family, "He had all the intelligence and strength of a king, but unlike a normal king, he enjoyed sleeping on the rock of the Earth and splashing through her streams and oceans. He gazed at the clouds, the birds and the trees and found amazement at the stars and the moon." Riley was a member of the Association of Field Geologists. He is survived by his parents, two sisters, three nephews and several aunts, uncles and cousins.

John Robertson Jr. EM '49 of Greenwood Village, Colo., died May 30. He was a member of a pioneer Pueblo, Colo., family and a mining engineer for the CF&I Steel Corporation. Robertson was instrumental in establishing the Colorado Mining Association Education Foundation. He was a member of Pueblo Masonic Lodge 17, Society of Mining Engineers, past president of Colorado Mining Association, life member of Saint Andrew Society, 1257 Engineers Combat Battalion, U.S. Army during World War II and later served in the U.S. Army Reserves. Robertson was predeceased by his wife and daughter. He is survived by a son, John Robertson III BSC Min '73, and four grandchildren. His father, John Robertson Sr., was also a CSM alumnus.

Howard V. Sears EM '37 of Lebanon, Mo., died March 30 at age 86. After graduation, Sears worked for the St. Joe Lead Company in Flat River, Mo. He entered the U.S. Army as a second lieutenant in 1941. He was stationed in the China-Burma-India theater to build airfields during World War II. After the war he returned to St. Joe's, later the Doe Run Company. He ended his 48-year career as superintendent of central services, retiring in 1985. Sears was a professional engineer with the State of Missouri Professional Engineers and Land Surveyors. He was an Eagle Scout and a merit badge counselor for the Boy Scouts. While at Mines, he was on the swim team and in 2000, was inducted into the CSM Sports Hall of Fame. His hobbies included gardening, traveling, being outdoors and playing bridge. Sears is survived by his wife of 60 years, Maxine, two daughters, two sons, and nine grandchildren.

Franklin C. Settle BSc CPR '85 died peacefully at his home in Houston August 15 following a 14-year battle with brain cancer. He was 39. Settle was

born in Pueblo, Colo., and graduated from Centennial High School, where he met his wife of 17 years, Valerie Pratt. After graduation from Mines, Settle earned a master's degree in management science operations research from Wichita State University in 1988. He was an energy and natural resources industry professional with experience in business, operations and technology strategy consulting with clients in the Americas, western and central Europe and Asia. He also worked for six years in the petrochemical industry. In the course of his career, Settle was employed by Vulcan Materials, Coastal Corp., MG Refining and Marketing, Bonner & Moore Management Science, Andersen Consulting and most recently was vice president, integrated strategy, for Sapient Corp. Settle enjoyed traveling, skiing, fly-fishing, SCUBA diving and racing sports cars. He loved nature, wildlife and his dogs. Settle's widow, parents, grandmothers and in-laws survive him. His family says, "Frank's golden heart, extraordinary intellect and fierce wit will be sadly missed." In his memory, his family suggests donation to The Nature Conservancy or the CSMAA.
A website in his memory is at www.celebratingfrank.com.

Edwin M. Swift Geol E '39 of Youngtown, Ariz., died March 1 at age 86. During World War II, he served with the Tenth Army Engineers of the Third Division building bridges and landings under fire in North Africa and Italy. He was pinned down for several weeks at Anzio in Southern Europe. His unit was on its way to Japan when the war ended. After the war, he married Louie Lawlor, who died in 1980. In 1983 he married Louise Morrow. As a civilian, Swift worked for the Army and was in charge of construction of the Gavins Point dam in South Dakota, worked at NORAD in Colorado Springs and helped construct the Langdon Missile Defense Center in North Dakota. He is survived by his widow, a twin brother, a nephew and a niece.

Harold M. "Butch" Weaver EM '31 of Auburn, Calif., died June 15 of natural causes at age 96. The third-generation

Californian held a master's degree from Stanford University in addition to his Mines degree. He spent 59 years in public education and was considered by many to be the "father of modern Sierra College" in Rocklin, Calif. At the time of his death, he was president emeritus of the school. Weaver taught mining engineering and geology at first. During World War II, he began teaching aviation, aeronautics and surveying. He retired in 1971 after 33 years but continued to serve 21 more years on the Placer County Board of Education. He volunteered for 25 years for the American Cancer Society and in recent years was the oldest member of the Auburn Rotary Club, which he joined in 1946. Weaver attributed his success to his 58-year marriage to his high school sweetheart, Gertrude, who died in 1986. Weaver was an active member of the Alumni Association and Kappa Sigma, and had attended his 50th class reunion. He is survived by a daughter, a son, five grandchildren and three great-grandchildren.

Robert C. Weisner EM '42 died March 5 at age 83. Son of the late Rudolph Weisner and Marie Weisner Seipp, he graduated from Wheat Ridge (Colo.) High in 1935. He was retired from the U.S. Bureau of Mines. A funeral was held in Virginia and his ashes were scattered in Colorado. Weisner is survived by his wife of 58 years, Margaret, a daughter, a son and two granddaughters.

Also in Memoriam

Bill L. Bessinger CM '50	Oct. 26, 2001	K. William Jeffers Geol E '56, Geop E '56	Dec. 4, 2002
Anthony M. Direnzo Geol E '48	Sept. 4, 2001	Robert B. Kennedy PE '38	Nov. 21, 2001
Dennis P. Hickey Geop E '68	Feb. 2, 2002	John E. Moody PE '3	Jan. 25, 2002
Clinton O. Hurd Geol E '42	July 2002		

1952

Larry G. Hayes E M is retired in Modesto, Calif.

1953

John B. Chase Jr. Geol E is retired in Richardson, Texas.

1959

William R. Mills Jr. Geol E is a consultant for William R. Mills and Associates in Yorba Linda, Calif.

1960

Keith E. Anderson P E is retired in Olympia, Wash.

Ronald L. Bredehoft P R E is a staff technologist for Technip-Coflexip in Upland, Calif.

1961

Walter G. Reuter Met E was awarded the 2001 Fracture Mechanics Medal. The award, administered by Committee E08 on Fatigue and Fracture, recognizes

significant contributions that have exerted a profound positive effect on the development of the scientific discipline of fracture mechanics. Reuter is an engineer and scientific fellow with the Idaho National Engineering and Environmental Laboratory in Idaho Falls.

An ASTM member for more than 30 yeas, Reuter serves on E08 and a number of its subcommittees. He is also a former member of the Society for Experimental Mechanics and the American Society for Metals.

During his career, Reuter has concentrated on the use of fracture mechanics as a tool for material selection, for the study of environmentally induced cracking and as a methodology for predicting structural integrity. His primary interest has been in the use of specimens containing surface cracks to simulate the fracture process in structural components for evaluating models developed to predict structural integrity.

1964

Ralph E. Townsend P R E is retired in Littleton, Colo.

1965

John M. Burgess Math E retired at the end of 2000 and is enjoying life on the Mississippi Gulf Coast. He and his wife Betsi live in Gulfport, Miss.

1967

John N. Teets Met E is general manager fof Bay Shore Systems, Inc. in Rathdrum, ID. BSS manufactures drilling attachments for tracked vehicles.

1968

Thomas S. Elliott P E is chief operating officer for Texas Independent Exploration in Houston.

1969

Michael K. Dreher Met E is a research engineer for Kaiser Aluminum and Chemical Corporation in Spokane, Wash.

W. Dennis Heagney P E retired from Transocean on June 30. He lives in Houston.

Robert C. Nelson Chem E is a urologic surgeon for Samaritan Healthcare. in Moses Lake, Wash.

1971

Bradford J. Sinex Jr. MSc Pet is retired in Golden, Colo.

1972

John C. Darrow BSc Math has retired from Qwest and lives in Denver.

1973

Raul E. Alvarado Farrup BSc CPR is the C&HT group chief operating officer for Accenture LLP in El Segundo, Calif. He returned July 1 from an assignment in Madrid, Spain.

1974

Stanley J. Gradisar BSc Min is a patent attorney with Gibson, Dunn and Crutcher LLP in Denver.

Patrick R. Taylor BSc Met, BSc Math, PhD Met '78 is a professor at CSM.

1975

Theodore S. Allen III BSc Pet is an operation manager for Trump Energy, in Yukon, Okla..

Ralph A. Briley BSc CPR, MSc CPR '84 is the construction safety adviser (worldwide) for ExxonMobil Research and Engineering Company in Fairfax, Va.

S. Arthur Stewart BSc Pet owns Stewart Global in Prescott, Ariz.

1976

Randal L. Bruno BSc Phy is a senior consultant for Shaw Environmental and Infrastructure, Inc. in Fresno, Calif.

Rene R. St. Pierre BSc Pet is a division drilling manager for EOG Resources, Inc. in Midland, Texas.

1977

Sheldon T. Edwards B E, BSc CPR is an energy consultant for Edwards Consulting in San Antonio, Texas.

1979

Randy J. Carroll MSc Geop is a senior programmer at PGS, Inc. in Louisville, Colo.

Anthony M. Meyers BSc Min is manager of engineering for North American Coal Corp.

Michael D. Van Horn MSc Geol is chief geologist, exploration for EOG Resources, Inc. in Houston.

o n the move

1980

Patrick D. Allen PhD Min Ec is the senior lead systems engineer for General Dynamics in Arlington, Va.

1981

Ann E. Hanson BSc Geop is the founder and principal of Brannds in Ionia, Michigan.

Joseph G. Horvath MSc Geochem is a co-founder of EnviroGro Solutions in Furlong, Pa.

Dawn M. Krupp - BSc Geol 1981, MSc Env Sc 1993 is an Engineer for EXCO Resources, Inc.

1983

Richard S. Anderson CPR is corporate manager of air programs for Waste Management Inc. in Houston.

Roxanne L. Lastoria BSc Geop is a major and an environmental engineer for the Illinois Air National Guard in Peoria, Ill.

E. Scott MacBride BSc Pet is a principal software engineer for IHS, in Englewood, Colo.

John A. Stafsholt BSc Pet is a district manager for Siebel Systems Inc. in Houston.

1984

Roberta Rae Nolan-Lobmeyer BSc CPR is a staff/process engineer for Intersil in Palm Bay, Fla.

1985

Kevin A. Andersen BSc Chem is a senior research chemist for Shell Chemical in Houston, Texas.

Catherine A. Clark BSc Geol is a supervising engineer for Montgomery Watson Harza in Lakewood, Colo.

Daniel C. Johnson M.D. BSc Geop is an assistant professor of medicine at University of Colorado Health Science Center in Denver, Colo.

1986

James F. Mattern BSc Geop is chief executive officer for Devito Builders in Wyomissing, Pa.

Jeremy J. Zimmerman BSc Geop, MSc Geop '89 is senior geophysicist for seismic reservoir services for WesternGeco in Houston.

1987

Jordy L. Murray BSc Eng is a second-year law student at Washington and Lee College of Law in Lexington, Va.

1988

Richard H. Kerr BSc Eng is a project manager for ASI RCC, Inc. in Buena Vista, Colo.

1989

Victoria J. Marizcurrena-Smith - BSc CPR 1989 is a staff planning engineer in planning systems for the Valero Energy Corporation. She lives and works in San Antonio, Texas.

Kamarza Mulia - MSc CPR 1989, PhD CPR 1993 is a lecturer at the University of Indonesia in Depok, Indonesia. He and **Elsa A. Krisanti, PhD Chem 1993**, live in Jakarta, Indonesia. His e-mail address is kmulia@che.ui.edu.

1990

Darin R. Duran BSc Geol is a principal of J.A. Cesare and Associates, Inc.

Jeffrey L. Duvall BSc Min is an independent mining consultant in Greeley, Colo.

Anthony P. Gangemi BSc Eng, MSc Env Sc '93 is a patent attorney for Downs, Rachlin & Martin PLLC in Burlington, Vt.

Kevin S. Johnson BSc Met, MSc Met '98 is a senior metallurgist for Cameron in Houston.

Nagendra Palle MSc Appl Mech is a manager for A.T. Kearney, Inc. in San Francisco.

1991

Peter C. Michael Msc Phy is a systems engineer for Ericsson Microwave Systems AB with the Swedish Airborne Early Warning System in Gothenburg, Sweden.

Bryan Mortimer BSc Min and wife **Lisa BSc Math '92** announce their arrive their "brussel sprout" Scott William, born Jan. 1 in Brussels, Belgium. They also have a son, Nathan, and a daughter, Grace.

Mark D. Sonnenfeld MSc Geol, PhD Geol 1996 is director of geology for iReservoir.com, Inc. in Littleton, Colo.

Gary L. Womack BSc Phy and his wife announce the July 26 birth of daughter Abigail Christine. She weighed 8 pounds, 3 ounces and measured 20 inches in length at birth.

1992

Terrance J. Cirbo BSc CPR is a project engineer for URS in Rolling Meadows, Ill.

Gokhan Erdem MSc Met is chief engineer at the Eregli Iron and Steel Plant in Kdz Eregli, Zonguldak, Turkey.

Denise M. Thomas BSc CPR is a process engineer for Kodak Polychrome Graphics in Windsor, Colo.

1993

Scott J. Burke BSc Eng is a project engineer for B. F. Shaw in Simpsonville, S.C.

Heather M. Coursey BSc Eng is a plant engineering supervisor for the United Parcel Service of America Inc. in Madison Heights, Mich.

Elsa A. Krisanti PhD Chem is a lecturer at the University of Indonesia in Depok, Indonesia. She and Kamarza Mulia MSc CPR '89, PhD CPR live in Jakarta, Indonesia.

Kevin J. O'Connell BSc Eng is a project civil engineer for MFG Inc. in Boulder, Colo.

Jeffery S. Odenbaugh BSc Eng is a engineering laboratory manager for Earthworks Engineering Group LLC in Albuquerque, N.M.

Antonio C.B. Ramos PhD Geop is a senior geophysicist for PETROBRAS in Rio De Janeiro, Brazil.

Robin L. Simmons BSc Geol is a designer for Pape-Dawson Engineers in San Antonio, Texas.

Julie D. White BSc CPR is an independent process engineer in Houston.

1994

Andrew S. Bragg BSc Eng is a company commander for the U.S. Army. He is wrapping up a four-year tour in Germany. In January, he will transfer to Alameda, Calif., to work with a counter-drug task force.

Chad M. Foltz BSc Met is a senior process engineer, rolling mills, for Ameristeel in Baldwin, Fla..

Jaime A. Guzman BSc Met, MSc Met '96 is an MBA student at the Wharton School of the University of Pennsylvania. He and **Nancy C. Ballout, BSc CPR '97**, live in Philadelphia, Pa.

Samantha Przywitowski BSc Met and husband, Patrick Coughlin, announce the birth of a daughter, Frances Mary, born April 7 in San Diego. She weighed 8 pounds 5 ounces at birth and measured 21 1/2 inches long.

Anthony L. Shouse MSc Min Ec is vice president of finance for Wolf Ventures, Inc., in Denver.

Chu H. Son BSc Eng is sales manager for Microcomp Solutions, Inc.

Mark L. Ulmer BSc Pet, BSc Eng '97 is a petroleum engineer for Patina Oil and Gas in Centennial, Colo.

Peter J. Verschoor BSc Eng is a software systems integrator for Wells' Dairy, Inc., the makers of Blue Bunny Ice Cream in Le Mars, Iowa.

Theodore W. Wurfel BSc Eng is president of Corporate Compliance, Inc., an environmental engineering firm, in Spring, Texas.

1995

Tracy W. Crowther BSc CPR is a process engineer for Texas Industries in Midlothian, Texas.

Aldo R. Gurmendi BSc Pet is a drilling systems engineer for Baker Hughes INTEQ in Houston.

Fronz S. Robinson BSc Eng is a product development engineer for Sundyne Corporation in Arvada, Colo.

Evangeline C. Simones BSc Math is a storage industry analyst for Evaluator Group in Greenwood Village, Colo.

1996

Robert D. Carlson BSc Eng is an MBA student at University of Chicago.

Brent D. Hablutzel BSc CPR is an MBA student at University of Oxford in Oxford, England.

Jess A. Peonio BSc Pet is a petroleum operations engineer for ChevronTexaco in Kazakhastan.

Erik P. Ressel BSc Eng is a project engineer for Dome Construction in South San Francisco, Calif.

Douglas M. Trickett BSc Met, MSc Met '98 is a technical liaison for Hitachi High Technologies in Kudamatsu City, Japan.

1997

Sukiman H. Asaari BSc Pet is a technical professional for Halliburton Energy Services in Kuala Lumpur, Malaysia.

R. Brian Lawson MSc Engr Sys is a project manager for GDS Associates, Inc. in Marietta, Ga.

Kari S. Sanders BSc Phy, BSc Eng is a senior multi-disciplined engineer II for the Raytheon Company in Aurora, Colo.

Lisa D. Thieme MSc Geol is an exploration geologist for Shell Oil Company in New Orleans.

1998

Daniel G. Burnett BSc Eng is a mechanical engineer for Metara, Inc., in Sunnyvale, Calif.

Jason E. Butchko MSc Env Sc is a business unit manager for Hach Company.

Scott T. Hardesty BSc Eng is a staff engineer for Applied Research Associates in Littleton, Colorado.

Erin L. Iverson BSc Geol is a senior GIS specialist for Treadwell & Rollo, Inc., in San Francisco.

Wesley J. Kaisershot BSc Eng is utility coordinator for HDR Engineering, which is building a 91-mile toll road connecting north of Austin, Texas, to west of San Antonio, Texas.

Kyndra S. Lupplace BSc Eng and Adam Lupplace are new proprietors of the Turtle Pointe Golf Club in Arkadelphia, Ark.

Travis Moore BSc Eng married Maggie Moore Oct. 6 in Beaver Creek, Colo. The couple resides in Denver. Travis is a design engineer with Black & Veatch Engineers. Maggie is sales and marketing project manager with Amber Homes, Inc. Front row from left, **Justin Paulsen BSc Eng, Curtis Fischaber BSc Eng, Mike Nagata BSc Met, M Eng Met '01,** groom Travis, bride Maggie, **Jeremy Thompson BSc Eng '01, Brett Dempsey BSc Eng**. Back row from left, **Pete Varney PhD Geol '00**, James Heskin, **Suzanne Moore Heskin BSc Geop '01, Tom Fischaber BSc Eng, Quentin Moore BSc CPR, MSc Env Sc '01, Phil Quinnett BSc CPR** (in very back), **Dan Sorenson BSc CPR, Robert Moore BSc Pet '72, Melinda Moore Gale BSc Geop '88**, Kael Koolmees, **Sean Thorne BSc Eng '01**.

Michael R. Ross BSc Eng, BSc

on the move

Eng is a graduate student in aereospace engineering at University of Colorado at Boulder.

Grant H. Mulliken BSc Eng is working on a PhD in computation and neural systems at California Institute of Technology in Pasadena, Calif.

1999

Aaron Fleet BSc Phy, BSc Econ earned a master's degree from Cornell University in Ithaca, N.Y. He is now working on his PhD at Cornell doing research using x-rays from the Cornell High Energy Synchrotron Source (CHESS) to study the physics of crystalline materials grown using pulsed laser deposition.

Christine Forcier BSc Geol earned a master's at Cornell University's food science department in August 2001. She is a researcher at the Boyce Thompson Institute for Plant Research on Cornell's campus.

Heather Olson Hafer BSc Met & Material Eng is a product engineer for Goodrich in Colorado Springs, Colo.

Maureen Wan MSc Geochem is a geologist for Weiss Associates in Emeryville, Calif.

2000

Shayma A. Ahmad BSc Pet is a petroleum engineer for KUFPEC in Kuwait.

Ryan E. Binkley BSc Pet is a captain and manager of operations for Riverboat Discovery for Alaska Riverways, Inc., in Fairbanks, Alaska.

Carrie A. Capps BSc Eng is a professional in mechanical engineering for Earth Tech in Englewood, Colo.

Matthew J. Crill BSc Met & Material Eng is an associate materials engineer for Lockheed Martin Aeronautics in Fort Worth, Texas.

Patrick E. Freemyers BSc Eng is a project manager for Gebaut Samen in Rockville, Md.

Kristen J. Gruber BSc CPR is a systems engineer for Lockheed Martin Mission Systems in Colorado Springs, Colo.

Dawn R. Kerr BSc Chem, BSc CPR married Alan Culley May 25 at Heritage Square in Golden, Colo. Alan is currently a mining engineering student at CSM. Dawn works for Compliance Partners, Inc.

Mary Inez Larson BSc Eng is a mechanical engineer for BAE Systems in Austin, Texas.

Juan C. Madeni BSc Met & Material Eng is a graduate student at CSM.

Timothy A. McCarthy BSc Geol is a student at The Southern Baptist Theological Seminary in Louisville, Ky.

Mark C. Moon BSc Eng is a consultant for SAIC Consulting in Houston.

Brandon D. Morrison BSc Phy is an engineer for Texas Instruments Incorporated in Dallas.

Steven W. Passmore BSc Eng is a sales representative for the Ingersoll-Rand Company in Pacific Beach, Calif.

Michael P. Poirier Geop E is a geoophysicist for Aspect Resources in Denver.

Mark A. Richards BSc Min is a product applications manager for Latin America for Caterpillar Inc., in Miami, Fla.

Geoffrey M. Vasil BSc Math & Computer Science is a graduate student at University of Colorado in Boulder.

John Robert West BSc Geol is an environmental engineer with URS in Denver.

2001

Mark Dace MSc Engr Sys and **Lisa Wehmeyer BSc Econ, MSc Eng Tech Mgmt '02** were married in July. The couple resides in Mercer Island, Wash.

Eric P. Dodson MSc Env Sc is an environmental engineer for Logan City, Utah.

Aaron G. Gabler BSc Math & Computer Science, BSc Econ is owner/consultant for Gabler Services in Arvada, Colo.

Ryan R. Hansen BSc Chem Eng is an associate engineer for Parsons Corporation in Denver.

Sara E. Himelein BSc Chem Eng is a graduate student and J.D. candidate at Willamette University College of Law in Salem, Ore.

Bradley A. Kelley BSc Math & Computer Science is a software engineer and trainer for Eagle Computer Systems in Lakewood, Colo.

James K. Linse BSc Math & Computer Science is a programmer for Univance Telecommunications in Englewood, Colo.

Zachary R. Prieskorn BSc Eng is an engineer in training for Lehigh Portland Cement in Mason City, Iowa.

Nicole M. Rose BSc Pet is a reservoir engineer for Aspect Resources in Denver.

Keith P. Savage BSc Met & Material Engineering is a graduate student at University of Tennessee Space Institute in Tullahoma, Tenn.

Adrian J. Sikorski BSc Eng is a production technologist for Shell International Exploration and Production in Rijsurijk, Netherlands.

Zachary R. Snyder BSc Eng is an assistant civil engineer for Burns & McDonnell in Englewood, Colo.

Judy L. Toel BSc Econ is a geophysicist for Western Geco in Houston.

Scott W. Townsend PhD Appl Phy is a senior process engineer in Portland, Ore.

Philip D. Washburn BSc Eng is an engineer for Air Liquide.

Bryan T. Wischer BSc Eng is an engineer for US Filter/Chester Engineers in Huntington, W. Va.

2002

Diana Abdul Rahman BSc Geol is an exploration geologist for ExxonMobil Production and Exploration Malaysia Inc.

Justin R. Anderson BSc Eng is an engineer in training for VSL.

Travis N. Attanasio BSc Eng is an engineer-in-training for Brockette, Davis, Drake Inc., in Dallas.

Nicole A. Baert BSc Geop is a second lieutenant in the U.S. Air Force.

Michael A. Bazar BSc Eng is a graduate student at CSM.

Jody L. Bennett BSc Math & Computer Science is a computer specialist for the Department of the Interior, minerals management service, in Denver.

Eric C. Berg BSc Eng is a graduate student at CSM.

Kai Binkley BSc Pet is a petroleum engineer for BP.

Mandy J. Bonkoski BSc Eng is an engineer at the Puget Sound Naval Shipyard.

Brian R. Buck BSc Chem Eng is a petroleum engineer for the Phillips Petroleum Company.

Christopher D. Bulson BSc Eng is a second lieutenant in the U.S. Air Force.

Jeffrey R. Busby BSc Eng is a graduate student at Massachusetts Institute of Technology.

Robert A. Cambron II BSc Eng is a mechanical engineer for Air Liquide.

Jeremiah J. Camp BSc Eng is a second lieutenant in the U.S. Air Force.

Christopher M. Carpio BSc Eng is a manufacturing intern at Ash Grove Cement Company in Durkee, Ore.

Jushalene Sablan Christensen BSc Eng is a graduate student at Wichita State University. Her husband **Charles F. Christensen BSc Eng '00** is in the U.S. Air Force and is stationed at McConnell Air Force Base.

Randall N. Christiansen BSc Eng is a teller at Peak National Bank in Golden, Colo.

Dale R. Clark BSc Eng is a graduate student at the CSM.

Sean M. Clark BSc Chem Eng is an engineer for Air Liquide America.

Christopher J. Cobb BSc Eng is a second lieutenant in the U.S. Air Force.

Stacy M. Collins BSc Eng is a pressure equipment engineer for Shell International Exploration and Production in Deerpark, Texas.

Heather D. Crabb BSc Eng works in engineering design for Carter & Burgess.

C. Thomas Darrow BSc Math & Computer Science is a graduate student in applied math at University of Washington.

Andrew R. Depperschmidt BSc Phy is a graduate student at CSM.

Daniel R. Dirksen BSc Eng is a project manager for ARC Inc.

Sean M. Donlin BSc Chem Eng is a graduate student at CSM.

Joanna J. Eastment BSc Eng is an associate engineer for IBM Printing Systems in Boulder, Colo.

Brian A. Ellis BSc Phy is a graduate student at CSM.

Casey D. Felmlee BSc Min, BSc Eng is an engineer for LaFarge West, Inc.

Mariah A. Forte BSc Econ, BSc Chem Eng is in gas marketing for ExxonMobil.

Jon B. Froderberg BSc Eng is a designer for Stewart & Stevenson in Denver, Colo.

Robert P. Gillis BSc Eng works for Ames Construction in Aurora, Colo.

Sean L. Gilpin BSc Math & Computer Science is a solution developer for Avanade.

Chad L. Goerzen BSc Phy works at the Lawrence Livermore National Laboratory in Livermore, Calif.

Andres Guerra BSc Eng is a graduate student at CSM.

Wesley B. Harbert BSc Eng is a design engineer for TST of Denver–Consulting Engineers in Lone Tree, Colo.

Joel T. Harry BSc Eng is an airport engineer for Airport Development Group.

Ethan S. Hecht BSc Phy is a graduate student at CSM.

Cynthia A. Davis Hicks MSc Env Sc is an associate scientist for the URS Corporation in Houston.

Joanna J. Higgins BSc Eng is a hardware engineer for IBM in Boulder, Colo.

Jason E. Hilgers BSc Geol is a staff engineer for the URS Corporation.

April M. Hillman BSc Eng is a graduate student at CSM.

James J. Hochnadel BSc Met & Material Engineering is a materials engineer for Chevron-Texaco, Inc.

Sophia M. Holtsnider BSc Eng is an intelligence research specialist for the Defense Intelligence Agency in Washington, D.C.

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Send us your pictures!

Have you recently gotten married? Have a new baby? Won an award? If you send us photos appropriate for On the Move, we'd love to publish them. Send electronic copies at 300 dpi to mkeller@mines.edu or mail a photo to Maureen Keller, CSMAA, P.O. Box 1410, Golden, CO 80402-1440.

Thank you!

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Novelty Items

Senior Matthew Bird, a pitcher for Mines baseball, models a t-shirt ($14.98) and a jacket ($39.98). He holds a child's Blaster sweatshirt ($19.98) and a child's hooded sweatshirt ($29.98), which also comes in gold, gray, and maroon.

Women's long-sleeved t-shirts are, from left $39.98, $49.98 and $16.98.

Senior civil engineering major Matthew Bird models a hooded sweatshirt ($49.98) and holds two others, from left, $49.98 and $54.98.

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Alumni Association
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Golden, CO 80402-1410

The Celebration of Mines features student activities, clubs, organizations and academics. Each year students create a mural reflecting the spirit of the event that is later posted in the Green Center's Computing Center.