



Newsletter

Petroleum Engineering

Vol. 10, No. 1

September 2005

Colorado School of Mines

Greetings from Craig W. Van Kirk

It is my great pleasure to introduce this annual newsletter to alumni and friends on the status of CSM's Petroleum Engineering (PE) Department. This issue is our 10th annual, and possibly our most positive of all. In my entire 25.5 years as PE's Department Head, I can say in many ways the program is healthier and stronger now than ever, and it is well poised for a significant and positive future.

But, before I give you the details, I am happy to report that my family is in very good health. My wife Denice and I very much enjoy our kids and grandkids, and they all are doing very well.

During the past 12 months we did not add any new faculty, but we did have a change in one of our administrative assistant positions. Denise Winn-Bower, who joined us in May 2004, continues on with us, and she is the prime mover in assembling this newsletter. Jackie Waitman, who also joined us in May 2004, left us in August to move with her husband to their new home in Arizona. Our new administrative assistant, Eleanor Maes, joined us in August after 2 years at CSM, across campus, and 15 years at the University of New Mexico. All of you readers will enjoy getting to know these two ladies, they are excellent and friendly, great new PE teammates.

The frequent e-mails, letters, cards, phone calls, and visits you alumni, friends, and partners provide to us are very much enjoyed and appreciated, plus they deliver a significant portion of our overall satisfaction.

PE's program is very healthy in many ways. Recruiting for our students is strong, several job offers per student, 100% job placement before graduation, BS starting salaries approaching \$70,000 per year, Masters and Ph.D. salaries in the neighborhood of \$100,000 per year, with some exceeding that number. I wish our faculty salaries in the PE Department were so high! During the past year we graduated 35 BS degrees and 15 graduate degrees.

This year's PE senior class size is 40, while our junior class is 70. Our graduate student enrollment of 74 is our largest ever, with a very healthy number of 35 USA citizens. Student enrollment has never been small, and it is growing significantly at all levels. Our International student enrollment



Craig W. Van Kirk by Alderson Hall

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Please help us by completing and mailing the enclosed Alumni Survey

is healthy at both the undergrad and graduate levels, with excellent quality students from around the world.

The long established success and popularity of our PE program continues to attract non-Colorado residents and international students at the highest rates on campus. Also, our global activities continue to not only attract more students, but also more partners, sponsors, and opportunities for joint ventures around the world. For examples: the Abu Dhabi Petroleum Institute (ADPI) continues to prosper; Egypt's invitation for us to open CSM's first and only branch campus in Egypt as an open coed international campus is maturing nicely, and even though we don't have a final agreement yet, we started teaching graduate-level courses in Egypt last October (8 so far): Iraq and Iran have asked us to help improve their PE programs; and several other international contacts have been made requesting our assistance.

CSM's PE Department is among the highest ranked, best recognized, and most respected such program in the world. PE focuses internally on providing the best possible quality education to our students, and externally we focus our efforts on our competition among our peer universities.

We compete successfully with other top-rated engineering programs domestically and globally, at both the undergraduate and graduate levels. The Program purposefully emphasizes an open learning environment, where education is balanced between teaching and research. The result of this strategy continues to promote the long-standing reputation of the Program; we enjoy domestic and global high-profile recognition.

Historically and today PE attracts far more non-resident students than resident students, at both the undergrad and grad levels. Also, PE has more international students than any other CSM department, by a factor of 2.0 or more. Essentially 100 percent of our international students are fully funded by sponsors and require no financial aid from CSM.

CSM recently adopted a new Strategic Plan (SP) in 2004 for the next 10 years. Many of the goals of CSM's SP coincide with PE's past accomplishments and goals. The current global energy "situation" places CSM's PE Program in the right place at the right time for a phenomenal future, based upon and building on a very successful past.

The PE Department Visiting Committee (VC) is the oldest and most active one at CSM, having started in 1980. The group meets on campus every 18 to 24 months. The most recent meeting was held in October of 2004 when we hosted our VC for two days to review CSM's new SP and advise us about the future needs.

As usual, we received a very positive report supporting our activities and accomplishments, and the committee provided valuable advice for CSM and PE's future.

As CSM President John Trefny recently stated, "One element of the Plan is to move Mines from a local orientation to one that expressly encompasses national and international needs." CSM's PE Department clearly has successfully achieved this SP goal for global engagement, and opportunities for further expansion are phenomenal.

One major point regarding PE's Plan is that the Program expects continued growth in student enrollment at both the undergrad and grad levels, and continued rapid growth in research funding and global engagement. This "best case scenario" requires more faculty, support staff, grad student TA's, and Alderson Hall (AH) space.

One of our PE alumni has stepped forward recently with intentions to provide a multimillion dollar gift to enable construction of a new state-of-the art building for the PE Department! This generous grant will form the foundation for attracting additional contributions which will generate the ultimate new home for PE.

As usual, many of you alumni and friends will be invited to participate in this new fund-raising campaign in the near future. Recent past such fund raising activities for our PE Program have enjoyed significant successes, combining contributions ranging from \$20 to \$20,000 to \$1.0 million.

Two of our generous alumni are providing several million dollars for endowing faculty Chairs for PE. One is fully funded and ready for occupancy, and we are currently well into a recruiting campaign to find the best candidate. The second endowed chair is not yet fully funded and established, but it probably will be within the next few months.

It is clear that PE has already attained many of CSM's new SP goals, far ahead of the SP schedule, and is making rapid progress in the few goals which have not yet been fully satisfied. A brief description of PE's status relative to CSM's SP seven major strategies is as follows:

1. World Class. PE is there.
2. Research. PE is growing fast and could be fully so recognized in the very near future.
3. Undergrad Education. PE is there.
4. Grad Programs. PE is there.
5. Mix of Students. PE is there.
6. Expand Financial Support. PE is there.
7. Restructure Deployment of Resources. PE should be leveraged with additional resources in order to generate additional profitable returns for CSM.

Our research activities associated with acquiring sponsorship from industry and government agencies are growing rapidly, partially because of our recently increased faculty FTE. Last year we exceeded \$1.5 million, for the first time ever. PE's average sponsored research funding per professor is now near CSM's average, and growing rapidly.

Much of our new research funding has been attracted from Denver area companies supporting our research efforts in the Rocky Mountain States. We are expanding our efforts to address local industry needs, including natural gas, tight reservoir rocks requiring fracture stimulation, access to public lands, and many other technical, economic, and political/social issues.

During 2004 PE's faculty (for the first time) reached CSM's average sponsored research volume, exceeding \$100,000 each. Several faculty have created new consortia with 5 to 20 members each, with total annual sponsorship of several hundred thousand dollars per consortium. This accelerating growth reflects the faculty's involvement with the global petroleum industry, with global partners, and also serving our nearby partners in Denver and the Rocky Mountain States. The growth potential is tremendous and could reach several million dollars within a few short years, if staff and space are available.

Annual student evaluations of faculty teaching classes rank PE's profs well above campus averages. Also, graduate student surveys indicate a very high level of satisfaction with our program. Our current students and our alumni are quite satisfied and dedicated to CSM. Our alumni are campus leaders in fund raising for CSM and PE support.

Clearly, the primary reasons that CSM's PE Program enjoys so much success is the excellent

quality of the students and the staff. The current faculty of 9 on tenure track, plus several others on soft donated monies are outstanding. They are dedicated to the students; through teaching, research, and service. Each of them has a section following in this newsletter for your review.

One final comment on the PE Program's accomplishments to date and attractiveness for further investment: the measure of the value of the PE Program is evidenced by feedback from our graduates and our industry and research partners, the excellent performance of our graduates in other graduate school programs and in private industry, solid accreditation reviews and assessment, and strong financial support from off-campus sources. In short, we have many customers and supporters. We could have many, many more.

As always, we are preparing for the Society of Petroleum Engineers Annual Technical Conference and Exhibition in Dallas early in October. We will cancel all PE classes for the 3 days Monday through Wednesday October 10-12, so that PE faculty can attend and any PE student who wants to can also attend. As always, the PE Department will provide significant resources to fund much of the costs for the trip for any PE student.

I want to thank you alumni and other friends of the Program for your continuing financial support, which enables us to provide many exceptional educational experiences for our students; such as, the annual SPE Conference, their off campus meetings, our outstanding computer lab facilities and coordinator, our two Summer Field Sessions off campus, and many others. The result of the healthy partnership among you supporters, our staff, and our students is the continuing excellent yearly graduates who enjoy successful careers in our global petroleum industry.

It is my pleasure to provide this report to you and to be a part of CSM's PE team. After 25.5 years as PE's Department Head, I look forward to several more years in this capacity before starting to phase down.

Please keep in touch with us and come by for a visit any time.

My best to you and yours,

Craig



Van Kirk recruiting future PE Students.

Letters from Our Faculty

Larry G. Chorn

Time flies when you're having fun. I just looked at my contribution to the newsletter last year and was reminded of all the work that had gone on and students that I had the honor to work with and offer my insights and experience. Hopefully they are finding the interactions and information useful out in the real world. It was a new experience to see some of my first graduate students leave for jobs around the world. I am sure they're enjoying their new careers and I look forward to hearing from them.

Classes are getting bigger each semester, as oil and gas become lead items in our newspapers and television news-casts. The classrooms are being strained and we've had to move some classes into other buildings with larger seating capacities. I am sure that all of you who are responsible, directly or indirectly, for staffing issues in your company welcome that news!

This year looks just as action-packed as my first two in the department. I have two graduate students writing M.S. thesis as we speak and two more generating data and analyses for their thesis. I expect to be doing a lot of reading and editing for them during the next few months as we complete their thesis and prepare journal articles and presentations.



Larry Chorn

But I have to fit that work in between teaching PEGN 422 and two graduate courses in Petroleum Economics (Uncertainty in Subsurface Estimation and Petroleum Project Portfolio Management) this fall. I have fallen into the schedule of teaching three classes per semester, one undergraduate and two graduate, so lectures and student meetings keep me engaged. The PE faculty decided that the existing fluid mechanics undergraduate class was not sufficiently focused on petroleum issues and, somehow, I was given the opportunity to develop a new fluids class for sophomores in the program. PE fluid mechanics is taught in the spring semester and this past semester I had 74 students enrolled in the class.

The department's interaction with the Egypt petroleum industry continues and I had the pleasure of traveling to teach a three-week course on Advanced Reservoir Management. The travel was long and tiring but the students and the Egyptian people were delightful. I highly recommend a trip to Egypt if you are looking for warm hospitality and incredible tourist sights. Professor Graves and I were there at

the same time for two of the three weeks and we took time out of our first week to visit the pyramids at Giza. It was quite an experience seeing the pyramids and watching Professor Graves bargain with the local vendors for great deals on memorabilia. Needless to say, she won most of the exchanges by my count!

I know all of you are very busy with your careers and families so I will not ramble on too long. I encourage you to visit the department when your travels bring you near Golden. We are always here and very happy to see you and catch up on your recent exploits and successes.

Richard L. Christiansen

Things you can't avoid. . .

When I started working in the industry in 1980, oil prices were rising steadily. I recall talk of prices going to \$100 per barrel. The Windfall Profit Tax of 1980 motivated many companies to pursue Enhanced Oil Recovery methods to produce more oil and to reduce their tax burden – not necessarily in that order. The precipitous drop of oil prices in late 1985 and 1986, and the sustained low price for many years thereafter erased the appeal of “exotic” methods for boosting oil recovery. Even waterfloods became exotic.

Times change. Recently, I visited with one of our current students who as a Summer Intern assessed the potential of CO₂ flooding for a Wyoming oil field. While I am pleased to see this renewal of interest in EOR, we will need to adjust our coursework a tad to prepare juniors for such analysis.

Times have changed more dramatically in the gas business. Back in 1980, 640 acres per well was the rule. Now, it seems that 10 acres may not be small enough. And to drill all these gas wells, we are importing rigs and crews from China! Ni hao. After the drillers finish, someone has to frac the wells. The Rock Springs office of Halliburton houses the largest frac operation in the world: it will grow from 800 to 1000 employees by next summer.

All these gas wells will quickly load-up with water – faster than most of you realize. Many never fully recover from being loaded with frac liquid. All will eventually succumb to water accumulation. Water in gas wells is on the list of things you can't avoid, like death and taxes. Coincidentally, my research focuses on lifting liquids from gas wells. During the last ten years, this endeavor has grown to a full-time operation. Three undergraduates and one graduate student work with



Richard Christiansen

me. We have learned quite a bit along the way. Here are some of the topics studied in the past year:

- Extent of lost gas production because of water blocks
- Methods for boosting gas production by minimizing the casing-tubing bottleneck
- Correlations for foam flow
- Performance of vortex-generating devices
- We frequently have visitors to the flow loop lab.

They leave with better understanding of gas-liquid flow – you can read all you want, but seeing it first hand makes a huge difference. We offer a one and 1/2 day short-course filled with flow-loop demos. If you operate gas wells, you should probably benefit from this short-course.

Most of the project funding has come from the Stripper Well Consortium, which is funded by DOE and NYSERDA (a research funding source in New York), and managed by Penn State. Fortunately, I won another year of financial support from them last Spring. Of course, additional support is always welcome.

I would like to expand the program to include clean-up of liquids after hydraulic fracturing and lifting of liquids from horizontal wells. If these topics are interesting to you and your company, please let me know so that a clearer plan of study can be formulated. rchristi@mines.edu 303-273-3965.

Alfred W. Eustes

Drilling education is doing fine at Mines. In fact, I have 69 students in PEGN 311 Drilling Engineering this semester! The student population is growing. I continue to teach the PEGN 311 and PEGN 361 Completion Engineering classes. This semester, since John Fanchi is on sabbatical, I am also working on PEGN 481 Senior Seminar. As always, I am always interested in feedback about what was useful and what needs to be added. Please let me know when we meet or by email or phone.

We continue to work with the Bureau of Land Management on developing a proposal for determining the drilling, completion, and reservoir management issues and potential solutions and limitations of directional drilling. The DOE so far has not funded our proposals; but, knowing how important this is to the state and nation, we continue to push for it.

The Jet Propulsion Laboratory Martian Drilling project is still on hold. I was invited to Washington D.C. this summer to participate as on a proposal peer review panel for NASA's Astrobiology efforts. It was very fascinating to see where NASA's search for life is going. Many of the proposals were for underground off planet (which was why I was asked to serve). We were asked to rank the proposals but not to actually determine who was to get what. All in all, it is quite interesting to see where space exploration is going

I was on sabbatical this last semester. I had the privilege of representing the school in a graduate class on

Deepwater Drilling in Alexandria, Egypt this last spring. It was an interesting experience: the people, food, and driving all made for a memorable three weeks. The pyramids really are there and they are big! In June, I had the pleasure of teaching a three week course called Drilling Mechanical Engineering at the Mining University of Leoben, our sister school in Austria. I was impressed with the school and especially the hospitality and friendliness of the faculty, students, and the general public in Leoben and Austria.



Bill Eustes

I returned to PEGN 315 Field Session I this year. We had 72 students so the Department split the group into two sections. Erdal and Turhan took one group to Houston; and Mark and I took the other group through the Rocky Mountains. Frankly, we had a much cooler trip, in more ways than one. Let me tell you about it.

The Twelve Days of Field Session (with literary license and a few exaggerations):

On the first day of Field Session, Kerr McGee showed to us, *a reservoir in the Rocky Mountains*

On the second day of Field Session, Calfrac showed to us, *two fracture jobs*

On the third day of Field Session, the BLM showed to us, *three hundred regs*

On the fourth day of Field Session, Anadarko showed to us, *four pumping units*

On the fifth day of Field Session, Centrilift showed to us, *five ESP's*

On the sixth day of Field Session, we drove through Thermopolis and saw, *six hot springs bubbling*

On the seventh day of Field Session, we cruised through Yellowstone and saw, *seven geysers spouting*

On the eighth day of Field Session, we caught at Fremont Lake, *eight rainbow trout*

On the ninth day of Field Session, Questar showed to us, *nine rigs a running*

On the tenth day of Field Session, Cudd and Howco showed to us, *ten crews real busy*

On the eleventh day of Field Session, we drove to Colorado with, *eleven students sleeping*

On the twelfth day of Field Session, EnCana showed to us, *twelve rigs a turning*

That about sums up Field Session in the Rockies this year. There were many interesting and fun things that we did. Although I am teasing the BLM in the above song, I did think that the BLM presentation in Casper opened the student's eyes and started to make them realize that there is

more to engineering than equations. And the excitement at Kerr McGee, Anadarko, Questar, and EnCana was contagious. The activity at CalFrac (on site at a fracture stimulation), Caza (multiple rig tours), Tristate (they opened a pump for us in their shop), Centrilift (ESP work), Cudd (we literally chased a snubbing unit from location to location), and Halliburton (really, really busy) showed that this industry is in an upturn and that there is (and always has been) a future career here.

As always, I want to thank the many people who made this class possible. I have listed them below:

Scott Hagemann	Kerr-McGee Oil and Gas Corporation
Ralph Nelms	Kerr-McGee Oil and Gas Corporation
Jerry Cuzella	Kerr-McGee Oil and Gas Corporation
Zane Gordon	Kerr-McGee Oil and Gas Corporation
Carlos Ochoa	Kerr-McGee Oil and Gas Corporation
Mark Lamontagne	Calfrac Well Services Corp.
Chad Buffington	Calfrac Well Services Corp.
Kelvin Edsall	EnCana Oil and Gas (USA) Inc.
David Hill	EnCana Oil and Gas (USA) Inc.
Jeff Salen	Caza Drilling, Inc.
Asgar Shariff	Wyoming State Office Reservoir Management Group, BLM
Karl Osvald	Wyoming State Office Reservoir Management Group, BLM
Don Whyde	Assistant Field Manager, Resources, BLM
Joe Meyer	Casper Field Office, BLM
Eve Bennett	Casper Field Office, BLM
Sarah Bucklin-Comiskey	Casper Field Office, BLM
Larry Claypool	Wyoming State Office Reservoir Management Group, BLM
Dean Stilwell	Wyoming State Office Reservoir Management Group, BLM
Dwain McGarry	Wyoming State Office Reservoir Management Group, BLM
Richard Marvel	Wyoming Oil and Gas Commission
Bryant Mook	Elk Petroleum, Inc.
Justin Raithel	Anadarko Petroleum Corp.
Brandon Vandervoort	Anadarko Petroleum Corp.
B.J. Jackson	Anadarko Petroleum Corp.
Danny Morse	Anadarko Petroleum Corp.
Everett Dewitt	Anadarko Petroleum Corp.
Tom Thrall	Anadarko Petroleum Corp.
Skip Harvey	Tri-County Pump Service
Jeff Johnston	Tri-County Pump Service
Erich Schmidt	Centrilift
Glenn Fretland	Centrilift
Greg Cook	Centrilift
Mike Kraus	Centrilift
Victor Eifealdt	Questar Exploration and Production Company
Ron Hogan	Questar Exploration and Production Company
Jim McCrea	Questar Exploration and Production Company
Dean Davis	Newpark Drilling Fluids
Kevin Williams	Questar Exploration and Production Company

Steve Law

Kevin Peretti
 Jimmy Druce
 Tyson Foutz
 Menno Hershberger
 Mark Roberts
 Emily Jeffords
 Karen Mills
 Doug Rosa
 Scott Craig
 Daniel Martinez

Questar Exploration and Production Company
 Questar Gas Management Company
 Questar Gas Management Company
 Cudd Well Control
 Cudd Well Control
 Halliburton Energy Services
 Halliburton Energy Services
 Halliburton Energy Services
 EnCana Oil and Gas (USA) Inc.
 EnCana Oil and Gas (USA) Inc.
 Majestic International

One of the things I like to do in these newsletters is to be certain to list everybody that helped make these field sessions the successes that they are. However, in the hustle and bustle of the session, I sometimes don't get everyone's name that helped us. I apologize if I have misidentified or even left you out of our thanks. If I have inadvertently left you off, please let me know.

This field session saw no injuries of any kind, as usual. That is because we stress safety, safety, and safety!

John R. Fanchi

Many of you may remember Senior Seminar as an opportunity to improve your oral presentation skills. In addition to maintaining the oral and written component, Senior Seminar is being revised so that we can introduce all of our undergraduate students to energy issues and the emerging energy mix, including competing energy options. Presentation topics incorporate material from my non-technical book **Energy in the 21st Century** (Fanchi, World Scientific, 2005).

I am preparing a third edition of **Principles of Applied Reservoir Simulation**. The third edition is a significant revision of the second edition, including new software. It includes several revisions that were suggested from some of my colleagues in industry and academia. The text has been restructured and expanded to better integrate information about reservoir simulation and reservoir management. The reservoir simulator accompanying the third edition is a much more sophisticated flow simulator than the simulator provided with the second edition. The text and exercises include simulator applications to traditional oil and gas reservoir problems, as



John Fanchi - Giza Pyramid

well as more special purpose applications to coal gas modeling, carbon dioxide sequestration, geomechanics, time-lapse seismology, and flow in fractures. The third edition should be available during the first quarter of 2006.

Phase III of the Consortium for Integrated Flow Modeling will be completed this year. We have created a program that combines a petrophysical model with a fluid property model to calculate seismic velocities and elastic parameters (Young's modulus and Poisson's ratio) as functions of pressure and saturation. Static elastic parameters are suitable for geomechanical calculations, such as hydraulic fracture design. A conversion algorithm is available as an option for converting dynamic elastic parameters to static elastic parameters. In addition, we have developed a catalog of coefficients for estimating fundamental petrophysical parameters as a function of lithology. More information about the consortium is provided at my website. If you believe your company can benefit from this technology, there is still time to join Phase III.

In support of continuing education, I teamed with Tom Davis (Geophysics) to present a course on time-lapse seismology as part of the CSM education initiative in Egypt. The accompanying photo shows me learning more about the local culture.

If you would like more information about any of these topics, visit my website at <http://www.mines.edu/~jfanchi/> or email me at jfanchi@mines.edu.

Will Fleckenstein

As an adjunct faculty member, I teach drilling and completions classes as needed by the department, and I spend the rest of my time involved in the industry as a consultant in redevelopment projects, enabling me to bring the "real world" back into the class room. This last year I had the opportunity to teach the undergraduate Completions and graduate Core Drilling Classes during the sabbatical of Dr. Eustes. I am involved with a drilling project offshore of California and based several of the class homeworks on drilling problems associated with that project. Judging from the number of students working in the computer lab late in the evening on those problems and the quality of the solutions prepared by the students, the CSM PE students are well prepared to tackle the industry's challenges. Currently I'm teaching a graduate class in Workover Design and Operations, which I have offered every couple of semesters for the last five years. The class is unique to CSM and grew out of the realization that millions of wells have been drilled worldwide, and much of the future global petroleum production will originate from these existing wells, after some operation to enhance their production.

Dr. Eustes and I completed a multi-year project investigating the stresses present in a cemented wellbore, resulting in a series of SPE papers concerning burst and collapse loading conditions including examining the effects of non-uniform loading on casing collapse, using finite element

modeling. The final work tied the research together and was presented at last year's AADE meeting.

Wellbore construction occurs at in all parts of the world. I have been involved with the Ice Cube project at the South Pole. There are no hydrocarbons involved of any type, since the medium being drilled is ice. The purpose of Ice Cube is to plant an array of muon and neutrino detectors in the ice cap at the South Pole. The astrophysics (and cost!) is awesome, but it is contingent on drilling a series of 8,500' boreholes in the ice using hot water. As usual, the drilling was much simpler on paper, so I was brought in to help the scientific team with their problems. Long after the last drop of oil is produced, there will still be a need to drill a wellbore, somewhere in the world.

I still run PERFORM, a research center which was originally set up by Dr. Mark Pearson to study methods of enhancing the productivity of oil and gas wells. I have been working on commercializing a stimulation technology, and hope to have a patented process sometime this year. I believe Edison once stated that invention is 1% inspiration and 99% perspiration, and I think he was spot on.

I hope everyone has had a wonderful year.

Ramona M. Graves

This year's newsletter article is being written while I am on a semester sabbatical. Yup – I thought this would be a great way to kick off my 24th year. I know the rest of the PE staff thought *it was time* that Graves take a break from "the usual"! Being on sabbatical doesn't mean being on vacation. For me it means focusing on one or two things and accomplishing what I can't get done during a regular semester. I told Craig that this is the semester for laser/rock destruction and getting the funding necessary to build a prototype. This goal is progressing nicely! I hope to be able to give you a very positive update next year.

Another goal is to do some traveling for the school and the department. Since May, I have been to Russia (laser stuff), Kazakhstan (CSM PR), and Egypt twice as part of the PE/CSM initiative. I also had the opportunity to spend a week on the Energy and Mineral Field Institute (EMFI) field trip put on for our national leaders by Special Programs and Continuing Education (SPACE). I got to know some key government people from not only Washington, but also Colorado and Wyoming. The trip focused on the exciting activities on the Western Slope in these two states. What an excit-



Will Fleckenstein

ing time to be in the oil business – tight gas, oil shale, coal bed methane! I will be going to Paris in September for an AAPG meeting and visiting Schlumberger, IFP, etc while I am there. Then I'll wrap up the sabbatical by returning to Myanmar with Jennifer and Donna Anderson from the Geology Department.

Of course all of the above does not mean I'm not involved in the department activities. (Goodness what if they discovered they can get along without me – can't let that happen!) In PE 308 last semester I had about 75 students and, since we don't have a classroom that big in Alderson, I taught it in the balcony of Bunker Auditorium. The student that was in charge of carrying my "box of rocks" that I always bring to class was one of the *bigger* fellows in class.



Ramona Graves

the ABET review coming up next year, it is a reminder that even though the numbers are great we have to keep up the quality and personal care for each of the students.

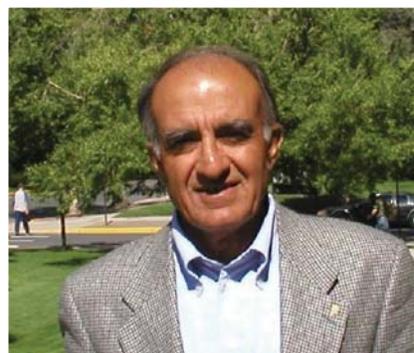
ABET – this will be the 5th accreditation review that I have gone through. Every time we prepare for this it reinforces what a great faculty team we have in the department, what amazing hardworking students we graduate, and how much we all accomplish in 4 or 5 "short" years.

Finally, kids are doing great. Lacey went with me on my last trip to Egypt. Since she is still majoring in archeology, how could we pass on this opportunity? Jake maintains the home front (especially the two new dogs) while I travel. He says he is staying at my house more than his own. They are both such a joy. I like having adult children! And speaking of adult children – I expect to see many of you at the MASSADONA REUNION in 2006!!

Hossein Kazemi

In the academic year 2004-2005 I continued my involvement in teaching, research, and technology transfer. I am grateful for the support I received from my colleagues in the department, especially Dr. Erdal Ozkan who relentlessly supported

my research activities. Dr. Ozkan and I, as co-directors of Marathon Center of Excellence for Reservoir Studies, Dr. Van Kirk, as Department Chair, and several graduate students continued



Hossein Kazemi

our effort to make the Center a top research group at CSM. Dr. Van Kirk provided the Center with housing on the second floor of the Petroleum Engineering Department. The Center will house ten graduate students; will have conference facilities; will have several large high resolution flat panel displays and two multi-screen computer workstations.

The Center has received \$100,000 annually for the past two years and will receive another \$100,000 in the academic year 2005-2006 for a total of \$300,000 from Marathon Oil Company. We also have received a \$360,000 two-year contract from Kerr-McGee (formerly, West Port Resources) to conduct geological reservoir characterization and reservoir engineering evaluation of Wasatch and Mesa Verde formations in southeastern Utah. In this project we are collaborating with Dr. Neil Hurley, Dr. Nick Harris and Dr. Mike Gardner of Geology and Geological Engineering Department. We also received additional financial support from Aramco and Questa Engineering for specific projects.

We held the second annual meeting of Marathon Center of Excellence in late April, 2005. We had representations from several oil, service, and consulting companies. We believe the interest in research projects is high enough to lead to additional participation from a few other companies in the future.

Our current research focus is on "efficient computation in large-scale, high resolution, fine-grid reservoir models." Here we have been exploiting the hidden power of the multi-mesh computing to account for accurate reservoir physics and to capture the effect of reservoir heterogeneity on fluid channeling. Both streamline simulation and dual-mesh computing are included in these studies.

In addition to teaching Reservoir Simulation I and II, I had the privilege to work extensively with eight graduate students, several completing their graduate program by the end of 2005. I also presented a one-week course at the National University of Mexico in December 2004 and will be making presentations at Aramco's technology center in December 2005.

Finally, I continued to chair the SPE Committee on Primers. We hope to publish several short technical books (primers) on timely topics of interest soon. These books should promote collaboration among various disciplines in our business. I also co-chaired a SPE Forum on R&D - who pays who plays, which was held in June 2005.

Mark G. Miller

After several years of having our undergraduate students learn Visual Basic in the rock and fluid laboratories, it now has its own class. I am fortunate to be able to teach this new class.



Mark Miller

We are using Visual Basic in the Excel environment to develop a library of petroleum functions. We are getting feedback that some of

our students are successfully using VB in their jobs.

The computer lab is continually being renewed with new software and new computers. Our students are lucky to be able to work on industry software that they will see after they graduate. We appreciate the companies that donate their software and make this possible.

This year our summer Petroleum SuperSchool had the largest class size in several years. Kerr-McGee, Caza Drilling, and BJ Services all helped by allowing us to visit their facilities. After the fieldtrip, the students made many comments about how being able to visit production facilities, rig floors, and see the stimulation equipment really helped cement the classroom activities. As in previous years, the fieldtrip is a Saturday activity. Our hosts are very gracious about working us into their busy schedules. We very much appreciate these companies and their employees accommodating us. Thanks.

Jennifer L. Miskimins

Hello! Once again I'm glad to have the chance to catch up with you through this newsletter. It's nice to have the opportunity to sit back and reflect on what has occurred during the last twelve months or so. It has been a fun year for me, with many ongoing projects in both the research and teaching realms.

I'm happy to report that the Fracturing, Acidizing, Stimulation Technology (FAST) Consortium which I started last year is doing well and gaining a lot of momentum. We have 20 member companies and are actively pursuing projects in four major areas (slickwater fracturing, non-Darcy flow, CBM stimulation, and hydraulic fracture height growth). Several fulltime graduate students are working on these projects. For the non-Darcy project, we have purchased a cryogenic compressor that allows us to simulate a wide range of well flow rates and are conducting experiments to evaluate flow in various proppants. For the height containment project, we have just completed a series of "big block" fracturing tests designed to evaluate shear slippage and are currently analyzing those results.

In addition to staying busy with FAST, I have been working on another research project in the area of proppant fracturing. Unfortunately, since it is proprietary work for the sponsors, I'll have to wait to share that project and results with you. Guess you'll have to tune in next year for that update!

From the teaching side of things, I am enjoying my classes and the students that are passing through them. We had a great time at Massadona this year and brainstormed our way into a reunion. Yes, a reunion for those of you who didn't get enough of the great outdoors of NW Colorado the first time! Please see the advertisement in this newsletter. We would love to have you join us!!

The last major thing I would like to mention to you is the upcoming ABET accreditation visit. ABET stands for the Accreditation Board for Engineering and Technology and is the organization



Jennifer Miskimins

which "ensures the quality of postsecondary education" for over 550 colleges and universities. CSM and the Petroleum Engineering Department were last accredited in 2000 and are up for another review in 2006. Alumni surveys are a critical component of our assessment requirements, so I would like to encourage you to respond to the enclosed survey. Wish us luck as we prepare over the next twelve months or so for the October 2006 visit.

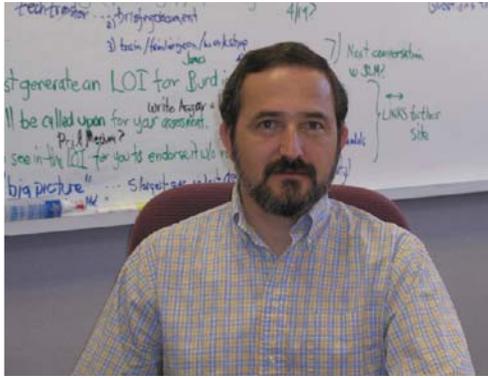
As always, feel free to contact me anytime at (303) 384-2419 or jmiskimi@mines.edu or visit my web site at www.mines.edu/~jmiskimi/.

Erdal Ozkan

The academic year of 2004-2005 was one of my busiest. Dr. Kazemi and I worked hard to build the research program under the Marathon Center of Excellence for Reservoir Studies. The center has had great success since we started it in the summer of 2003. We have been able to bring funds close to a million dollars that helped us support our research and, most importantly, our graduate students. In the last two years, eight students finished their graduate studies under the center. Funding has been received for nine projects. Six of these projects have been completed and the results have been delivered. The other three projects are progressing as planned.

In addition to funded projects, we have developed new research that has been particularly successful in attracting interest from the industry. We presented our research activities to the members of the industry in our second annual meeting in last April. Based on the interest from the attendees, we are now forming a consortium around multi-scale computing research. We are also planning to form other consortia in the near future.

To be able to better coordinate our increasing research activities, we are moving the Marathon Center of Excellence



Erdal Ozkan

in Reservoir Studies to a larger area in the Petroleum Engineering Department. The new research office will have study areas for ten to twelve students, a general meeting area with modern presentation equipment, a lounge area for our hard working students to take breaks, a small, private meeting room, and a computing room with two, most up-to-date computers. The room is expected to be fully functional by mid November. You can find more information about the center in Dr. Kazemi's letter.

In addition to my research activities, I continued to teach my regular courses: undergraduate and graduate well testing, horizontal wells, and applied mathematics for fluid flow in porous media. I have also continued coordinating our graduate program. We have been enjoying record high enrollment in our graduate program, similar to our undergraduate program, and looking forward to the support from the CSM administration to improve the working conditions of our faculty under this increased load.

I also led the PEGN315 summer field session to Houston and the Gulf Coast last summer with the help of Dr. Yildiz. The students enjoyed the field session (I am not sure if this is a good or bad sign). You will find a few pictures from the field session in this newsletter. Because of the large number of students, we had to split the field session into two groups. The lucky students came with us to Houston; the rest had to suffer their two weeks on the Rockies with Dr. Eustes and Dr. Miller (who, of course, might be telling a different story).

I also taught an applied mathematics short course at Baker Hughes/Inteq last summer. I was very pleased to see the interest from industry on such a fundamental topic and I enjoyed the interaction with the small group of highly motivated attendees. I also attended two SPE Advanced Technology Workshops and an R&D forum as a discussion leader. This year was my last year as the Executive Editor of SPEREE for the reservoir evaluation side. I tried to clean the paper backlog and improve the speed of the evaluation process. The waiting time is still unacceptably long, but with the improvements of the on-line system and the removal of the major backlog, I am hoping to see a more efficient process in the near future.

Turhan Yildiz

Greetings from Colorado, the beautiful, the home of the great outdoors. I just returned from a weekend fishing trip. Although I could not renew my personal fishing record and mostly caught sucker fish, it was a wonderful and relaxing getaway.

In February and March, I spent two weeks in Egypt to teach a course on advanced gas reservoir engineering. It was a great experience. During the summer, I joined Prof. Ozkan to run the PEGN 315 Summer Field Session first time ever. It was a great pleasure to meet with CSM alumni and old friends. I truly appreciate the hospitality of our alumni and their continued support for the field sessions. This semester, I enjoy teaching the graduate level multidisciplinary course Integrated Exploration and Development. I am also substituting for Prof. Graves, who is on her sabbatical, to teach the graduate level Petroleum Testing Techniques course.

During the academic year of 2004/2005, I authored/co-authored three journal articles and two papers in conference proceedings. All three articles are about perforated wells. The article "Effects of Formation Damage and High-Velocity Flow on The Productivity of Perforated Horizontal Wells", which I co-authored, has appeared in August 2005 issue of *SPE Reservoir Evaluation & Engineering*. The articles "Productivity of Selectively Perforated Horizontal Wells" and "Assessment of Total Skin Factor in Perforated Wells" will appear in *SPE Production & Facilities* and *SPE Reservoir Evaluation & Engineering*, respectively.

I am also collaborating with Prof. Christiansen on a research project sponsored by Stripper Well Consortium. In conjunction with the project "New Technology for Unloading Gas Wells," we will investigate the transient multiphase flow phenomena during gas well loading and unloading.



Turhan Yildiz

Attention CSM Alumni
You asked for it and you got it:

MASSADONA FIELD CAMP REUNION

All Classes Invited



The PE Department
is hosting a
fundraising reunion at
the Massadona field
camp area

June 1-4, 2006.

**Round up your old
buddies and come see if
it's all that you
remember!!**



**Bring your family and give
them the experience
they've been hearing
about all these years!!**

Get More Information At:

http://www.mines.edu/academic/petroleum/dept_info.htm

Student Organizations

Society of Petroleum Engineers

by *Steven Happ*, President

The Colorado School of Mines Petroleum Engineering Department has been part of the university's academic excellence for 89 of the school's 131 years of existence. For the last 23 years, the Mines student chapter of the Society of Petroleum Engineers (SPE) has helped students get involved and educated about their future.

My name is Steven Happ and I am the 2005-2006 president for the Society of Petroleum Engineers student chapter. The Mines SPE chapter is 1 of 131 international chapters that can be found in 42 different countries. On campus, we pride ourselves as being one of the largest organizations, noted for our involvement in school activities. Anyone who has a desire to learn more about the oil and gas industry is welcome to become a member.

Members of SPE can benefit from the organization in a variety of different ways and levels. Those benefits include being exposed to technical presentations from distinguished industry leaders on a wide range of issues. The technical presentations are also a time for students to network with the presenters for internships, jobs, or future encounters. Lastly and most importantly are the friendships between fellow students that are indis-



Steve Happ

pensable throughout their academic careers and lives.

To get the year started off, SPE will have a booth set up during the Celebration of Mines to inform new freshmen or undecided students about what SPE is and if it would be right for them. The biggest event of the semester is going to be the chapter's trip to Dallas for the Annual Technical Conference and Exhibition (ATCE). This gives all students a chance to see the newest technology, listen to paper presentations, form new contacts, look for internships or jobs, and cheer on our PetroBowl team while realizing what a great career path they have chosen. The major event in the spring semester will be the Joint Session Dinner that we have every year with the Denver Professional Chapter. This gives students a chance to meet with alumni and industry professionals from the area if they were not able to attend a lunch meeting. There will also be smaller events taking place throughout the year.

This year, I'm challenging myself to make SPE a stronger group with the help of all of the highly motivated officers. We would like to thank all of the companies that give charitable donations to SPE enabling us to participate in many activities. If you're interested in learning more or getting involved in the Mines SPE student chapter, you can find further information on the internet at www.mines.edu/stu_life/organ/spe/index.html or email me at shapp@mines.edu. Thanks and Go Diggers!

Pi Epsilon Tau

by *Cathy Tolliver*, President

The Petroleum Engineering honor society, Pi Epsilon Tau (PET) was founded at the University of Oklahoma in 1947. This organization was founded upon the ideals of loyalty, fellowship, and cooperation, and aims to foster close bonds between members and maintain high ideals and standards in the engineering profession. The PET chapter at Mines is ready for another active year. The chapter currently has more than twenty members, consisting of both graduate and undergraduate students. In addition to students selected upon academic, social, and community merit, all faculty at Mines are members of PET.

Last spring, the chapter completed a community service project for the department that included cleaning and painting one of the department's classrooms. This year, the chapter hopes to complete more projects within the department and community, initiate new members this fall, and continue to foster bonds between students, faculty, and industry. Furthermore, we hope to continue to promote the Petroleum Engineering department by helping with *Discover CSM* days, where potential students have the opportunity to discover the opportunities that Mines, and the Petroleum Engineering department, have to offer.

In April, the chapter elected Cathy Tolliver as President, Said Al-Lawati as Vice President, Sean Horigan as Secretary, Megan Starr as Treasurer, and Eric Romberg as Initiation Chair. As newly elected officers, we all look forward to a productive and fun year. With questions concerning the Mines chapter of PET, or suggestions for service projects for the chapter this year, please contact me, Cathy Tolliver, at ctollive@mines.edu.



Cathy Tolliver

American Association of Drilling Engineers

By *James Bland*, President

Well another year has come and gone at the Colorado School of Mines. It's that time again for us to finish up those summer internships and start hitting the books again. My name is James Bland and I am this year's President of the local chapter of the American Association of Drilling Engineers (AADE) at the Colorado School of Mines. This chapter was founded in 1996 and was the first student chapter in the nation.

AADE offers the Petroleum Engineering students to learn about real world drilling practices taking place in the drilling industry today. This is done with bi-monthly meetings where guest speakers from industry come in and speak on various hot topics happening in the industry. This year the officers and myself have received requests from many companies who want to come speak at these "lunch and learns." Also as with last year, we are in the planning stages of getting some weekend trips planned for

tours of some of the more interesting drilling operations going on with-in reasonable driving distance of Golden.

In the near future the AADE members will be showcasing our organization at the Celebration of Mines at the beginning of September. This is usually a joint venture with student chapter of the Society of Petroleum Engineers (SPE) here on campus. A few joint events with SPE are also in the planning stages for later this fall. These include presentations that deal with the drilling industry but also have a strong emphasis of Petroleum Engineering involved. There is also

an AADE BBQ being planned for later this fall so new members can meet the officers and our faculty advisor, Dr. Bill Eustes. Members will also be encouraged to attend the joint session with the local Denver Chapter of AADE. This will give them the chance to meet and talk to actual drilling engineers in the work force. This is a great opportunity for students to make contacts for future employment.

The officers and I are excited for what is to come this year for AADE. We can never have too many events

planned so feel free contact me if you would like to speak. My email address is jbland@mines.edu.



James Bland

Field Session 315



Copano Bay, TX



— Copano Bay, TX - with TX Field Session



Tyson Foutz at Cudd with R.M. Field Session



Caza Rig #17 - CO

Scenes From Massadona

PEGN 316 Field Session II

Global warming has come to Massadona! Or at least for this year's field camp it did. Of the 14 days of camp, 13 were warm and sunny with some temperatures topping in the 90° F range. For those of you who remember days where the wind was blowing and the snow was falling, you will understand what a treat this year was for me, my co-instructor Donna Anderson, our two TA's, and the 29 students. Of course, you will also likely agree that this year's group got off easy!



Look!! It fits!

again available in camp for those hardy souls who show disdain toward fleeing to the Rangely recreation center. The second addition came in the form of two **NEW** (*gasp*) cabins added in anticipation of

The new additions to camp this year came courtesy of both this year's Junior/Senior class and the PE department itself. From the Junior/Senior class, the old in-camp showers were rebuilt and updated. The showering area had fallen into a state of disrepair and needed some serious work. I'm now happy to report that "warm" showers are once



Students on one cold day.



2005 PEGN 316 group photo.

Scenes From Massadona

the large class size expected next spring. Based on numbers from the first field sessions, PEGN 315, this year, we expect to have around 70 students in Massadona next year and needed some additional living space. Needless to say, next year's class size will bring some challenges that haven't been seen at Massadona for several years.

As always, this year's session consisted of the classic geology-themed exercises with integration into petroleum production. We need to thank several people who hosted our group this year including Eric Bridgford and Tina Johnson from Encana, Ron Wackowski of Chevron, Steve McPherson of Kerr McGee, and Russ Griffin of Questar. Also thanks need to go to Production Logging Services (PLS) for once again conducting their production logging school.

In closing, I would like to bring your attention to the Massadona reunion advertisement included in this year's newsletter. The time seems right to hold this all-class reunion, and we hope you will consider joining us in visiting the camp while remembering good times and meeting up with old friends. I have included a few pictures in the newsletter from this year's camp that I hope you will enjoy.



The Smurf brigade visiting Encana's operation.



Getting ready for the annual raft trip.



A beautiful Massadona moonrise.

We are currently updating the PEGN 316 website for 2005 and would encourage you to visit it at <http://www.mines.edu/academic/petroleum/316/PEGN316.html> to view more pictures.

Alumni Reception at SPE Conference

To our Petroleum Alumni:

Your attendance is requested at the Colorado School of Mines, Petroleum Engineering Alumni Reception to be held during the Annual SPE Technical Conference in Dallas, Texas, October 9 through 12, 2005. The Alumni Reception will be held on Tuesday evening, October 11th at the Wyndham Anatole Hotel, the Monet Ballroom, from 5:30 to 7:00 pm. The charge will be \$25, because students are free. As always, there will be plenty of food with a cash bar.



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