The Mining Engineer
The first MS&T-UMR-MSM Engineer Newsletter for the Mining Engineering Program
October 2010

Experimental Mine on Fire: The #1 Awesome College Lab in the United States according to Popular Science. Story on Page 19
A Message from the Chair

Rolla Mining Engineering currently has 9 full-time tenured/tenure track faculty members, one short of the critical 10 required to carry out the research and education mandate of the growing programs. The faculty members continue to distinguish themselves in their research, education and service mandate. Faculty research awards averaged between $2 and $4 million a year for the past five years. Dr. Awuah-Offei received the 2009 Outstanding Teaching Award from the Department. Dr. Baird received the Mines and Metallurgy Academy’s Senior Faculty Award and the Department Research Award in 2009. Dr. Frimpong is currently serving as a Member of the Board of Natural Resources and as a Co-Chair for the ASCE-UNESCO Committee on Emerging Energy Technologies. Dr. Ge received the 2010 Acoustic Emissions Working Group Fellow Award. Dr. Gillies was the Invited Keynote Speaker at Mine Diesel Emission Conference in Toronto (2008), Queensland Seals Workshop (2009), 9th International Mine Ventilation Congress in Delhi (2009) and as the 2005/09 Chair of Int. Mine Ventilation Congress Committee. Dr. Worsey received the 2009 S&T’s Faculty Service Award for his outstanding public education on safe explosive use.

Rolla Mining Engineering continues to be served by a strong Development Board comprising of 30 senior industry executives. The Board is very instrumental in shaping our graduates for industry. Through the support of donors, industry and alums, the Department offered an average of $180K per year in scholarships and financial aid to our students. This is significant given the financial difficulties faced by students. Rolla Mining Engineering maintains strong and active student chapters of the Society for Mining, Metallurgy and Exploration Inc., International Society of Explosives Engineers, National Sand, Stone and Gravel Association, and Women in Mining. Our students are also actively involved in Mucking, Mine Rescue and Mine Design Competitions. On behalf of the Department, I extend sincere gratitude to our industry partners and donors, whose contributions have made possible the professional and leadership training and development of our students through internships and coop opportunities and extra-curricular activities.

As we look toward the next decade, S&T must make strategic initiatives to become the global university of choice for mining engineering education, research and graduate employees for industry. The most important challenge in this process concerns limited capacity and space. Rolla Mining Engineering is working with its Board to raise over $5 million to renew and expand its capacity for growth. The $2.5 million investment in the new Experimental Mine Building will make available 15,000 square feet of space for major facilities and activities the program needs for growth. The $2.5 million investments in new laboratories in virtual surface and underground mining, materials handling and mine survey and the expansions in the rock mechanics, mine ventilation, explosives and mine health and safety, will create unparalleled world-class environments for Mining Engineering education and research. Additional faculty and scholarship are also essential in this process.

As we begin a new decade with hope, optimism and opportunities, I would like to thank our Board, alums, industry, faculty, staff and the Mines and Metallurgy Academy for their significant support in educating the future leaders of our industry. On behalf of the Department, I extend sincere gratitude to Paul Lang, Senior Vice President of Arch Coal, Bill Kennedy, President and CEO of Kennedy Metal Products and A. Bruce Neil, President and CEO for Doe Run for their leadership and outstanding contributions to this cause.

We are on the right track toward our vision of global pre-eminence. Let us therefore garner all our strength to focus on this important mission until, at the mountain peak, we can lay hold of this vision and proclaim Rolla as the best in the world. Thank you for your continuing support!! Rolla is counting on YOU!!

Samuel Frimpong, PhD, PEng, Professor and Chair and Robert Quenon Chair
Brief Background

Dr. Summers was an Indentured Apprentice in the National Coal Board before studying Mining Engineering at University of Leeds in 1962. He obtained his BSc (Class 1) in 1965 and PhD in 1968. He was hired as Assistant Professor at the University of Missouri-Rolla in September 01, 1968. He joined the Rock Mechanics and Explosives Research Center (RMERC) and was successively promoted to the rank of Curators’ Professor in 1980. During his career at Missouri S&T, he served 20 years as Director of RMERC. He was appointed as Curators’ Professor Emeritus in May 2010.

Dr. Summers’ legacy will be in the Stonehenge and Millennium Arch sculptures carved from granite (and which gave him a short appearance on the “Tonight Show with Jay Leno”), formation of the High Pressure Water-jet Lab (HPWL) and the students he has impacted during his career. HPWL researchers created a new room (the Omnimax Theater) under the Gateway Arch in St Louis, developed a full-scale plant for dismantling explosives from munitions for Army Ammunition Plants in Crane, IN and Hawthorne, NV. The high pressure waterjet technology has moved from an academic curiosity to a multi-billion dollar a year industry. From the high precision cutting of titanium and glass, to the removal of cancerous tissue, while leaving healthy tissue behind, the technology continues to grow in application. He has worked with energetic materials and the use of high-pressure waterjets for over 45 years. He recently co-founded the award-winning Energy Web site “The Oil Drum” in 2005, and “Bit Tooth Energy” in 2009.

Dr. Summers was a founding member of the Waterjet Technology Association (WTA) in USA and has served as President and Chairman of both its Board and the International Society for Waterjet Technology. He was honored as a Foreign Member of the Russian Mining Academy, an Honorary Professorship in China, an Honorary Diploma in Poland, and Distinguished Member of the American Society of Mining Engineers. He received the Pioneer Award of WTA in 1997, the only honorary Lifetime Member of WTA.

On behalf of the Department and the University, I congratulate Dr. Summers and his wife Barbara for their outstanding contributions to this University and the people they have served in several communities all over the world.

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

Phonathon 2010

Fall is coming to the Ozarks and that means the annual Mining Engineering Phonathon is coming up. Our students will work the phones from November 7 to 10, 2010. We hope you will take their call and continue your generous donations to the Department. Remember that all Phonathon donations will come to the Department. The Phonathon funds support scholarships, mucking and mine rescue, as well as the four student organizations.
Our Destination in the Next Decade

Missouri S&T recognizes that the “Mining Industry of the Future” will continue to face tough challenges, whose solutions will require highly qualified graduates and advanced research initiatives. The expanding global mineral markets will continue to increase the demand for highly qualified graduates. Missouri S&T is taking several bold initiatives within its core mission for the next decade to provide relevant solutions to industry needs. The “State of Excellence” that should guide our collective effort must focus on excellence in education and research, availability of resources and facilities, and strong networks of alumni, industry and our global partners. To this effect and within the context of our core mission, Missouri S&T will be recognized as the global university of choice for mining engineering education, research and graduate employees for the mining industry within the next decade. Our vision of global leadership will be achieved by paying attention to the seven core values of Excellence, Ethics, Experience, Exposure, Leadership, Passion, and Tradition that form the basis of our tradition of excellence.

In the pursuit of excellence and global leadership in Mining Engineering education and research, the following strategic objectives will provide impetus as guiding principles.

Maintain Mining Engineering at Frontiers of Education and Research: Pursue initiatives to strengthen Mining Engineering as the global program of choice.

Enrich the Student Experience: Provide well-diversified environments, with currency in technology, to produce highly qualified graduates for industry, academia and other employers.

Broaden Mining Engineering Research: Mining Engineering research will be advanced using fundamental and applied research initiatives via individual efforts and collaborative partnerships.

Expand S&T's Mining Engineering Capacity: Expand and create additional resources and facilities to match capacity expansion initiatives.

Strengthen National and Global Partnerships: Engage national and global universities, industries and organizations as partners in education and research.

Your continuous support, counsel and dedication to Rolla Mining Engineering will undoubtedly lead Missouri S&T to scale this height of Excellence. Rolla will always be grateful for your contributions. Let’s dream together in this pursuit of excellence.

DR. HARYI ERTEN RE-DISCOVERED

By Dr. Greg Galecki

On his trip to visit the Department of Mining Engineering at the Dokuz Eylul University in Buca/Izmir, Turkey, during August 2010, Dr. Galecki met with Dr. Hayri Ertan, a former Mining Engineering Department Chairman at UMR.

Dr. Ertan and his wife Sevim are living in Norfolk, Virginia US during the off-summer months to be close to their daughter Mujde and her family. The family enjoys the beauty of their native Turkey city of Cesme during the summer.

The visit was arranged with the help of Dr. Sezai Sen and Dr. Gul Akar, the post doctoral fellows who will join our department and the Rock Mechanics and Explosives Research Center in early October 2010 to work on mineral processing projects.

Though the visit was scheduled as a short drop-in during lunch break, it went well beyond the scheduled time as we were remembering Dave Summers, Jerry Tien, Paul Worsey, Norm Smith, Stewart Gillies and many others.
Missouri S&T has a strong interest in the health and safety of miners all over the world. This can be seen through the mine rescue teams that our University supports. As of now, we have nearly 30 members - all students. These members come together every year to create two underground competition teams. The students are highly trained in the exploration, first aid, and proper care of the equipment used. The student teams test their skills against the best professional teams in the United States twice a year. Not only do they test their skills, but the last couple of competitions a Missouri S&T Team has placed in the top five three times. Twice they placed fourth. This shows the time and the commitment made by these young men and women, who care about the health and safety of the miners of today and the future. Missouri S&T was the first University with a mine rescue team. Three other universities have followed our lead: CSM, UK and Penn State.

The 2010 International Intercollegiate Mining (Mucking) Competition was held in Kalgoorlie, Australia. Four teams represented Missouri S&T. Forty-one teams, plus two alum teams, registered for the competition. Twenty-six men’s teams, three women and twelve co-ed teams showed their skills in mucking, gold panning, hand steeling, track stand, surveying, jack leg drilling and swede saw. Our Co-Ed team defended their US title by placing 2nd. The S&T Lady Muckers placed 3rd. S&T Muckers # 1 tied with Mackay for 5th place - the best US men’s teams.

The teams want to thank all of the generous donors that helped to make this trip possible. The teams spent a day in Sydney and then had several days in Perth before traveling to Kalgoorlie. Paul Worsey and Barbara Robertson traveled with the teams. Samuel Frimpong and Stewart Gillies met the teams in Kalgoorlie.

The 2011 competition will be hosted by Mackay School of Mines in Reno, Nevada, and will be in the middle of March.
Greetings from the Experimental Mine: Jimmie and DeWayne are still there. Our summer was busy with preparation of the new mine building site. As you see on the right, we have a new fence and gate. This is a good face lift for the mine entrance. We had 3 sessions of summer explosives camps - that makes fourteen camps total. Camp# 2 set the trees next to parking Lot M on fire during the grand fireworks show n Friday night. We always have the fire truck on stand by. The grounds crew said they did not like the trees anyway.

The 2009 Mine Rescue Competition was held on September 29, 2009. Fifteen teams from around the country participated. Doe Run placed 1st for the 4th time in a row. Our teams came in 4th and 14th. Casey Slaughter came in 1st in the team trainer competition.

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Jimmie turned 60 in January 2010. Since his first grandson’s birthday is on the same day, we don’t talk about that. We only speak of Gage’s (grandson) 1st birthday. A very proud grandpa, if you can’t tell. Another grandson was born in April. This makes a total of 4 in the Taylor clan of grandchildren.

DeWayne’s son had a 10 and 2 football season last year with the most exciting last game (4 over times). We have never seen that. This is the last year for high school football. Next year we will need to watch more of the Miner games.

A donation to the Experimental Mine.
A John Deer 555G with a 4 way bucket was a great addition to the fleet of equipment at the mine. We are using it on the new building site. Jimmie still has problems with the “non-existing” steering wheel.

If you are in the Rolla area, give us a call 573-341-6406, or email Jimmie jtaylor@mst.edu or DeWayne phelpscd@mst.edu.
The S&T student chapter of Society of Mining, Metallurgy, and Exploration would like to introduce the 2010-2011 officers: President: Ryan Sinclair, Vice-President: Mike Shuman, Secretary: Benjamin Sutton, Treasurer: Will Thompson. We started out the last year with a Kickball Social. We do this at the beginning of the fall semester to catch up with everyone after the summer and have an opportunity for new members or potential members to meet everyone. This was such a great success that this year we are having an “All Society Kickball Social”. Each month we have several students attend the St. Louis Sectional SME dinners as well. This is a good opportunity for students to meet industry members and network. The SME student chapter also hosted a caving trip to a cave located in Meramec Springs Park outside of Sullivan, MO. The trip was a lot of fun and everyone saw some neat formations. We also participated in the annual Haunted Mine, which helps fund our trip to the National SME Conference. This is always a success and last year was no different. For this, the Experimental Mine is transformed and is open to the public. The Haunted Mine benefits all the societies and is the biggest fundraiser for them. This year we have already kicked things off by forming committees, creating a new mentor program, and preparing for the upcoming membership drive. Last year’s membership drive brought in over 30 new members, and this year we hope to exceed that mark.

It has become a tradition for S&T to attend the P&H/Joy Mining Reception and take the group photo.

Worsey dubbed honorary knight by St. Pat

Paul had the honor of being knighted at the St. Pat’s coronation. The students lead by Matt Coy stepped up to the plate and completely ran the pyrotechnics, as Paul was now part of the pageant. In every successive coronation since we started the pyro has been stepped up and this was no exception, with new elements added, including a huge waterfall. Our students made St. Pat look like a rock star and he dubbed Paul “Sir Pyro.” A great job by the students and quite an honor for Paul who looked pretty dapper in his tax. It was by far the best St. Pat’s coronation so far. On Saturday Paul got to ride in the parade in a corvette and sling beads in his honorary knights regalia.
Missouri S&T is home to the first student chapter of the International Society of Explosives Engineer. We are the largest student chapter and that allows us to maintain a significant presence at conferences, usually between twenty to thirty students. In February 2010, many students attended the Annual Conference in Orlando, Florida, where three of our students gave presentations. Tristan Worsey and Jacqueline Berendzen presented papers on their summer internship experiences, and Phillip Mulligan presented on his graduate research. This year, nine students received scholarships from ISEE. A small group of students also attended “Best in the West” in Spearfish, South Dakota. Two S&T students presented at this conference. Jacqueline Berendzen about her summer internships and Dominique Nolan about his graduate research. Our continued presence and involvement is greatly appreciated by the hosting chapters, and Missouri S&T is being considered for the scholarship list. This year, we will be sending students to Mid-America conference at the Lake of the Ozarks, the 2011 Annual Conference in San Diego, California, and “Best in the West” in South Dakota.

ISEE hosts many student functions during the year including firework shows for campus events, “Blow Stuff Up Day” fund-raiser event, float trips, and bonfires. Universal Challenge Center ropes course, Guy Fawkes Day, and joint society gatherings are a few new events we are planning this year. ISEE is also sponsoring guest speakers from Davey Bickford and Orica. Both presentations will involve equipment used in industry and it is essential for students to learn about these. Missouri S&T ISEE’s website is in the works and we will enter the “Best Website competition” for the 2011 Annual Conference.

Explosives Engineering Masters

In April the Explosives Engineering Masters was approved by the State Coordinating Board for Higher Education and finally became a reality, just in time for two students who were almost ready to defend their dissertations and have since completed their requirements for graduation. They are Nathan Rouse and Charles Zdazinsky. Nathan works for an engineering consulting firm in Kentucky and Charlie has been snapped up by Orica. Our goal is that the Masters program provides the technical expertise and new blood to replace the aging technical and managerial workforce in the explosives industry, which is of critical importance to mining. With the word getting around enrollment is starting to snowball, with a significant number of people enrolling in the graduate certificate program to get started on courses and give them time to get their formal application for the masters program submitted and reviewed. The masters program is fully sustainable with good growth in courses, with 11 separate courses being offered this year, without counting special problems and research. Five of these classes are offered distance and we are hoping to expand that substantially in 2011. We are currently working with USAEC (the engineers) at Fort Leonard Wood to make the masters available to the military engineers, which we hope will bring many of them into the industry when they exit the military.
Dr. Kwame Awuah-Offei (Dr. Kwame) has had fruitful year. Teaching, research, and outreach activities have all shown positive results that auger well for the future.

Kwame has been conducting research to map CO₂ emission rates on reclaimed mine land. The effort is to help regulators and mining companies to better evaluate reclaimed mine land prior to development for post-mining land uses. This is part of the effort to better understand and mitigate CO₂ accumulation in homes built on reclaimed mine land with mineral carbonates and acid mine drainage. Other research areas include modeling and optimization of mining systems, design and management of sustainable mining systems, mining equipment performance evaluation, and earthmoving equipment-formation interactions. Kwame joined the Rock Mechanics and Explosives Research Center as a research associate and continued to be involved with the Mining Optimization Laboratory at the University of Alberta, Canada.

### Active research grants

<table>
<thead>
<tr>
<th>Project title</th>
<th>Sponsor</th>
<th>Project #</th>
<th>PI:</th>
<th>Co-PI:</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂ Flux Delineation for Construction on Reclaimed Mine</td>
<td>Office of Surface Mining, Reclamation and Enforcement</td>
<td>S09AC15437</td>
<td>Kwame Awuah-Offei</td>
<td>Alfred J. Baldassare</td>
<td>08/01/09-05/01/11</td>
</tr>
<tr>
<td>Reducing Energy Consumption &amp; Carbon Footprint through Improved Production Practices</td>
<td>Illinois Clean Coal Institute</td>
<td>10/ER9</td>
<td>Kwame Awuah-Offei</td>
<td>David Summers</td>
<td>01/01/2010-12/31/2010</td>
</tr>
</tbody>
</table>

Even though the bulk of Kwame’s research activity still involves graduate research assistants, he continues to seek ways to introduce more undergraduates and K-12 students to mining and mining research. Last year, Kwame mentored two mining engineering undergraduates (Justin Higginbotham and Neil Rapp) to do research with funding from the University’s Opportunities for Undergraduate Research Experience (OURE). Both students did excellent work. Justin presented his work at the University of Missouri Undergraduate Research Day at the Capitol in Jefferson City. Starting September, the OURE program is funding two new mining engineering students to do research with Kwame. The OURE Fellows program is funding one mining and three mechanical engineering students to do interdisciplinary research with him.

### OURE projects

<table>
<thead>
<tr>
<th>Student(s)</th>
<th>Project title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neil Rapp</td>
<td>Non-carbonates’ effectiveness at neutralizing acid without producing CO₂</td>
</tr>
<tr>
<td>Justin Higginbotham</td>
<td>Comparing impact and compression crushers for product finishing in Missouri limestone quarries</td>
</tr>
<tr>
<td>Scott Miller</td>
<td>Mine-to-kiln linear programming optimization of cement production</td>
</tr>
<tr>
<td>Josh Cole</td>
<td>Estimating mining truck and shovel system reliability</td>
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<tr>
<td>Emily Briggs, Luke Jones, Mathew Ortel, Chris Vincent†</td>
<td>Mine exploration platform‡</td>
</tr>
<tr>
<td>Mechanical engineering student</td>
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</tr>
</tbody>
</table>

‡ Kwame will co-advertise this project with Dr. Douglas Bristow, Mechanical Engineering.

Over the summer, two Missouri high school students (Seung Hee Lee and Meredith Bradley) joined his research group as part of S&T’s Summer Research Academy. The students participated in university level research in mining. This was particularly interesting because they both had no prior mining experience or knowledge. Seung Hee and Meredith were considering engineering and biochemistry, respectively, when they joined the group. It is too soon to tell if we changed their mind completely. However, we know they are thinking about it.
With respect to teaching, Kwame is offering Surface Mine Design (one of the new additions to the curriculum) for the first time this fall. Thanks to Gemcom Software International, we have 60 seats of Surpac and MineSched, and 50 seats of Whittle for teaching this course. We have 54 students registered in surface mine design! The reaction we get from mine planning software vendors when we ask for 60 licenses is always one of shock. Kwame thanks Vulcan Materials and Newmont Mining for committing to have mine planners present in this class. Kwame also appreciates the help of Missouri Department of Natural Resources (Dam & Reservoir Safety and Land Reclamation programs), Fred Weber, Capital Quarries, and Vulcan Materials for providing personnel to present to students in the environmental aspects of mining class, in the past. The presence of industry presenters in our classes keeps the issues contemporary and motivates the students, because they see the application of what they are learning.

With this new course and its partner class (Underground Mine Design), the Department intends to address one of the shortcomings that have been pointed out to us – computer aided mine design skills. Our students should be more marketable with these additions.

Finally, Kwame is making connections with area high schools to educate students on mining engineering. Kwame has been collaborating with Project Lead the Way (PLTW), a non-profit that promotes engineering education at the K-12 level, in this direction. PLTW helps identify high school “engineering” teachers that are interested in visits from Kwame. This past year, Kwame visited McCluer North and McCluer South-Berkeley High Schools in North St. Louis County. We aim to engage some of these students by introducing them early to mining engineering. Most of the high school PLTW curricula is geared toward civil and mechanical engineering and do not expose these potential recruits (these are students with an interest in engineering since PLTW classes are electives) to mining engineering.

One of the strengths of Rolla mining engineering has always been the opportunity for students to specialize in different aspects of mining. We are taking steps to maintain this strength. It is our hope that the work in sustainable mining practices and mine design and planning will grow to augment other well-established aspects of mining at Rolla.

**Bismark Osei** is conducting research to better predict dredgeability of compact aggregates by hydraulically actuated clamshell dredges. His research includes both field experiments with a 16 yd³ clamshell dredge and computer modeling of the dredging action. He determined work done by the pistons and the motor energy consumed during dredging from the field data. His computer model simulates the work done by the pistons and has been used to study the effect of cycle time (which is set by the operator prior to the cycle) on the work done. The research work will help prevent aggregate companies from acquiring non-performing dredges. It will also help dredge operators to run hydraulic clamshell dredges better. University of Missouri Research Board sponsored the research. Rohr Corporation and Concrete Nor’West provided in-kind support. Bismark has been busy presenting his results. His SME Annual Meeting presentation was streamed live on the internet as part of SME’s experiment with streaming interesting sessions. His poster at the S&T Graduate Research Showcase was judged the second best in his session.

**Moagabo J. K. Mathiba** is modeling soil carbon dioxide (CO₂) flux generated by acid mine drainage (AMD) neutralization reactions with limestone on reclaimed mine land soils. Using geostatistical techniques, specifically semi-variogram modeling and kriging, the research will develop an optimal soil CO₂ flux sampling protocol for use in assessing the risk for CO₂ migration into structures at specific sites of interest. Parallel with flux sampling protocol, the research will also develop stable isotope sampling protocol to identify the sources of CO₂ using carbon isotope ratios. The outcome of the research will enable accurate and cost effective assessment and prediction of CO₂ concentrations that can be expected to accumulate in building structures erected on or near reclaimed coal mine spoils and or pinpoint specific hotspots on such parcels of land. The result s of the research can be part of the final stages of reclamation plans. It can be used for assessing the suitability of newly reclaimed mine land for residential/commercial use, conditional use with mitigation or exclusion as a final post-mining land use.

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**Dr. Awuah-Offei** is the OURE Coordinator for mining engineering. Justin Higginbotham, senior, participated in the annual Legislative Day in Jefferson City, Missouri, and displayed a poster about his OURE Project.
A New Curriculum for a New Generation

In preparation towards the 2008-09 ABET accreditation process, the Chair and the Faculty undertook a major quality audit of the B.S. degree in Mining Engineering based on the fundamental requirements of engineering education, professional engineering practice, industry trends, relationships with government and financial organizations, regulatory departments, and the public. Extensive consultations were carried out with undergraduate students, Development Board and alumni through comprehensive surveys. One of the major outcomes of this major ABET process was the development of a new B.S. degree curriculum to incorporate mine design, communication, ore reserves and soils. Table 1 summarizes the strengths of the new curriculum.

<table>
<thead>
<tr>
<th>FOCUS AREA</th>
<th>NEW COURSES IN THE NEW CURRICULUM</th>
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<tbody>
<tr>
<td>Mine Design</td>
<td>Two new courses, Mi Eng 225 (Surface Mine Design; 3 hours) and Mi Eng 235 (Underground Mine Design; 3 hours), will focus on geomechanical, geometric and computer-aided mine design. Emphasis is placed on designing safe, efficient and economic surface and underground mine layouts. Students will become familiar with the use of a commercial mine design software early in the curriculum.</td>
</tr>
<tr>
<td>Knowledge of Soils</td>
<td>A new course, Mi Eng 332 (Soils and Overburden Materials; 2 hours), focuses on soils and overburden characterization, failure Modes and soils slope stability, waste dumps, tailings and earth dams, and foundations for heavy mining machinery.</td>
</tr>
<tr>
<td>Capstone Design</td>
<td>A new course, Mi Eng 392 (Mine Design Project I; 1 hour), adds efficiency for executing the requirements of Mi Eng 393 (Mine Design Project II). Course allows students to build project teams, acquire drill hole data and information, set up data base in appropriate design environment and develop project schedules in the semester immediately preceding Mi Eng 393.</td>
</tr>
<tr>
<td>Ore Reserves</td>
<td>Four courses have been revised to cover ore reserves broadly in the curriculum – sampling theory and methods in Mi Eng 221 (Mining Exploration); drill hole data review and analysis, database management and conventional methods in Mi Eng 225; parametric statistics and introductory geostatistics in Mi Eng 225 and geostatistical methods in Mi Eng 392.</td>
</tr>
<tr>
<td>Communication</td>
<td>A new undergraduate seminar has been introduced to allow students to make presentations to their peers. In addition to the technical presentations and comprehensive written report requirements in Mi Eng 393 and requirements in other courses, students have greater opportunities to improve their communication skills in the new curriculum.</td>
</tr>
</tbody>
</table>

### 2010 Student Awards

**Professional Leadership**
- Amanda Kimbel
- Brianna Drury

**External Relations**
- James Hawkins

**Student Recruiter**
- Bobby Austin
- Jessica Austin

**Student Activity**
- Maggie Hettinger
- Chairman’s Award for Good Citizenship
  - Casey Slaughter
  - Chris Searing

**Congratulations!**

### High GPA Freshmen
- Cody Lewis
- Alexander Carter

### High GPA Sophomore
- Jessica Stacy

### High GPA Junior
- Michael Allen

### High GPA Senior
- Neil Rapp

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**Worsey receives on line teaching award**

In April, Paul received an “outstanding teaching award of excellence” for online teaching from Henry Wiebe, the dean of global learning at Missouri S&T. This is the top distance teaching award on campus. He has received this award once before in 2006 and two outstanding teaching commendation awards in 2005 and 2009. Paul has no clue to his success with his distance classes, “I guess the distance students like my style and practical attitude,” he says. The explosives program currently offers 5 distance classes, 3 of which are taught by Paul, in conjunction with on campus offerings.
Expanding the Strength of Our Faculty

Over the past three years, faculty renewal and expansion have been given a serious consideration as part of the capacity renewal efforts. Three faculty members were hired to replace retirees and two were added to expand the faculty complement from 7 to 9. Efforts are currently underway to justify the recruitment of a tenth faculty to bring the faculty strength to a critical mass to handle the education and research mission of the S&T Mining Engineering programs. A complement of 10 faculty members provides S&T a position of strength to execute the current strategic plan for attaining our vision of global leadership in mining engineering research and education. The table below shows the highlights of the major research and teaching areas of the five faculty members hired over the past three years.

<table>
<thead>
<tr>
<th>Faculty Member</th>
<th>Position/Title</th>
<th>Research Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Kwame Awuah-Offei</td>
<td>Assistant Professor</td>
<td>Computer-Aided Mine Design, Mine Environmental Engineering, Systems Life Cycle Modeling, Dredging Mechanics, Excavation Engineering, Geostatistics</td>
</tr>
<tr>
<td>Dr. Jason Baird</td>
<td>Associate Professor &amp; Asst. Director, RMERC</td>
<td>Explosive-Resistant Structures, Energetic Materials, Advanced Composite Materials Explosive Taggants, Explosive-Driven Pulsed Power</td>
</tr>
<tr>
<td>Dr. Grzegorz Galecki</td>
<td>Associate Professor</td>
<td>Mineral-Coal Processing by Waterjets, Nanotechnology, Reconfigurable Systems and System Integration</td>
</tr>
<tr>
<td>Dr. Maochen Ge</td>
<td>Associate Professor</td>
<td>Rock/Soil Mechanics &amp; Ground Control, Acoustic Emissions, Geostatistics and Numerical Modeling</td>
</tr>
<tr>
<td>Dr. Stewart Gillies</td>
<td>Union Pacific - Rocky Mountain Energy Professor &amp; Interim Director, RMERC</td>
<td>Underground Mining Methods Mine Atmospheric Control Mine Economics Mine Health and Safety</td>
</tr>
</tbody>
</table>
Worsey receives service award

On the February 1, 2010, at the university awards banquet, Paul received the 2009 Faculty Service Award “in recognition of notable contributions in service to Missouri S&T and the profession.” He received it principally for the countless amount of publicity he has brought the university not only in the state of Missouri on the TV and national newspapers, but also internationally. Highlights of which Include the front page of St. Louis Dispatch May 7, 2005, front page of New York Times Science Times July 2007, the International Herald Tribune July 2007. The Detonator series shown on Discovery Channel throughout the world aired January 2009, all firsts for the campus.

Strategic International Partnerships

One of the goals under Strategic Objective #5 (within the 2010-20 Strategic Plan) is for S&T to become a leading US institution for international cooperation in mining engineering education and research. Rolla Mining Engineering is currently pursuing several initiatives with universities and research organizations around the world toward this objective. Rolla currently has agreements with several universities in Australia, Botswana, China, Ghana and Brazil. The partnership with the University of Botswana (UB) has gained traction with the second batch of 19 students joining S&T in Fall 2010. The picture shows all of the S&T-UB students at a luncheon hosted by International Affairs. The first batch of students of 14 will graduate in May 2011. S&T is currently examining opportunities to collaborate with the National University of Singapore (NUS) using the S&T-UB model. Singapore is a technology base for the industry in Malaysia, Indonesia, Vietnam and the Philippines, and is looking forward to becoming a Mining Engineering powerhouse in the Far East. Discussions are ongoing with the NUS, Metals, Minerals and Materials Technology Center (M3TC) of NUS, Economic Development Board (EDB) of Singapore and Peabody Energy on initiative.

International Affairs hosts Luncheon for S&T-UB Students
Update from Rock Mechanics and Explosives Research Center
Interim Director Dr Stewart Gillies

The last year was one of major changes for the Center. Dr Gillies was appointed as Interim Director from mid 2009. Major staff and faculty changes also occurred. Dr Summers gave notice of his planned retirement from Missouri S&T. He accepted the appointment as Emeritus Curators Professor and continues his active association with the Center. A number of new faculty is associated with the Center and many relocated their graduate students into Center offices. Current faculty are listed.

<table>
<thead>
<tr>
<th>Faculty Members</th>
<th>Academic Dept.</th>
<th>Titles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdel Salem, Mohamed</td>
<td>Geology</td>
<td>Senior Research Investigator</td>
</tr>
<tr>
<td>Awuah-Offei, Kwame</td>
<td>Mining Eng</td>
<td>Associate Investigator</td>
</tr>
<tr>
<td>Baird, Jason</td>
<td>Mining Eng</td>
<td>Research Associate</td>
</tr>
<tr>
<td>Chellappan, Sriram</td>
<td>Computer, Elec.</td>
<td>Associate Investigator</td>
</tr>
<tr>
<td>Eckert, Andreas</td>
<td>Petroleum Eng</td>
<td>Research Associate</td>
</tr>
<tr>
<td>Galecki, Greg</td>
<td>Mining Eng</td>
<td>Senior Research Investigator</td>
</tr>
<tr>
<td>Ge, Louis</td>
<td>Civil Eng</td>
<td>Research Associate</td>
</tr>
<tr>
<td>Ge, Mao-Chen</td>
<td>Mining Eng</td>
<td>Research Associate</td>
</tr>
<tr>
<td>Gertsch, Leslie</td>
<td>Geological Eng</td>
<td>Senior Research Investigator</td>
</tr>
<tr>
<td>Gillies, Stewart</td>
<td>Mining Eng</td>
<td>Senior Research Investigator</td>
</tr>
<tr>
<td>Hogan, John</td>
<td>Geology</td>
<td>Research Investigator</td>
</tr>
<tr>
<td>Maerz, Norbert</td>
<td>Geological Eng</td>
<td>Senior Research Investigator</td>
</tr>
<tr>
<td>Nygaard, Runar</td>
<td>Petroleum Eng</td>
<td>Research Associate</td>
</tr>
<tr>
<td>Summers, David</td>
<td>Mining Eng</td>
<td>Senior Research Investigator</td>
</tr>
<tr>
<td>Tien, Jerry</td>
<td>Mining Eng</td>
<td>Research Associate</td>
</tr>
<tr>
<td>Volz, Jeffrey</td>
<td>Civil Eng</td>
<td>Research Associate</td>
</tr>
</tbody>
</table>

The Center includes faculty (Dr Baird and Dr Volz) and graduate students housed in Missouri S&T Building 4 (an old Bureau of Mines building) who are conducting Blasting Research.

Research accesses funding from a number of areas. Examples include Clean Coal, Energy, NIOSH with current contracts with DOE, OSM and NIOSH and geotechnical issues of high pressure water jet and explosives research with current contracts with DOE; Abrasive Waterjetting with KMT; Boeing; Impact Technology; Office of Naval Research; Explosives Research with the US Air Force; Homeland Security; Babcock & Wilcox; Applied Research Associate, Inc; the Fort Leonard Wood Institute, MODOT/UTC, NSF and SGER. New areas of research are mine ventilation funded by NIOSH. Activities continue in establishing the mineral-processing Lab within the Center.

The RMERC Waterjet Laboratory recently acquired a new ultra high pressure 90,000 psi high pressure pump for advanced titanium machining projects carried out jointly with the S&T Center for Aerospace Manufacturing Technologies.

2010 Old Timers Award

The recipient of the 2010 Old Timers Award is Jill Groeblinghoff. Jill worked several summers in the coal industry and is now with CONSOL Energy. Dennis Kostic, President of Weir International Mining Consultants, presented Jill with the Old Timers Watch at the Annual Student Awards Banquet.
KEA88 - The Rolla Brand
Rolla Mining Engineering strongly emphasizes the importance of internship and cooperative programs in its total quality education of graduates. The Rolla Brand, KEA88, has been crafted from the three dimensional ingredients of Knowledge, Experience and Attributes (or Behaviors) for preparing graduates who are job ready after graduation. To be job ready after graduation, a graduate must score a minimum job readiness factor (JRF) rating of 80%. The maximum contribution from education (K-Value) is 50% (with 40 – 50% range). A student who graduates with a cumulative GPA $\geq 3.00/4.00$ receives the maximum 50% K-Value, and a student with a cumulative GPA between 2.00 and 2.50/4.00 receives the minimum 40%. The K-Value for any cumulative GPA between the lower and upper ranges is linearly interpolated between 40 and 50%. Experience (E-Value) from internships and cooperative opportunities contribute a maximum of 30% (with zero – 30% range). A student who completes at least 2 summer internships or one cooperative opportunity receives the maximum E-Value of 30%. Attributes (or Behaviors) contribute a maximum of 20% (with zero – 20% range). The Attributes (A-Value) is assigned based on the communication, leadership, human relations and organizational skills, as well as hard work, sense of duty and the passion of a graduate for the industry. These ratings have been developed from our extensive discussions with the companies that hire our students and with the Board. They capture the essential knowledge, qualities, and skills set that put graduates on the success trajectory from Day 1. It is important to note that a student graduating with a cumulative GPA of 4.0 with no internship is not job ready, while a student with a cumulative GPA of 2.0/4.0 with internship could be job ready.

The average for Rolla since we started measuring the JRF factor is in the range of 85 – 93%. Rolla’s goal in this area is to achieve a 95% average with a minimum of 88% in the next decade. A number of initiatives must be taken in concert with our industrial partners to achieve this goal. These initiatives include (i) 100 % internship or cooperative placement of the Freshmen Mining Engineering students; (ii) critical understanding by our students on the significance of internships and cooperative education in the training and education; (iii) aggressive pursuit of placement opportunities by our students; (iv) marketing our students in industry; and (v) preparing Rolla students to contribute towards the bottom line of industry as interns. Again, Rolla is grateful to our industry partners for the internship and cooperative opportunities. Rolla deems this as a privilege and cherishes our future partnership with industry.

![THE ROLLA BRAND – KEA88](chart.png)

- **Knowledge**
  - GPA: $2.0 - 2.5/4.0 = 40%$
  - GPA $\geq 3.0/4.0 = 50%$

- **Experience**
  - 2 Interns/1 Coop = 30%
  - 0 Intern/0 Coop = 0%

- **Attributes:** (0 – 20%)
  - Communication Skills
  - Leadership Skills
  - Human Relation Skills
  - Organizational Skills
  - Hard Work + Sense of Duty
  - Passion for Industry
Expanding Facilities and Infrastructure for Mining Engineering Education

Physical facilities and infrastructure are required to sustain the growth and expansion of the Mining Engineering programs. This need was articulated in the program quality audit carried out in preparation for the 2008-09 ABET accreditation process. This was subsequently discussed at the Board meetings in 2008 and 2009 and was launched in the capacity renewal conference in Fall 2009. Under the capacity renewal scheme, a new $2.5 million, 15,000-square foot Experimental Mine Building is being constructed to provide a 180-seat classroom capacity, space for three labs, mine rescue and mucking stations and an information center to provide relevant information on mining to the public. Photos below show the groundbreaking ceremony for the new Experimental Mine Building.

Breaking Ground for the New Experimental Mine Building at Missouri S&T

The mine ventilation, rock mechanics and explosives labs will be expanded to cater for the increasing research and education capacities. New laboratories will include a virtual surface (below) and underground mine, mine survey, and mine health and safety laboratories. On behalf of the Department, I want to thank Bill Kennedy and Kennedy Metal Products, Bruce Neil and the Doe Run Company, John Eaves and Paul Lang of Arch Coal, Chris Curfman and Janpeter Bekkering of CAT Global Mining, Greg Lang and Barrick Gold North America, Michael DeCola and Mississippi Lime Company for their major contributions towards the capacity expansion initiatives.

Future Virtual Surface Mining Laboratory
Update from Dr. Tien

Dr. Tien received a 5-year $1.25 M NIOSH grant to study mine fire and fire simulations. The goals for this grant are to further understand the occurrence of mine fires, their impacts on local and global ventilation network, and firefighting methods. Another goal for this project is to cultivate the next generation of ventilation engineers in anticipation of the retirement of current mining faculty in the next five to ten years nationwide. To that end, the program has been quite successful in recruiting four very competent graduates with diverse experience and expertise. Dr. Stewart Gillies is the Co-PI for this project.

The project has also introduced a new course (Mine Ventilation and Fire Simulation) co-taught by the two investigators (Tien and Gillies) in the Spring Semester 2010. In addition, the Group attended a 12-day Ventgraph training short course in Krakow, Poland, in early August 2010.

Jerry Tien has served as the faculty advisor for the Chinese Student and Scholar’s Association for the past ten years. He has also assisted the campus to recruit overseas and has traveled several times with senior administrators in China, Hong Kong, and Taiwan, and has been successful in facilitating exchange visit, hosting visiting scholars, and bringing in students. With the campus’ increasing emphasis on globalization and international collaboration, he was asked to take up an official role in this regard and starting in fall 2010, Jerry will be the senior faculty liaison in China. His first trip in this new capacity will be with Chancellor Carney and Vice Provost Jay Goff in late October.

Over the past four years, Jerry has been running the Western U.S. Mine Safety and Health and Translation Center. This training center is funded by NIOSH with an annual budget of nearly $750,000.00. In collaboration with Colorado School of Mines and University of Utah, the Center has 12 safety training projects (hazard identification and risk assessment for small mines, DPM emissions control workshop and safety training, fundamentals of mine ventilation, DOD training, mine rescue computer simulator, coal mine bump training, etc.) Over the last five years, over 530 trainees have attended the various programs.

This is the ninth year for our online ME program and it is doing very well. Between 45 to 50 students are active every semester. For those mining professionals who want to sharpen their skills but cannot get away from their employment, this is perfect for them. Please spread the words to whoever is interested, contact either Judy Russell or me for further details.
Laurin Bookout
This summer I was an intern for Battelle at the St. Robert, MO office. This branch of Battelle develops simulations and custom models for military and non-military applications and also teaches courses for military and law enforcement personnel on a variety of subjects.

Over the summer I was exposed to several different projects and worked on any contract where help was needed. I was able to get a copy of one of the home-made explosives (HME) course materials, complete with instructor’s notes. This was really interesting to me, as I didn’t know just how many common household items could be easily manipulated to make explosive materials. I was also able to read some improvised explosive device (IED) awareness course materials which I also found very informative.

For the first part of the summer I worked on creating a couple of different simulation scenarios using the program OneSAF. The scenarios I helped create are used at the Ft. Leonard Wood Maneuver Support Center’s Battle Lab as a virtual training tool for the soldiers at the Fort. The other project I worked on this summer was also a virtual training tool that can be used for different types of person to person interactions. Although neither of the main projects I worked on were explosive related, due to the projects that were available over the summer, the internship was still a valuable learning experience and I enjoyed working at Battelle.

Dominique Nolan
This summer I conducted and assisted in conducting research on several projects at the Missouri S&T Experimental Mine and Fort Leonard Wood. I completed the experimental testing dealing with shaped charge research in conjunction with AMRDEC-WDID Redstone Arsenal. That project is applied research on conical shaped charge penetration of rock targets, looking at the fracturing and fragmentation of rock due to penetration done by a specific conical shaped charge.

I also worked with one of the national laboratories in testing explosive charge performance on cement and metal targets at the Missouri S&T Experimental Mine. This work deals with the efficiency of a charge, as well as looking at mitigation of explosive forces applied against a specific target.

Finally, I assisted with a Leonard Wood Institute experiment being conducted by the Missouri S&T Civil Engineering Department dealing with blast mitigation and wall strengthening using composite materials.

Overall it was a wonderful summer for testing with many tests being performed and a large quantity of good data being obtained.

Buck Hawkins
I am researching current explosives recognition and awareness training conducted with site security professionals. As part of the research, I attended a Department of Homeland Security (DHS)-sponsored event, the Chemical Sector Security Summit, which was geared to further define DHS’s role in the anti-terrorism standards at chemical facilities. I also assisted Dr. Jason Baird in bringing security, emergency response and law enforcement professionals to participate in explosives awareness training at the Experimental Mine.

I am working with Dr. Paul Worsey in recruiting students, particularly from the Armed Forces, for the Explosives Engineering Master’s as well. As such, I am helping the Fort Leonard Wood US Army Engineer School to create interest in the program and am assisting in program development, recruitment material and site visits to the post. As an additional job, I am maintaining the Explosives Engineering website, explosives.mst.edu.

Phil Mulligan
This summer I researched the effects different explosives would have on the formation and penetration of an Explosively Formed Projectile (EFP). We have had quite a bit of interest, lately, from outside companies in using EFPs to test their armor designs.

My work involved designing several EFPs with different explosives to be aimed at a steel target. I measured the velocity, penetration, and kinetic energy for each EFP fired. This research is an important part of my thesis; it is one of 6 physical parameters of an EFP that I am testing to show how changing the physical parameters of an EFP change its performance.

I also assisted in leading a small crew of workers to improve the explosive research facilities at Missouri S&T. Over the summer we finished all the renovations to the new Underground Explosives Research Center (formally known as the “WOMBAT”), improved testing conditions in the S&T quarry, renovated the Blast Table, began preparations for the new Outdoor Explosives Research Center, and maintained the Explosives Research Lab. We also re-installed/renovated/prepared the Hydroforming Tank for upcoming research projects, and assisted in the development of the new building site at the experimental mine.
News from Jason Baird

Aside from supervision of Dom’s and Phil’s work (they need little supervision, fortunately) and teaching Buck’s gratis explosives awareness and ID course to local law and FBI folks, I was able to spend time blowing-up stuff!

As Dom mentioned, we participated in blast testing several test articles constructed by the Civil Engineers - Dr. Jeff Volz from CE and his students (Ben Gliha, an MS student, was in the lead) and staff were responsible for the test set-up, but we provided the blast services as well as Range Officer and Range Safety functions on one of the demolition ranges at Ft. Leonard Wood.

I also spent time on personal research into explosive-driven pulsed power systems for my company, Loki Incorporated, and providing ballistic test consultation and services under a contract with MO-Sci Corporation.

PopSci’s “Mind-Blowing College Labs”

The S&T Experimental Mine just ranked #1 lab by Popular Science. The Experimental Mine was showcased in its September 2010 issue. We beat out schools including MIT (Toy lab), Carnegie Mellon (Robotics Institute), University of Florida (Lightning Research Laboratory) and Stanford (SLAC national Accelerator Laboratory).

The full two-page spread picture shows an explosion underground just inside the Kennedy portal with Paul and several of his students (for full picture see popular science). The photographer took several attempts to get the right shot and timing because he was using a fill in flash, which precluded burst mode on his camera. In each shot, the flames were moved closer and extra effects added. Paul and several of the students are licensed pyrotechnicians and have plenty of experience with FX long with the stage pyrotechnics and special effects class which is taught each fall. The camera angle and quality of the fireballs were so good that several people have thought it was CGI. Paul and the students had great fun setting it up and shooting. On the technical side the explosion was produced by ether cans cut with detonating cord, delayed to build the effect using shock tube detonators and initiated using a Rohenbuhler radio remote detonation system.

The best accolades came from the editor of Popular Science and here is an excerpt from his editorial at the front of the magazine:

On pages 52 and 53, another underground photo. Here, with professor Paul Worsey, five students from the Missouri University of Science and technology detonate charges in the school’s private mine. The students wear a look of blasé competence. But I’m not buying it. Look closely, and I think you’ll agree that there’s glee, too - the “blow stuff up real good” glee of students at the most awesome college lab in the country. The shot was orchestrated by our staff photographer, John B. Carnett, who found that Worsey and team were eager accomplices. “It became clear that this was a “Go big or go home’ group,” he told me. “Paul was like a little kid – excited and willing to solve my needs with his knowledge.” It’s hard to believe but Carnett insists the group was safe, given their expertise in controlling blasts. (Although it’s worth noting that the shock wave destroyed one of his lighting units.) “What’s important to know,” Carnett said, changing the subject, “is that teachers like Paul change the lives of students forever, and that the world needs more of them.” And as our Afghanistan story shows, that need – for competent people who go big – is very real indeed. (On an interesting note this was matched with the article of a trillion dollars worth of minerals lies in rich veins across Afghanistan.)
Paul Worsey returns to Brazil

Paul & Gill were invited to Brazil in July. They spent three weeks there. They toured the beaches of Santa Catherina state for a week, saw penguins and whales (July is winter in the southern hemisphere), then taught a post graduate blasting course at UFRGS, and in the last week taught an industry short course in Crisiuma on blasting in coal mines. The short course was hosted by UFRGS and sponsored by the Brazilian geological survey and Britanite, a major Brazilian explosives company. While in Crisiuma, Paul helped the local mining industry with a political situation. He provided pro mining and blasting propaganda on a TV station, 2 radio stations and 2 newspapers. The Detonators was on TV during the course and the Brazilians were thrilled to have a blasting celebrity. There was some serious partying and churrasco at the end of the course, courtesy of Britanite.

OLD MINER RETURNS

John Allen, a Missouri School of Mines Graduate, visited the Rock Mechanics and Explosive Research Department on September 16, 2010. He was hosted by Interim Director Dr. Gillies. John graduated from Missouri School of Mines in Mining Geology in 1942, and in Mining Engineering in 1947. He married Helen Holman, granddaughter of Dr. Wayne Barely, Professor Emeritus of English at MSM, in 1947. John and Helen returned to Rolla in 1997 as permanent residents.

John maintains an interest in the progress of his alma mater and was especially impressed by the activities of the Rock Lab, in which he was briefed by Dr. Dave Summers. He also visited the School Mine, and was amazed to see the changes made since the early 40’s. Mine Supervisor Jimmie Taylor and some of his staff showed John around below ground. Jimmie was understandable proud of the mine and the Mine Rescue and Mucking Teams that trained and competed there.

NSSGA Student Chapter is back!

Over the past few years our NSSGA Student Chapter was in peril of dying. Thanks to Brianna Drury, Past President, and Chris Searing, Past Vice President, the chapter is back and thriving. The chapter collaborated with the other student organizations and showed 15 members at the end of the academic year. One big draw was the monthly “Movie Night” coordinated by Brianna. A good movie and pizza is a great attention getter! Thanks to the ground work done last year, the chapter has a very active group of officers this year and is working with the other organizations. Plans are underway for members to attend CONEXPO/CONAGG next March. This group of students will have much more to report in the 2011 newsletter.
Explosives summer camps  #s 12, 13 & 14

This year’s explosives camps were successes again. The numbers were slightly down due to little advertising and the depressed economy (16, 17 & 12 from 20 per camp). However the numbers were far more manageable and we think the kids had a far better experience - five and a half days of nonstop action with explosives, the chartreuse lure for the mining program and it’s working. We are getting around 30% of the campers coming to the department. Dyno, Doe Run and Premier were great hosts again and this year’s camps beat all previous camps on the number of high explosive blasts they had. We are already swinging into gear for next year with the dates already set (June 5-10, 12-17 and 19-24). There are now two other universities attempting to copy our success, but our camps still have the most hands on experience and bang!

Camp participants glue electric matches on a display for the final pyro show

Jimmie Taylor helps one of the campers to test the firing board

Women in Mining

The 2010 Annual Meeting for Women in Mining was held in Denver, Colorado, in May 2010. Four members of the S&T chapter attended and received a very warm welcome. The students participated in all events and were able to take a tour of the Henderson Mine. The keynote speaker was Bonnie Love, World Wide Drilling Resource. We want to thank Bonnie for the photo. It shows all participants ready to enter the Henderson Mine. The 2011 Annual Meeting will be hosted by the Nevada Chapter of WIM.

New officers of the chapter: President - Steven O’Donnell; Vice President - Benjamin Sutton; Secretary - Kelly Hunter; Treasurer - Jessica Stacy.

Barbara Robertson was selected as the Faculty/Staff of the Month for June 2010. Barb was nominated by the Shamrock Chapter of the National Residence Hall Honorary for her efforts with the explosives summer camps. This award is usually only given to faculty or staff working in residential housing.
Online
MASTER OF ENGINEERING DEGREE
Mining Engineering

The program will provide you with:

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More information is available at the following website:
mining.mst.edu

For more details contact:

ME Program Coordinator
Dr. Jerry Tien
tien@mst.edu
Tel. (573) 341 4757

ME Program Support
Judy Russell
jrussell@mst.edu
Tel. (573) 341 7652

Or contact the Department

Mining Engineering Program
226 McNutt Hall
Rolla, MO 65409-0450
mining@mst.edu

INNOVATIONS IN MINING ENGINEERING (IME) 2011

The IME 2011 Conference will be held at Missouri University of Science and Technology, Rolla, Missouri from August 30 to September 01, 2011. The conference will focus on research advances and technological innovations for the Mining Industry of the Future. Conference topics will include mine planning and design, novel mining methods, mining equipment technologies, maintenance engineering, geomechanics and ground control, mine investment evaluation, blasting and demolition, safety and risks engineering, environmental sustainability, mine automation and robotics, computational intelligence applications, and intelligent mining systems. The conference will feature key industry leaders and world renowned researchers as keynote speakers, relevant short courses and tours to Doe Run, Fort Leonard Wood and other interesting places. The request for abstracts will be released in November 2011.

Direct all enquiries to:

Samuel Frimpong
Chair of IME 2011 Technical Committee
226 McNutt Hall, Missouri S&T, Rolla, MO 65409
Phone: (573) 341-7617; Fax: (573) 341-6934

What’s New?

Here is a way to stay connected to your “old department” and receive news and job opportunities. If you have not done this, send your email address to mining@mst.edu and ask to be added to the mining engineering alum list server. We receive many postings from companies or employment agencies and forward these to the alums. This is free for our alums. If you are interested in a different position, forward your resume to barb@mst.edu. We keep resumes on file. If your company has a position, send us the info and we will forward it to our alums.
A Strong Board for S&T Mining Engineering

One of the strong supporting structures of Rolla Mining Engineering is the constitution and functioning of its Development Board. The Board consists of senior industry executives with a passion and dedication towards the training and education of the leaders of the mining industry of tomorrow. In addition to this core mission, the Board provides (i) counsel for improving and maintaining the quality of Rolla Mining Engineering Programs; (ii) input into the ABET accreditation of the undergraduate program; (iii) counsel in training and developing graduates to meet industry challenges; (iv) support for Mining Engineering at Missouri S&T; (v) counsel to University Administration to ensure that critical issues that affect the program are dealt with appropriately; and (vi) counsel and opportunities for internships and permanent job opportunities for our students. The table shows the current Board membership. The Board has been a vital instrument for growth and its role will be significant in the next decade. On behalf of the Department, I express sincere gratitude to the Board for its support and leadership. I specifically recognize the enormous contributions and sacrifice of Paul Lang, Senior Vice President of Arch Coal for his leadership and counsel in the capacity renewal program, Bill Kennedy for his major contribution to the new 15,000 square-foot Experimental Building and to Arch Coal, Barrick Gold North America, Bucyrus International, Caterpillar Global Mining, Doe Run Company, Joy-P&H Mining, and Mississippi Lime Company for their contributions toward the capacity renewal effort.

<table>
<thead>
<tr>
<th>MEMBERS</th>
<th>POSITION</th>
<th>COMPANY AND LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Bruce Neil</td>
<td>President and CEO</td>
<td>The Doe Run Mining Company</td>
</tr>
<tr>
<td>Stephen A. Lang</td>
<td>President and CEO</td>
<td>Centerra Gold</td>
</tr>
<tr>
<td>William Kennedy</td>
<td>President and CEO</td>
<td>Jack Kennedy Metal Products</td>
</tr>
<tr>
<td>Michael T. McCall</td>
<td>Former CEO and Chairman</td>
<td>Luminant Energy</td>
</tr>
<tr>
<td>Gregory A. Lang</td>
<td>President</td>
<td>Barrick Gold North America</td>
</tr>
<tr>
<td>Rob Vogel</td>
<td>President</td>
<td>Vulcan MidWest Operations</td>
</tr>
<tr>
<td>Bryan Galli</td>
<td>President - International Coal Sale</td>
<td>Peabody Energy</td>
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<tr>
<td>Richard Marston</td>
<td>President &amp; Principal Consultant</td>
<td>Marston &amp; Marston</td>
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<tr>
<td>John E. Cramer</td>
<td>President</td>
<td>Casper Stolle Quarry</td>
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<tr>
<td>Jeane Hull</td>
<td>Group Executive, PRB</td>
<td>Peabody Energy</td>
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<tr>
<td>Paul A. Lang</td>
<td>Senior Vice President</td>
<td>Arch Coal Inc.</td>
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<tr>
<td>Steve Kopenitz</td>
<td>Senior Vice President – Mining</td>
<td>Luminant Energy</td>
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<tr>
<td>Jay Layman</td>
<td>Vice President – Discovery/Development/Innovations</td>
<td>Newmont Mining</td>
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<tr>
<td>Chris Ward</td>
<td>Vice President/General Manager</td>
<td>Lehigh Hanson</td>
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<tr>
<td>Jeffrey A. Roschyk</td>
<td>Vice President – Marketing/Product Management</td>
<td>P&amp;H Mining Equipment</td>
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<tr>
<td>Mike Koesterer</td>
<td>Vice President – North America</td>
<td>Komatsu America Corporation</td>
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<tr>
<td>John Anderson</td>
<td>Vice President/General Manager</td>
<td>Martin Marietta</td>
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<tr>
<td>Corry Cook</td>
<td>Vice President – Americas</td>
<td>Immersive Technologies</td>
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<tr>
<td>Roger Gagliano</td>
<td>Vice President – Operations</td>
<td>Fred Weber Inc.</td>
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<tr>
<td>David Obergefell</td>
<td>Vice President – Global Frontiers</td>
<td>USG Corporation</td>
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<tr>
<td>Chris Upp</td>
<td>Vice President/General Manager</td>
<td>Conco Quarries</td>
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<td>Janpeter Bekkering</td>
<td>NACD Regional Manager</td>
<td>CAT Global Mining</td>
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<tr>
<td>Mark Hrutkay</td>
<td>Human Resources Manager</td>
<td>Consul Energy</td>
</tr>
<tr>
<td>Pat Risner</td>
<td>Director of Business Operations</td>
<td>BHP Billiton</td>
</tr>
<tr>
<td>Joe Mehl</td>
<td>District Engineering Manager</td>
<td>Kiewit Mining Group</td>
</tr>
<tr>
<td>Bruce Jones</td>
<td>General Manager</td>
<td>Cloud Peak Energy</td>
</tr>
<tr>
<td>Neal Stanton</td>
<td>Nitrogen Product Manager</td>
<td>ORICA USA Inc</td>
</tr>
<tr>
<td>Greg Gajewski</td>
<td>Technical Manager</td>
<td>Goodyear Company</td>
</tr>
<tr>
<td>Richard Phelps</td>
<td>Engineering Consultant</td>
<td>Private Consulting</td>
</tr>
<tr>
<td>Jerry Tystad</td>
<td>Director, Business Improvements</td>
<td>Peabody Energy</td>
</tr>
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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.

We have some mining companies come directly to the Department to interview. Close to thirty companies are looking for mining engineers at the Fall 2010 Career Fair. S&T/MSM 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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