Look at the Water Spout! Participants of the 2007 Summer Explosives Camps have some fun with water spouts. This was the fourth year for this one-of-a-kind summer camp and we had campers from nineteen States.

Photos courtesy of UMR Public Relations
From the Department Chair

The end of the 2006-07 academic year has ushered in a new year of promise as we continue the path toward excellence in everything embodied in the spirit of UMR. UMR Mining Engineering made significant progress in several dimensions within the framework of its Strategic Plan throughout the past year. The thrust of the Vision 2010 in this Strategic Plan is to be recognized as a global leader in Mining Engineering education and research. This is an opportunity to update you on the progress made so far towards this pinnacle of strength and excellence.

Expanding Capacities: UMR Mining Engineering programs continue to grow and expand at every level as illustrated in Figure 1. The respective growth in the total, freshmen, undergraduate and distance education enrollments are 90%, 300%, 88% and 170% from FS04 to FS07. This growth has become possible as a result of the faculty, staff and students working in cooperation with industry and our alums in several key areas. At the undergraduate level, the two key strategies focus on recruitment and retention. The Department has been successful in recruiting students using the Mining and Explosives Summer Camps, the campus-wide Jackling Program and other student-led activities. This year’s summer camps attracted 43 high school students from 19 states. Based on previous history, UMR attracts over 75% of the campers into Mining Engineering and several other disciplines. Over 70 students showed interest and visited the Mining Engineering program during the three weeks of the Jackling (Introduction to Engineering) program. In addition, Mining Engineering hosted 25 Kaufman Foundation scholars (mostly minority students) from Kansas City, MO. The Experimental Mine also hosted 50 high school science and math teachers under the Project LEAD The Way. This year, over 6,000 visitors toured the UMR Experimental Mine, one of our major corridors to the world. The exposure of the mine facilities to the public provides attraction to future potential Mining Engineering students. Jimmie Taylor and Brian Lewis do a great job on this front.

![Figure 1 Growth in UMR Mining Engineering Programs](image)

The program enjoys over 98% retention because of a number of university-industry initiatives. These initiatives include a Department that interacts frequently with students on academic and social levels and shows genuine care for these students, availability of scholarships, summer internships and the prospects of good paying jobs in industry, and student-led activities and participation. Through effective faculty advising with a strong administrative support, the Department has created a supportive environment for nurturing Mining Engineering students from freshmen through to graduation. This year, the Department awarded 111 scholarships ranging from $500 to $7,000 to several students. These scholarships were made possible due to the generous contributions by individuals and companies. These individuals and companies include the Allen Hale Memorial, Caterpillar, Robert Dye Memorial, Steve Feder, Granite Construction, Gary Hubbard, Peabody Energy, International Society of Explosives Engineers, Pat Hell Memorial, Joy Mining, P&H Mining, Samuel Krauss Memorial, TXU Corporation, Bill Kennedy, Peter Kiewit and Sons, The Lang Family, Pollard, Rinker Materials, Rio Tinto, SME Coal, June Allan Spokes, Stone Memorial, Bill Summers Memorial, TLT Babcock, US Gypsum, Guy H. Warring Memorial, Patrick Witt Memorial; Edward and Naomi Parsons.

Continued on Page 20
New Addition to our Faculty

We have filled one of the faculty positions we have open. Dr. Kwame Awuah-Offei has joined our Department effective September 1, 2007. He will teach mining reclamation starting in SP2008. You will hear more from him in the next issue of the newsletter. Dr. Awuah-Offei is coming to us from California where he worked for Granite Construction Co. We are also welcoming his wife and 1 month old son.

Good Bye to
Larry and Maxine Grayson

In April 2007 we celebrated Dr. Grayson’s time at UMR. He accepted the position as Chair, Department of Energy & Mineral Engineering and George H. Jr. and Anne B. Deike Chair in Mining Engineering at Pennsylvania State University. Penn State is in the process of rebuilding the mining engineering program and would like to see a similar growth as we have here at UMR.
Several alums joined a large group of students, faculty and staff to wish Larry and Maxine all the best at Penn State. However, Larry still works with us on Western Mine Safety and Health Training and Translation Center and will be offering classes on line.

2007 Old Timers Award

The recipient of the 2007 Old Timers Award is Joseph Haas from Rolla, MO. Joe worked in the coal industry as a summer intern for several year. He is currently working with BHP in New Mexico. Larry Grayson, a former recipient of this award, presented the watch at the Annual Awards Banquet.

Professional Degree presented to
Paul Lang

The presentation of a Professional Degree to Paul Lang provided a rare opportunity for us: to get a group photo of almost all the members of the Lang Family. Eugene Lang Sr and his wife Rose, sons Paul, Steven, Greg and Eugene Jr (not shown in photo) support the Lang Family Scholarship in Mining Engineering which benefits non-resident students. Elizabeth Lang, Steven’s daughter, is now enrolled in nuclear engineering.
**Allen Hale Memorial Scholarship**

A new scholarship was added to the list of scholarship endowments this Fall. Many of our alums knew Allen Hale during his career with Dyno Nobel. Allen lost his battle with cancer earlier this year. He will be missed in the industry, but especially in our department. Allen was a great supporter of our program. Several of his friends, with Paul Worsey and Marsha Elledge from Dyno Nobel leading the charge, together with his son Joe Hale and Marian, his wife, wanted to establish a scholarship through an endowment here at UMR. Many of Allen’s customers contributed to the fund. In addition Joe scheduled a golf tournament to benefit the fund - which was very successful! Donations were also collected at a day of fishing. To apply for this award students had to write an essay about what attracted them to the explosives industry. In September 2007 the scholarship was awarded for the first time. Alex Warren earned the scholarship by closing his essay with the following line: “there is no other field I would rather work in.” Joe and his Mother, together with Darryl Hale, were on hand to award the scholarship in September 2007.

1st Presentation of the Allen Hale Memorial Scholarship
from left: Dr. Paul Worsey; Dr. Samuel Frimpong; Alex Warren; Marian Hale; Joe Hale and Darryl Hale

*Thanks to everyone that helped to make this scholarship possible.*
In April 2007 Adam Kresler, senior in mining engineering from Winterpark, CO., was selected as one of two recipients of an Academy Scholarship from SoMEER Academy. Candidates for this scholarship are nominated by the board members of the Dr. Jim Scott Mining Society. Demonstrated leadership and involvement play a big role in the selection process together with academics. This is the 2nd academy scholar from mining engineering. Congratulations to Adam Kresler. His parents, Tom and Ann Kresler, made the trip from Colorado to be with Adam at the awards dinner.

2007 Spring Semester Senior Design
The senior design course incorporates all the courses in the undergraduate Mining Engineering curriculum into a capstone design course. It prepares graduates to understand the integrated nature of mine design and the formulation of project boundaries under uncertainty in a feasibility study.

In this course, the students are introduced to industry practices on mineral property/mine evaluation and feasibility study and all the various mining engineering tasks for completing the study. Effective communication and presentation skills using written reports and oral presentations are also emphasized in this course.

In the Spring Semester of 2007, three projects were undertaken, including (i) The Sherman Coal Mine Feasibility Study; (ii) The St Charles Quarry Feasibility Study; and (iii) The Southern Illinois Stone Quarry Feasibility Study. The final presentations were judged by industry. These judges included Dianna Tickner, VP Generation Development, Peabody Energy; Jim Humphrey, Senior Mining Consultant, Caterpillar Global Mining; Mark Adams, Plant Manager, USG Corporation; Leonard Wolff, Principal Advisor – Support Systems, Kennecott Utah Copper Corporation; and Ben Steltenpohl, Senior Mining Engineer, Vulcan Materials.

The BAR Consultants completed the best project for the Spring Semester of 2007.
We Want To Say “Thank You”

We are very fortunate to enjoy great support from our alums and the industry. Most of our alums help us by contributing to our Annual Phonathon. The 2007 Mining Engineering Phonathon is scheduled for November 4 - 8, 2007. As always, our students will be working the phones and we hope to reach you. Due to hectic schedules, and many unlisted or changed phone numbers, it is sometimes difficult to reach everyone, but we will try. Phonathon funds are used for financial aid, mucking and mine rescue activities, and other special projects. Over the past year we have received other donations that directly benefit our experimental mine and the student activities there. We want to thank our donors with this page.

Would you like to help with a similar donation? We are looking for a small track loader. Maybe your company has one and does not use it any longer. Give us a call.

This truck was donated by Mississippi Lime Co. It needed a little body work, but that was no problem with the help of the crew we have at the experimental mine.

A new trailer for Mine Rescue and Mucking
Thanks to Hanson Aggregates Inc.

We received 6 re-conditioned BG4 Draegers from DXP Safety. Our thanks to John Pennington

A new underground communication system for mine rescue training. Thanks to Vulcan Materials Co.
UMR enters into mining engineering partnership with the University of Botswana
07/19/2007 14:44 - UMR Public Relations

A delegation from the University of Botswana recently traveled to the University of Missouri-Rolla to formalize an agreement to collaborate on mining engineering endeavors.

UMR Provost Warren Kent Wray and UB Deputy Vice Chancellor of Academic Affairs Frank Youngman signed a memorandum of understanding of July 18 on behalf of the universities.

The two universities are finalizing details on a “3 plus 2 program” that will allow Botswana students to complete mining engineering degrees at UMR following three years of study at UB. The students in the program will spend the last two years at UMR.

UB is also interested in sending junior faculty to UMR for graduate programs. All students will be fully funded by Botswana’s Ministry of Education.

According to Dr. Samuel Frimpong, chair of UMR’s mining and nuclear engineering department, the first group of 10 Botswana students will transfer to UMR to participate in the new program during the 2009-2010 academic year.

“In the mid-1990s, UMR recruited more than 30 students from Botswana,” Frimpong says. “These students were fully sponsored by their government and were very successful. UMR and UB have since been exploring possibilities to continue this relationship.”

Jeanie Hofer, UMR’s director of international affairs, says the program will contribute to campus diversity objectives and provide a steady flow of new mining engineering students. Cultural and research exchanges are also planned.

In the coming years, UMR will help UB develop its own mining engineering department. Botswana is home to some of the world’s largest mining companies, including Anglo American, DeBeers and BCL.

UMR offers bachelor’s, master’s and Ph.D. degrees in mining engineering. UMR operates its own Experimental Mine and is the only university in the world with a mine rescue team that competes with professional teams.

At the signing ceremony: (sitting, left to right) UMR Provost Warren Kent Wray and UB Deputy Vice Chancellor of Academic Affairs Frank Youngman; (standing, left to right) Dr. Henry Weibe, dean of UMR’s School of Extended Learning; Dr. Samuel Frimpong, chair of UMR’s department of mining and nuclear engineering; and UB’s Dr. Alfred Ngowi.
2007 Student Awards

High GPA Freshmen
   Paul D. Conrad
   Michael M. Kuba

High GPA Sophomore
   Amanda C. Kimbel

High GPA Junior
   Andrew C. Blair

High GPA Senior
   Daniel J. Tabacchi

Old Timers Award
   Joseph Haas

Outstanding N/NM Graduate
   Daniel Richards

Outstanding Aggregates Graduate
   Matthew Angle

Professional Leadership Award
   Seth A. Reeves

External Relations Award
   Adam Kresler

Student Recruiter Award
   Dennis Sullens

Student Activity Award
   Charles Hoyt

Outstanding Graduate Teaching Award
   Yi “David” Zheng

Outstanding Graduate Research Award
   Nuray Demirel

Chairman’s Award for Good Citizenship
   Andrew C. Blair
   Brianna C. Drury

OGS Members “dazzled” by Pyrotechnics Show

Mining engineering students renting tuxedos? Yes, it did happen. In April 2007 our “Pyro Maniacs” were asked to set up a fireworks display at the annual gathering of the members of the Order of the Golden Shillelagh (OGS) in Branson, MO. Paul Worsey accompanied the group to Branson and the show was set up. Several of the students took advantage of an offer extended by the Development Office to join the group for the banquet, but tuxedos were required. This was an opportunity to see mining engineers all dressed up and actually having a place to go. The display was a big success and many of the attending OGS members made it a point to congratulate the students on their skills. Only one bush was set on fire - the fire truck on site handled this very easily.

Joshua Hoffman, senior in mining engineering, poses in his tuxedo with Chancellor Carney
UMR Lady Muckers Retain Title

The 2007 International Intercollegiate Mining Competition was hosted by the University of Arizona in Tucson in April 2007. Two men’s and two women’s teams made the trip to Tucson and they were joined by a UMR Alumni Team. Our Lady Muckers retained their title. The 2nd team placed 3rd in a field of four teams. The UMR Muckers placed 4th and 7th in a field of fifteen. Our Alumni Team placed 2nd in a field of four. Congratulations to all the team members. Many of our “muckers” are graduating and it is very satisfying to see the tradition continuing through all the new members of the second teams.

Over the past few years this competition has truly become an international event. Teams from Australia and Canada have been competing before, however, in 2007 a team from England participated for the first time. Somewhere in the future will be a competition in England - just watch for more news.

As most of you know the 2008 Competition will be held in Rolla and the dates are set for April 10 - 12, 2008. We need judges - so if you have some time, please mark those dates on your calendar and join us. If you are a “Mucker Alumni” why not put a team together? The Alumni Division has grown over the last few years and it is now almost a “Homecoming for Muckers.”

The team members will start the fund raising efforts by the end of this year. If you, or your company, would like to sponsor an event or a team, please get in touch with us.
**Mine Rescue Going Strong!**

Most of you know that we are the only university with a Mine Rescue Team. Over the past two years we went through a rebuilding period - our team members will graduate and leave UMR. The interest in mine rescue has carried over to the students and we have two teams now. Donations of Bio Marines and BG-4s helped us to outfit the two teams. In Fall 2006 the teams placed 3rd and 4th in the Southeast Missouri Competition. In May 2007 the teams did not place this high in the New Iberia competition, however, some of the students were more successful in individual events.

In August we had the first meeting for the team members and Jimmie Taylor was almost overwhelmed by the number of students, especially freshmen, interested in mine rescue. This will ensure that our tradition will continue. However, we can use your help in this. Everything the teams use is donated - if you have some extra equipment that is not being used, you can make a donation to the University. Contact the mining office for more details.

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**BREAKING NEWS!**


**Congratulations Casey - Well Done!**
SME Chapter Update
By Allie Letcher, President

SME started off the year with a BBQ on Aug. 22. We enjoyed brats, hamburgers and a game of kickball. Turn out was rather high with 34 students as well as our advisor and significant others.

The first meeting was attended by 25 students. Nominations were accepted to replace the acting vice-president due to a conflict of interest. After discussion of the nominees, a straw-poll was taken to elect the new vice-president and Drew Blair accepted the position. A brief outline of the year was also discussed in order to plan events like field trips and fund raisers.

2007 Annual SME Meeting in Denver, CO.

The 2007 Annual Meeting of SME was scheduled for Denver, CO. Denver is easier to reach by car or van, and we normally drive; however, this trip will be remembered for many reasons. Four vans were scheduled to leave on Saturday morning for Denver. Judy Russell and Barbara Robertson managed to get the mini van stuck in Barb’s front yard. Help arrived from the Mining Engineering “Cavalry”: Adam Kresler and Nathan Woods.

With the help of a chain, the mini van was pulled free and the trip started - next stop was Hayes, Kansas. I-70 was closed between the Kansas State Line and Denver due to accidents on the ice covered highway. The group managed to get some of the last hotel rooms in Hayes and spent the night. The arrival in Denver was delayed to Sunday morning, but everyone made it safely. Drs. Frimpong and Grayson had left a day earlier with the UMR Design Team to compete in the NSSGA/SME Design Competition and arrived in Denver before the snow storm hit. The next four days were filled with technical sessions, talking with recruiters, visiting displays and collecting business cards. Our Design Team placed 3rd in the competition this year and plans are underway to compete in 2008 and bring back 1st place. The 2008 Annual Meeting will be in Salt Lake City, UT. We will have a booth there and hope to see as many of our alums as we can.

We want to thank our sponsors for the 2007 Awards Banquet and the trip:
Peabody Energy;
Kiewit Mining Group;
Vulcan Materials Co;
Martin Marietta Aggregates;
US Gypsum Corp.

Without these generous donations our group would have been much smaller!

UMR Attending the 2007 Joy & P&H Hospitality Event
ISEE Student Chapter News
by David Lloyd, President

UMR-ISEE has a full semester ahead. We have already performed two fireworks shows for UMR home football games, and we are planning a third for homecoming. In addition, ISEE is in charge of our annual Haunted Mine fund raiser this year. Setup begins on the 28th of September, and it promises to be even more successful than last year. *The Haunted Mine will be open on October 20th, 21st, 27th, 28th and of course the 31st.* We are also scheduling an additional fund raiser in the form of “Blow Stuff Up Day.” The event allows UMR students to bring out class projects, textbooks, etc. and watch them get blasted into tiny pieces, for a nominal fee. Finally, we will soon begin our initial preparation for the ISEE National Conference in New Orleans, Louisiana.

On the more social side of things we have arranged some fun events for our members this semester. September 22nd stands as the date for our annual float trip. It should be an exciting time on the river. This semester should also include a long overdue bonfire social.

Suffice to say that the UMR chapter of ISEE, while continuing to expand and draw in new members, plans to continue its tradition of student involvement and education in the field of explosives engineering.

What does Mining Engineering and MTV have in common?

Yes, we can use both names in one sentence. MTV produces the show “Pimp my Ride”, well Paul decided it was time to do something to the explosives truck. The truck is relatively low mileage but the paint work was starting to blister. Now in the old days the rule was the explosives truck at any mine was usually the oldest worn out POS and the reasoning was if it blew up it was no real loss, however, those days are long gone and the DOT or MSHA doesn’t take kindly to using old wrecks to transport explosives anymore. Paul told the students it needed ‘tarting up’ a bit and they might as well pimp it whilst they were at it. His goal was to have something flashy that could be used as a mobile billboard to help get the word out and for recruiting purposes. As the target for recruiting is kids under 18, using a pimped ride seemed ideal.

The truck is a 94 Chevy ¾ ton extended cab 4x4 with a decent topper and winch so it already looked pretty beefy. So far the pickup truck has been given a new flashy paint job, flares added to the wheel arches, side window deflectors (highlights), a new front grill, chrome brush bar with spotlights, a new rear chrome bumper, new towing electrical hookup and chrome step up bars. Jimmy insisted that the wheels be changed from nasty stock to chrome alloy at $200 a pop which really set it off nicely. The outside is finished with bright decals on the bed which give the web address to the explosives program which bounces the user straight to the mining web pages explosive engineering page. The interior has also had a make over with the ripped seats being reupholstered with custom embroidered sticks of dynamite with burning fuses, the door armrests replaced and a dashboard cover being installed with new center console. Paul says’ “we kind of got carried away with it, but it’s well worth it as it is quite an eye catcher now, plus we’ve all had quite a bit of fun doing it…..It’s now pimpelicious!”
Haunted Mine, which is on the lines of a haunted house, to raise money for the various societies in the department. Last year the members worked hard and brought in over $1,000 to the society.

The year promises to be exciting and we are hoping to get a good start and keep ourselves busy until we leave for our jobs in the summer.

Over the summer our members worked with various companies, many as engineering interns.

- David Lloyd- Peabody (WY)
- Jen Fizer- Doe Run (MO)
- Mark Bunch- International Coal Group (IL)
- Toni Donovan- Granite Construction (CA)
- Alex Warren- Phelps Dodge
- Josiah Martin- Vulcan Materials (KY)
- Brain Sandhaus- Vulcan Materials (IL)
- Allie Letcher- Doc Run (MO)
- Brianna Drury- TXU (TX)
- Maggie Hettinger- Jim Walters Resources (AL)
- Dennis Sullens- USG (TX)

To start the year off we are doing the 3rd annual “What’s Mined is Yours” campaign. We had a lot of positive feedback over the past 2 years. Since the majority of the dorms on campus consist of freshmen, a whole new audience is seeing it for the first time. We plan the event around parents weekend to inform them as well.

This year promises to be busy with classroom visits. We are currently talking to a group of science teachers from one of the larger school districts in Missouri and plan to bring them down for a tour of our mine, give them material to take back to their classrooms, and potentially go visit their students later in the year.

The last major project to start our school year off is the departmental Haunted Mine. WIM will be helping with the event. We turn our experimental mine into a

Women In Mining- Rolla
Chapter
By Dennis Sullens, President
School has started here at UMR and the mining department is busy planning for the school year. Our first meeting was held on August 30 and thirteen students attend. Eleven are returning members. We would like to welcome our two new members, Josiah Martin and Mark Bunch.

Online
MASTER OF ENGINEERING DEGREE
Mining Enginnering
University of Missouri-Rolla
Mining Engineering

The program will provide you with:
- Advanced understanding of selected mining processes and their mutual relationships
- Ability to design selected mining processes and select the relevant equipment
- Ability to use cutting-edge engineering tools and knowledge to solve mining related problems in an economical, safe and efficient way

The classes are offered on-line and there are no residency requirements.
Big Detonation Tank Comes to UMR!

Traffic stopped for a while in Rolla on Monday, July 23, when a huge tank came rolling into town and was placed at the University of Missouri-Rolla’s Mining Department Explosives Lab.

The tank, otherwise known as an Explosion Containment Chamber, or ECC, came from the Army’s Dessert Chemical Depot in Utah where it was to be used for chemical weapons destruction.

The ECC was never used for that purpose, so when the Depot no longer needed it, Dr. Jason Baird was able to secure it for UMR to use as a detonation chamber for the Lab. After a two-year process to acquire the ECC, UMR shipped it from Utah to Missouri via a special heavy-haul transport truck.

Placement of the 85-ton ECC required the use of a 210-ton capacity crane, and according to the crane company, it was the heaviest lift ever recorded in the Rolla area.

Dr. Baird is looking forward to getting the ECC systems up and running so that he can begin explosive experimentation on several projects that will make use of the ECC’s 8-lb explosive charge detonation containment capability.

Update from the Experimental Mine by Jimmie Taylor

This past year the Mine Rescue Teams placed 3rd and 4th at the 2006 UMR Mine Rescue Contest. In 2007, there will be 15 teams at the Silver Anniversary of the UMR Mine Rescue Contest. This will be the most teams the contest has ever had. UMR will be entering two teams consisting of both new and veteran team members led by Ivan Howard and Nathan Davis. Both of the UMR teams will be using newly donated BG 4’s and BioMarine breathing apparatus that were donated by Draeger and BioMarine. In addition to the donation of the re breathers, Vulcan Materials donated funds for UMR Mine Rescue to receive a $10,000 mine rescue communications line from Con-Space.

The 2008 International Intercollegiate Mining Competition will be held here in Rolla again. UMR will most likely be entering 2 men’s teams as well as 2 women’s teams with the possibility of a coed team as well. Work is already underway to prepare the mucking site for the competition. UMR will, again, be jack legging in a true rock face after the 350 class prepared the face with a pre-split in the quarry wall. Any and all Alumni that are interested in competing again in the Alumni Division are more than welcome, and can contact Barb or myself to join a team, or create their own team.

Over this past summer, UMR again hosted two explosives camps for high school junior and senior students. There were more than 20 students in each camp, which covered demolition, outdoor pyrotechnics, underground drilling and blasting, surface drilling and blasting, and outdoor special effects.

Currently, Dyno Nobel Consulting is doing some testing at the mine quarry using single hole shots to determine the fragmentation patterns of the blast. Also, Winco is continuing their research into blast resistant windows in the Large Arena Test Simulator set up at the quarry.

Work is also continuing to develop a second level to the mine on the east end. This semester and next semester, the advanced and introductory blasting classes will be receive hands-on experience drilling and blasting a ramp down to the second level led by Dr. Worsey.

On a personal note, my second granddaughter will be born around the first of December. This is my oldest daughter, Shannon’s child.

If you are ever in the area, feel free to stop by the mine any time to see the progress that we have made, and also to stop by and just visit for a while. We also enjoy to hear from you, just in case you can’t make it back to Rolla.
News from Dr. Samuel Frimpong

(a) Truck Vision Research

Truck operators face severe challenges in surface mining and construction operations. These challenges include limited vision due to the extensive “blind” areas around trucks and its instability in responding to imminent dangers. Depending on prevailing conditions, vehicular control, in response to these dangers, can result in steering control losses and fatal accidents. The main objective is to develop intelligent sensing technologies with dynamic control and stability and collision avoidance capabilities.

Samuel Frimpong, Ying Li & Sanjeev Agarwal (UMR)

Research and Industry Visits

Over the year 2006, Dr. Frimpong visited many operations in the United States and carried out a number of activities, some of which are shared below.

Industry Visits: Dr. Frimpong visited several surface mining operations including a visit to the Kennecott Utah Copper Corporation’s Bingham Mine in Salt Lake City, the Grand River Quarry in Paducah, KY (Vulcan Materials) and the Farmersburg Mine, Terra Haute, IN.

(b) Truck Tire Research

Truck tires are used in rugged terrains with high rolling and grade resistances. These conditions increase the tmph rating of these tires leading to tread wear, cuts and complete failures. Tire load bearing capacities are sometimes exceeded resulting in overstressing, heating and subsequent failures. This research uses multi-body and soil physics to capture the dynamic behavior of tires under these conditions. Virtual simulators are developed to examine tire stress fields toward extend service life.

Samuel Frimpong & Ying Li (UMR)

Frontier Research: Three projects are highlighted because of their practical relevance to industry, and they include (a) truck vision, (b) truck tire and (c) truck vibration research.

(c) Truck Vibration Research

Shovel dumping is a high impact process. It results in significant vibrations, wear and tear of trucks. These vibrations are transmitted through the truck frame to an operator’s cabin, thereby exposing operators to magnitudes of whole body vibrations, which may exceed the recommended ISO limits. Experimental results have shown that the first two shovel passes have the most impact on truck vibrations. Research is underway to examine, model, simulate and mitigate the impact of vibrations on trucks.

Samuel Frimpong & Nassib Aouad (UMR)

Graduate Education: In 2006, one of Dr. Frimpong’s graduate students, Dr. Nuray Demirel, graduated with a PhD in Mining Engineering. Dr. Demirel is currently an Assistant Professor of Mining Engineering at the Middle Eastern Technical University in Ankara, Turkey.

Dr. Ying Li, Post-Doctoral Fellow, on a dragline at Farmersburg Mine in Terre Haute, IN.

Dr. Nuray Demirel, on a dragline at the Farmersburg Mine in Terre Haute, IN.
The RMERC continues to develop new lines of research, and in the past year has been spending more time in testing new concepts that may have some impact on the ability to make holes of varying size, through the earth we stand on. The water jet work that was recognized internationally last year brought, for a short time, a glass artist to work in the Center. Dr. Vanessa Cutler of the Glass Center in Sunderland, UK, came to use the 5-axis cutting table and to work both with the Water jet Lab and the new Glass Studio that is developing on campus. The water jet classes, with the class project being to develop individual works of art, continues to draw significant enrollment, showing that engineers are also creative. As this work continues to grow in variety of activity, it also becomes more confidential to the companies that are funding it, making the reporting of the effort a little more constrained than usual.

At the end of the year Dr. Worsey moved into McNutt Hall from the Center, and the contribution that he made to the Center’s explosive research will be missed. At present that work has been continued by Dr. Baird, (who I imagine is reporting his activity elsewhere in this letter).

One of the more interesting new ideas that have been developed over this past year relates to alternate energy. It is becoming evident that the world is approaching the time where the amount of oil produced from the ground per day is likely to peak and then decline. Given the large volumes of liquid fuel that are required for the international economy, this requires a rational look at alternate sources. Of these the production of biodiesel from algae shows some considerable promise. At present students, working with faculty from the Biological Sciences have started a project to look at how this might be a factor in future supply. One of the interesting wrinkles that we are looking at involves placing the algae farm underground. Underground cultivation has a number of benefits (it can double corn yield for example), and with potential production of up to 3,600 gal/acre/year can help provide a partial answer. Using space that has been left after mining overcomes some of the limitations of cost that building on the surface would generate, and the beneficial climate that can be established also allows cultivation of more productive strains that would be limited in surface farms. The problems of how much light is actually required, together with other growing conditions and required energy input relative to useful product, are part of the current investigation.
News from Jerry Tien

Dr. Tien has been serving as one of the six members on the federal Technical Study Panel to examine various issues relating to the use of belt entry air, belt flammability, ventilation system redesign, and other related issues. The Panel was established in the Mine Improvement and New Emergency Response Act of 2006 (MINER ACT), signed by President Bush in June 2006; he was officially appointed by Labor Secretary Elaine Chou. There have been five public hearings throughout the U.S. this year and the Panel is to present recommendations by the end of 2007.

In summer 2007, he spent over eight weeks on two separate trips to China’s Inner Mongolia and Xinjiang Province working on two coal projects, one surface and one underground. These are the frontiers of China very few people in the West have a chance to visit, and/or may not even be aware of. These areas are much like the American West — beautiful blue skies, miles and miles of grassland, thousands and thousands of sheep, horses, and cattle. Wonderful experience, both professionally and personally.

Dr. Tien has been busy coordinating UMR’s online ME program since Dr. Grayson left in June 2007. The program has been growing steadily, and really took off since last year. This is probably the only program of its kind anywhere. We have nearly 80 people from all over the US participating in the program at the present time. We are trying to strengthen our curriculum by adding new courses in aggregate, computer application, and other related topics.

This is the fourth year for the Western Mining Safety & Health & Training Center at UMR, one of the projects in the Center is the understanding and control of diesel particulate matter (DPM) underground. Current MSHA regulations require underground M/NM mine operators to control diesel particulate matter (DPM) to 350 mg/m$^3$ of total carbon (TC) or less. Beginning May 20, 2008, mine operators must reduce miners’ personal exposure to DPM to or below 160 mg/m$^3$ of TC, quite a challenge for the industry. In addition to conducting workshops throughout the country and disseminating information, we are also modeling the dissipation of DPM exhaust after it leaves the engine exhaust pipe and conducting field work in active underground mines. The study is still on-going.

Interested in news about UMR and the Department? Do you want to get information fast? Would you like to receive job postings from around the country? Would you like to post an open position you have? If your answer is “yes” to one or all of the above questions, you need to add your e-mail address to the Mining Engineering Alumni List server. Getting added is a very simple procedure. Just send a note to either barb@umr.edu or mining@lists.umr.edu and ask to be added. It is as simple as that. Over the past years this list server has become an important tool for our alums. Even if you are not looking for a new position, or have one to post, it is interesting to see all the opportunities that exist in the industry.
Greetings from Dr. Worsey’s Bunker

Dr. Worsey/Paul took his first full sabbatical/development leave for 6 months last year and missed the fall semester at UMR. He was invited to stay in Brazil by the UFRGS Mining Department in Porto Alegre. Whilst there he mentored one of their young faculty, taught an undergraduate blasting class and a postgraduate blasting class, served on the committee of one PhD student and one MS student, helped them set up some blasting related research with industry and taught 4 short courses, one for CVRD in the Amazon and one for Brazil’s largest explosives company, Britanite, at their headquarters. He got to visit a lot of mines from a state of the art copper mine to third world amethyst mines. Paul not only got to travel all over Brazil, but also visited Uruguay and Argentina, and not everything was work, as you can see from the photos.

Paul and his wife Jill were hosted by Jair Koppe (UFRGS mining chair), Jean Philippe Costa (Director of UFRGS LPM), and Enrique Munarretti (mining engineer/consultant). Some of you may remember Enrique - he was a visiting scholar in 1999. He has recently taken a position as assistant professor at UFRGS after several years working in the mining industry.

Paul now has former graduate students teaching explosives and blasting on three continents, North America: Bin Lim at New Mexico Tech and Braden Lusk at the University of Kentucky, South America: Enrique Munarretti in Brazil and Asia: Tariq in Pakistan. Whilst he was away Tristan (his son and freshman in mining engineering) got to accept one of the last teaching awards from the school on his behalf.

Paul took a whole semester to catch up after he got back in January, and got caught up just in time for Explosives Camp. We ran two very successful explosives camps this year and got some great publicity (see the explosives camp article). The department has been getting a lot of positive attention and visibility due to the camp and other explosives activities on campus.

Paul’s wife Jill has been helping keep him straight since going to Brazil and most recently directed his office move back to the mining department. The move was made to be more available to the students and to be close to the explosives lab which is now operational in the old USBM building 4, about 2 to 3 blocks from McNutt Hall.

Late this summer Paul was called back to Brazil to head a team of blasting experts to trouble shoot problems at CVRDs’ Itabira iron ore mine. Whilst he was there he got to operate one of the largest and modern front end loaders in the world, a Le Tourneau L2350. It was an extremely neat experience and a very easy and automated piece of equipment to operate. See pictures.
News from Dr. Apel

The two projects Dr. Apel is currently working on are the MinSIM and the HRT-MM systems. The MinSIM is an augmented reality system with integrated hypermedia that is suitable for training underground miners in the basics of using a jackleg drill to install rock bolts. There are currently a number of different VR simulators developed for the mining industry, but no system addresses underground rock bolters using a manual drill. The MinSIM system consists of a blue room, which is at the VR Laboratory at McNutt Hall where the trainees can use real tools such as jackleg drill and scale bar. The moment the trainee puts on the hardhat with mounted camera, inertia cube, and Head Mounted Display he is able to see the virtual mine environment. The participant can now scale down loose rock, drill holes, and install rock bolts in the virtual mine environment.

Trainee (David Nutakor) in the Virtual Mine Environment.

The HRTMM stands for the High-Resolution Target Movement Monitoring system, which can be used to monitor sub-millimeter ground movements at both surface and underground mines. The currently available remote distance meters and distance change monitors mainly use phase change and time-of-flight techniques. The described monitor uses triangulation technique to track position of an optical spot projection and then image processing to measure mine wall movements. The system can be easily automated and poses no obstruction to mine traffic. The position of an off-normal laser spot will shift as the target wall moves. The theoretical accuracy and range of this system depends solely on the resolution and focal length of the camera used. The remote capabilities of the system make it uniquely suited to applications where monitoring is required in high-traffic, inaccessible, or unstable and dangerous areas of a mine.

Conceptual setup for monitoring slope stability using HRTMM system.
In June 2007 we hosted the 4th Explosives Summer Camps. From the beginning, the Explosives Camp has drawn a lot of attention and we have seen an increase in out-of-state applicants. We had 42 campers in the two camps and the majority were out-of-state. Campers came from thirteen States, including Hawaii. Other States represented were Arkansas, Maryland, Florida, Montana, Oklahoma, Illinois, Indiana, Georgia, Tennessee, Iowa, Kansas, Texas. The prize for the longest travel, if we had a prize for this, would have gone to the camper that came from Cairo, Egypt. His father is assigned to the American Embassy there.

We had a very broad media coverage this summer - including the Science Editor for The New York Times. The article ran in The New York Times just prior to July 4th and we were snowed under by e-mails and phone calls from all over the US about this camp. So far we have close to seventy five prospects that want to apply for the camps next year. When you consider that close to 70% of the campers apply to UMR, you can understand the excitement about this. Not all the applicants are coming to mining engineering, but most are adding the minor in explosives engineering to their major. We have students majoring in civil, electrical, mechanical, chemical engineering and several non-engineering students that are working on completing the requirements for the minor. With all this success, Paul Worsey and Barbara Robertson submitted an abstract to ISEE to present a paper at the 2008 Annual Meeting in New Orleans, LA. The paper entitled: “Explosives Camp - Insanity or Cold Calculation?” is accepted and will be presented in January 2008.

Oh yeah, one more comment. Next year we plan to have 3 camps - these camps will be in June 2008 and will be back to back. Maybe now you can understand the title of the paper.
FROM THE DEPARTMENT CHAIR - continued

Parsons Memorial, Consol Energy, Schaffer, Thor Gjeles-teen, and WAIMME. On behalf of the Department and the students, I would like to thank all of you for your generous contributions. The Department is strong and growing because of you!!

The availability of summer internships and permanent industry jobs after graduation has been a catalyst for retaining students in the program. The opportunities for students to be exposed to the industry (in real working environments) and to become aware of the several facets of the industry early in the program provide solid grounding and a firm conviction to students for the choice of mining engineering as a profession. To this end, I would like to encourage industry to provide summer internships to the freshmen students in Mining Engineering to ensure their early exposure to the industry. UMR graduated 22 Mining Engineering students in the 2006-07 academic year, with the following employer distribution: coal mining (6), aggregates and construction (6), metal mining (5), industrial minerals (3), US Military (1) and self employment (1).

The Department appreciates the efforts by industry in hiring these students because it sends a strong message about job availability and security after graduation to incoming students.

The Mining Engineering students have been our ambassadors and agents for retaining our students through a number of student organizations and activities. In October 2006, the Haunted Mine activities brought over 3,000 visitors to the mine and raised a net of $10,769.80 to support student activities. The 2006 Phonathon brought in $38,630.50 to support scholarships and other important Department activities. The Department appreciates the support of its alums for continuously supporting the phonathon. UMR was third in the 2006 SME-NSSGA Mine Design Competition at Denver, and the team is poised to recapture the championship in Salt Lake City in February 2008. At the 2006 Mucking Competition in Tucson, AZ, the Women’s Teams once again demonstrated their supremacy in the competition by placing first and third. The Men’s Teams took the 4th and 7th places in the competition, and I understand they are working on the survey component to ensure a minimal closure error. The two UMR Mine Rescue Teams competed with 14 other professional teams and placed 6th and 9th. Casey Slaughter, a junior Mining Engineering student beat the national champion to claim the prize for the Biomegan contest. The drive to involve freshmen, transfer and continuing students in the student chapters of SME, NSSGA, ISEE and WIM and the Mucking and Mine Rescue Teams is a strong force toward student retention. The involvement of the students in these activities opens their eyes to another dimension of the industry in terms of leadership, team and network building, and communication skills with competitive strength.

Faculty Renewal: The increasing enrollments and faculty retirements have resulted in significant challenges, including the need for additional faculty positions, facilities and scholarships. In the October 2006 Newsletter, I outlined how these challenges would be addressed within the framework of our strategic plan. We have been successful in attracting Dr. Kwame Awuah-Offei from Granite Construction. Dr. Awuah-Offei graduated with a PhD in Mining Engineering from UMR with the best graduate research award in 2005. He will be teaching Environmental Aspects of Mining, Mineral Processing and Computer-Aided Design (Surface Mining). We are in the process of hiring another faculty in the area of Explosives Engineering expected to join us in January 2008. This faculty will fill the position of a new faculty line created by Chancellor Carney and Provost Wray to promote the increasing demand for expertise and knowledge in explosives engineering. A third senior faculty will also be hired to join the team by August 2008 with expertise in mine health and safety and/or mineral and coal processing.

UMR Mining Engineering Development Board: The Development Board met on April 11, 2007 at UMR to discuss a number of core issues associated with Mining Engineering education and research. The Board consists of senior executives from industry, which meets annually to review, discuss and to offer concrete advice on the vision, the mission and strategies for advancing toward the target of excellence in research and education. The current membership includes Mr. Bruce Neil (President and CEO of Doe Run), Mr. Bryan Galli (President of Coal Sales, Peabody), Mr. Jerry Tystad (Director of Business Improvement, Powder River Coal), Chris Upp (Director of Operations, CONCO Quarries), Richard Marston (President, Marston & Marston), John E. Cramer (President, Casper Stolle Quarry), William Kennedy (President & CEO, Kennedy Metal Products), Robert C. Meskimen (VP & General Manager, Martin Marietta), Rob Vogel (President, Vulcan Materials – Midwest Division), Ed McCord (Product Manager – CAT Large Mining Trucks and Shovels), Dennis Kostic (President and CEO, Weir International), David Obergfell (VP Manufacturing West Coast, USG), Alan MacVicar (Director, Safety and Administration, Rinker Materials), Joe Mehl (District Engineering Manager, Kiewit), Michael McCall (CEO, TXU Wholesale), Bruce Jones (General Manager, Spring Creek Coal Mine of Rio Tinto), Neal Stanton (Nitrogen Product Manager, ORICA), Steve Lang (Executive VP & COO, Stillwater Mining), Paul Lang (Senior Vice President of Operations, Arch...
Coal), Roger Gagliano (VP Operations, Fred Weber), Terry Engle (Marketing Manager, P&H Mining), Greg Gajewski (Technical Manager, Goodyear).

The Board reviewed the summary of industry and alumni surveys on the UMR Mining Engineering curriculum. The Board members were completely satisfied with the technical content of the program and its impact on the careers of graduates from the program, as reflected in the surveys. These surveys are part of the quality data and information for the ABET accreditation process discussed below. One important outcome of the Board meeting was to involve industry in teaching the Mine Management course in the undergraduate curriculum. Effective Fall 2007, this course has been divided into (i) fundamental management principles and (ii) frontline supervision. The latter will focus on practical issues faced by frontline supervisors in the first five years after graduation and will be taught by industry. On behalf of the Department, I want to thank the Board members for their time, sacrifice and service they have given to UMR and to the Mining Engineering program.

ABET Accreditation of the Undergraduate Mining Engineering Program: The quality of the UMR Mining Engineering undergraduate program and its overall administration will be evaluated as part of the ABET engineering accreditation process in the Fall 2008. All accredited engineering programs in the US are evaluated at the end of every six years to examine in detail the program strengths and areas requiring improvements. As part of the continuous improvement process, many of our constituents (industry and alums) have been solicited for inputs on the quality and strength of the program and areas requiring improvements. The results of the surveys and the summary of industry thoughts clearly show the continuous maintenance of the program quality and its administration. Below are the thoughts from industry on UMR graduates.

Program Strengths: (i) technically strong program; (ii) great depth of summer experience; (iii) excellent work ethic with can-do attitude; (iv) good people; (v) good organizational skills; (vi) good problem solving skills; (vii) don’t mind to get dirty to get job done; (viii) good interpersonal skills; (ix) good leadership capabilities; and (x) a passion for the industry. Areas Requiring Improvements: (i) presentation and communication skills; (ii) economic and business sense of mining; (iii) project management skills; and (iv) leadership skills. On behalf of the Department, I want to thank our alums for being dependable and trustworthy for the cause of industry.

Program Capacity Expansion and Renewal: As previously mentioned, the main challenges facing the Mining Engineering programs as they expand include faculty, facilities and scholarships. In order to position the program toward the Vision 2010, the Strategic Plan outlines initiatives to create at least two industry endowed chairs in mineral and coal processing, mine health and safety, CTL and synfuels, and quarry engineering. These endowed chairs provide additional teaching and research capacity in areas relevant to industry. There is also a need to renew the teaching laboratories in rock mechanics, mine ventilation and mineral/coal processing laboratories. These equipment and facilities were put in place in the 1950s and they have outlived their useful purposes. The Experimental Mine continues to be used for teaching, research and for public education, with over 6,000 visitors in 2006. The mine facilities require renewal and refurbishing to create additional room to meet the demands of growing Mining Engineering programs. I have had the opportunity to meet several industry executives to invite them to partner with UMR for creating additional resources for building the required facilities to support a growing program for equipping tomorrow’s leaders for the industry.

UMR-UB Initiative: As part of its international academic cooperation, UMR entered into an agreement to assist the University of Botswana (UB) in developing its Mining Engineering program. Botswana is a mining country with the industry contributing about 80% of its GNP. As part of this cooperation, about 10 to 20 students will be provided with 3 years of fundamental science, engineering and humanities courses at UB and complete the last two years, with degree certification from UMR. The fundamental courses have been reviewed and approved by UMR as courses that meet ABET accreditation criteria. We are excited about this agreement because it provides opportunity for faculty and student exchanges that will introduce UMR to major diamond and other mining operations in Botswana and UB to mining operations in the US.

Faculty/Staff Achievements & Honors: Throughout the year, UMR Mining Engineering faculty and staff were recognized for their contributions to the profession. Dr. Derek Apel was promoted to Associate Professor with tenure. He also received the sustained SOMEER Teaching Award. Dr. Greg Galecki was elected to the Board for the Waterjet Technology Association. Dr. David Summers was awarded an honorary Diploma by Koszalin University of Poland and was elected a lifetime member of the Waterjet Technology Association. Mr. Jimmie Taylor, our Mine Supervisor, won the UMR-MSM Staff Person of the Year Award. Dr. Jerry Tien served and is still serving as a member of the Federal Panel on Mine Health and Safety. Dr. Paul Worsey also received the sustained SOMEER Teaching Award. Dr. Samuel Frimpong was appointed to serve as Associate Editor for the ASCE Journal of Energy Engineering.
As I conclude this review, I would like to salute the following for their great contributions to UMR Mining Engineering. (i) Chancellor Carney and Provost Wray for their support for the Mining and Nuclear Engineering Programs; (ii) faculty, staff and students for their tireless efforts in building and promoting UMR Mining Engineering; (iii) the Mining Engineering Development Board for its commitment to the Program; (iv) our industry partners who continue to provide internship and permanent job opportunities for our students; (v) our donors whose contributions continue to make affordable university education a reality to many students; (vi) our alums, whose hard work, contributions and excellence continue to promote the excellence of the program beyond the borders of this university; and (vii) all the retired faculty for their legacy in building UMR, which is a beacon of hope for the profession of Mining Engineering around the world. May our tireless efforts continue to push education and research frontiers for expansion and knowledge until we see the dawn of excellence!!

Samuel Frimpong
Chair and Professor
Robert H. Quenon Endowed Chair
Department of Mining and Nuclear Engineering

Greetings from the faculty of Mining Engineering
From left: Dr. Summers; Dr. Grayson; Dr. Saperstein; Dr. Frimpong; Dr. Apel and Dr. Galecki
Finally, we want to thank you for all your support during this past year. As you have seen in this newsletter, our students, faculty and staff are very active and new projects or events seem to come out of nowhere. However, all these activities help us to “produce” the best young mining engineer possible - and we see that we are on track by increased numbers of companies looking to us for their mining engineers. The formula we use to mix curriculum, student and professional activities is working and we will keep on track. You can be proud of your “Old School” and the new generation of mining engineers. At the Fall 2007 Career Fair thirty five companies were looking for mining engineers! We always have mining companies coming directly to the Department to interview - but we are overwhelmed by the numbers we had this semester. UMR mining engineers have an excellent reputation in the industry and we are committed to keep the tradition going.

The Faculty and Staff of the Mining Engineering Program

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