



# COLORADO SCHOOL OF MINES

EARTH • ENERGY • ENVIRONMENT

## PETROLEUM ENGINEERING

### NEWSLETTER

VOL. 19, NO. 1 SEPTEMBER 2015

## GREETINGS FROM DR. ERDAL OZKAN

PROFESSOR AND DEPARTMENT HEAD



Erdal and his wife, Alev on a tour boat on the Bosphorus, Turkey, as part of the Annual Graduation Function and Seminar Program of the Istanbul Technical University, Petroleum Engineering Department (his Alma Mater) in June 2015.

Greetings,

The theme of this year's newsletter is "The Way Forward." We do not use this theme to imply a process of transformation; we rather use it to describe the evolution of the Department from its strong roots and traditional strengths to a contemporary leader in petroleum engineering education and research. As I stated in the last

year's newsletter, the "CSM PE Department has always had an impeccable standing in petroleum engineering education... In the last decade, we have also complemented our leadership challenge in education with the mission of creating a substantial research portfolio." Therefore, what we emphasize by "The Way Forward" is the progression of our name-brand into the needs of today and the future.

As part of our efforts to keep the CSM PE Department as a leader in its discipline, we have hired four tenure-track faculty and two teaching faculty in the past two years and we are continuing the search for another tenure-track faculty. Dr. Mansur Ermila joined our team as an Associate Teaching Professor in Spring 2015. In Fall 2015, Dr. Jorge Sampaio will join us as an Associate Professor and Elio Dean as Assistant Teaching Professor. They will be followed by Rosmer Brito, who, upon completion of her PhD, will join us as an Assistant Professor in Spring 2016. These additions to our faculty are

part of a plan to complement our existing strength in teaching and to emphasize our capabilities in research beyond our traditional areas of focus. A look at the CSM FY 2015 statistics may reveal the importance of hiring new faculty.

With 992 students (BS: 889, GR: 103), the PE Department hosts one-sixth of the total student body at CSM, which is slightly behind the ME Department (Table 1). Its student/faculty ratio of 75.3, however, is unmatched (Table 1 and Figure 1) by any CSM department. Similar trends are evident across the board: The PE Department graduated the largest group of BS students in Spring 2015 and has the highest ratios of the degrees granted per faculty in all categories (BS, ME, MS, and PhD). Approximately 20% of our students are female (CSM: 27%) and 15% of our undergraduate students (CSM: 3.5%) and 57.8% of our graduate students (CSM: 24.5%) are international.



Erdal at the December 2014 graduation reception with PE student (Lia) Carelia De Jesus Rojas Unamo who graduated with a MS in Petroleum Engineering.

### PE STATISTICS FOR 14-15

New Research  
Contracts \$5.2MM

### GRADUATES

PhD	10
MS/ME	28
BS	185

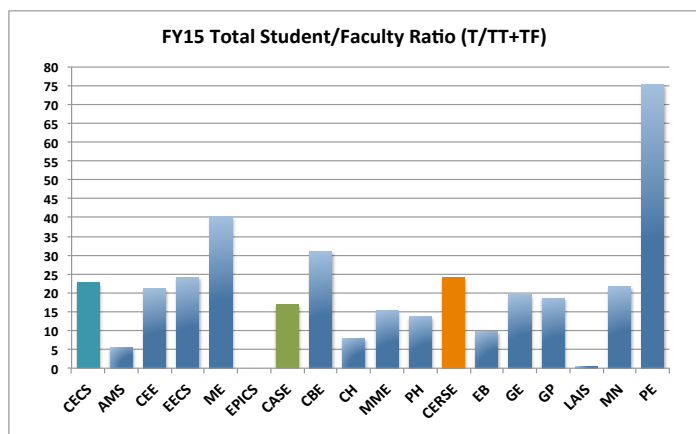
### CURRENT

PhD	47
MS/ME	53
Seniors	265
Juniors	208

\*Sophomore/Freshmen - do not declare until Spring Semester

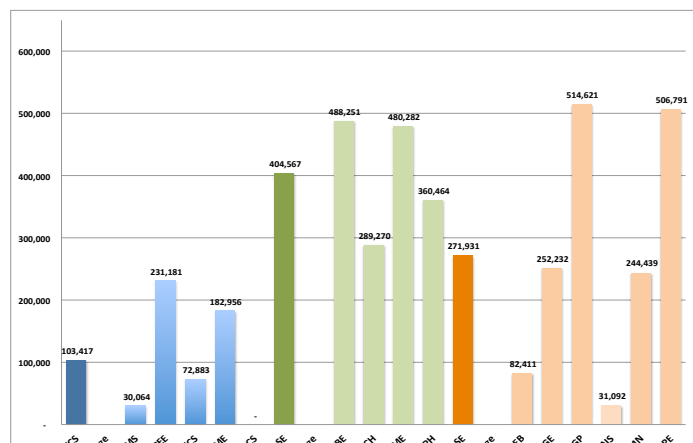
	FY15 Faculty		Majors FY2015								Ratios			
	Numbers													
	T/TT	TF	BS	MS-Non Thesis	MS-Thesis	PhD	GR	Total	BS / (T/TT+TF)	MS-Non- Thesis / T/TT	MS-Thesis / T/TT	PhD / T/TT	FY15 Stu/Fac T/TT+TF	
<b>CECS</b>	70.6	29.5	1,831	175	97	165	437	2,268	18.2	2.4	1.4	2.3	22.8	
Applied Math & Statistics	14.0	8.0	84	3	16	19	38	122	3.8	0.2	1.1	1.4	5.5	
Civil & Environmental Engineering	17.0	5.8	322	74	30	56	160	482	14.1	4.4	1.8	3.3	21.2	
Electrical Engineering & Comp Sci	17.0	7.0	469	49	23	38	110	579	19.5	2.9	1.4	2.2	24.1	
Mechanical Engineering	22.0	5.0	956	49	28	52	129	1,085	35.4	2.2	1.3	2.4	40.2	
Epics	0.0	3.7												
<b>CASE</b>	65.0	19.5	1,110	26	91	254	371	1,481	12.5	0.4	1.3	3.9	16.9	
Chemical & Biological Engineer	16.0	7.5	634	7	12	74	93	727	27.0	0.4	0.8	4.6	30.9	
Chemistry	14.0	5.0	83	1	10	56	67	150	4.4	0.1	0.7	4.0	7.9	
Metallurgical & Materials Eng	18.0	1.0	156	15	46	72	133	289	8.2	0.8	2.6	4.0	15.2	
Physics	17.0	6.0	217	3	23	52	78	315	10.3	0.2	1.4	3.1	13.7	
<b>CERSE</b>	71.2	23.0	1,313	165	221	189	575	1,898	17.2	2.6	2.8	2.7	24.2	
Economics and Business	11.0	3.0	20	74	13	29	116	136	1.4	6.7	1.2	2.6	9.7	
Geology	17.0	1.0	150	32	113	55	200	350	8.3	1.9	6.6	3.2	19.4	
Geophysics	12.0	0.0	135	6	41	41	88	223	11.3	0.5	3.4	3.4	18.6	
Liberal Arts & Intern't Study	13.0	14.0		9	4		13	17	0.7	0.7	0.3		0.9	
Mining	8.0	0.0	119	31	6	18	55	174	14.9	3.9	0.8	2.3	21.8	
Petroleum	10.2	3.0	889	13	44	46	103	992	67.5	1.3	4.3	4.5	75.3	
<b>TOTAL</b>	206.2	70.0	4,254	366	409	608	1,383	5,637	16.0	1.8	1.8	3.0	21.3	

**Table 1 – CSM Enrollment and Student / Faculty Ratio Statistics by Department for Fall 2014 (Source: Academic Affairs FY 2015 Operations Manual)**



**Figure 1 – CSM Student / Faculty Ratio Statistics by Department for Fall 2014 (Source: Academic Affairs FY 2015 Operations Manual)**

The research awards of the PE Faculty in FY 2014 amounted to \$5,166,279 (fourth in campus). In terms of the research awards per faculty (Figure 2), the PE Department (\$506,791) is only slightly below Geophysics (\$514,621), and the average PE faculty generates approximately twice as much research funding as the average CSM faculty (\$259,972).



**Figure 1 – CSM Student / Faculty Ratio Statistics by Department for Fall 2014 (Source: Academic Affairs FY 2015 Operations Manual)**

The above numbers may be interpreted in favor of hiring more faculties. However, with the volatility of the oil price and the industry's current hiring trends, our student numbers are subject to fluctuations. My generation of petroleum engineers

has been through at least eight (depending on how you count them) downtimes of the oil price and the industry. We have learned that it always comes back up. However, experience has taught us to not plan for the uptimes. The placement statistics for the Spring 2014 graduates was an impressive 94%. The official numbers are yet to be released for the Spring 2015 graduates, but we know that some of our students could not find employment opportunities or lost their offers. This will bring down our placement statistics and, in the long run, may influence our enrollment figures.

Furthermore, with the addition of the 6 new hires in the past two years, our number of full-time faculty has increased from 12 to 18. This 50% increase brings us the additional responsibility of mentoring and integrating the new faculty to our existing structure, reassessing our resources versus our needs, and redistributing and realigning our capacity to increase not only the efficiency, but also the quality of our teaching and research. Therefore, in addition to increasing the quantitative strength and the breadth of specialty of our faculty, we have been reviewing our undergraduate and graduate curricula. Our objective is to revise their contents and organizations to meet the changing needs of the modern oil and gas industry and to suit the learning styles of the Millennials, who make up the current generation of students. Our main challenge in these efforts is to preserve the fundamentals while eliminating the obsolete and focusing on the new essentials without falling for the fashionable. Our curriculum revision efforts will continue in the new academic year. We will also reach out to our alumni and the industry professionals to incorporate their suggestions in the process of revisions.

Before concluding this message, I would like to share with you the great accomplishments of our Faculty: Two of our faculties have been rewarded with promotion for their great contributions to the CSM, PE Department, and the professional society. Dr. Xiaolong Yin has been promoted to Associate Professor with tenure and Dr. Linda Battalora has received her promotion to Teaching Professor. You may want to congratulate them when you communicate with them or meet with them at the SPE 2015 Annual Meeting in Houston, Texas, September 28-30. It is also my great pleasure to announce that Dr. Hazim Abass will receive the SPE Honorary Membership designation and Dr. Yu-Shu Wu will be awarded the SPE Distinguished Member designation during the SPE 2015 Annual Meeting. This year, Dr. Manika Prasad has brought us another excellent recognition. She has been selected as the recipient of the SEG's Outstanding Educator Award for her contribution to the CSM Center for Rock Abuse. She will receive the award during SEG's 2015 Annual Meeting in New Orleans, Louisiana, October 18-22. We are very proud of them and hope that you can join us to show our pride and support of them at the award ceremonies.

Thanks for your continuing support and please stay in touch.



## RAMONA M. GRAVES - DEAN OF CERSE



Hossein and Ramona at KAUST – University in Saudi Arabia.

made a trip to Houston with the Foundation to visit alumni and corporate supporters. However, judging from the series of meetings I've had with him and meetings scheduled, he is doing much more than socializing. I look forward to working with him.



Walking the canopy 100 ft above the Amazon rainforest.

year at Mines and if history is an indicator, the productivity and engagement of the current faculty won't decrease and they will set a very high standard for the new faculty.



Hazim and Ramona at the Aramco sponsored conference Deep Space/Deep Ocean held in Houston.

Mines is starting a new academic year with much excitement in the air! Although our new president, Paul Johnson has been on campus for less than a month as I write, there have been numerous sightings. I've seen him at a McBride Honors Program retreat, a faculty farewell party, a faculty welcome party, and even playing volleyball in the commons with the administrative faculty. Paul has also

The department also is a prime mover on several of Mines global strategic initiatives that not only involve PE but also other department in CERSE and across the other two engineering colleges. Countries that will have even great involvement with us over the next year include Kazakhstan, Kuwait, China, Saudi Arabia, Peru, Spain, and Morocco.



Geri Thompson, Ramona and other guy piranha fishing.

Personal notes: Still love my new calling as a grandma! Just completed nine-day babysitting duty with Oliver while parents on vacation. And speaking of vacations - I actually took a fantastic one this year with Bob Thompson's wife, Gerri, and daughter Katy. We thrived and survived in the Amazon rainforest, Machu Picchu, and the Galapagos Islands. Besides this being a great adventure, I was really happy to discover that I could adjust to no (well almost no) email contact for three weeks.

CERSE has a new communication/information specialist that has been doing a fantastic job of marketing CERSE good news and great activities. We have Facebook, tweets, newsletters, and much other great web "stuff". My learning curve on using some these new-fangled communication methods has been steep. Check them out often and they change daily.

[facebook.com/HumansofMines](https://facebook.com/HumansofMines)



Blue-footed Booby

### HAZIM ABASS - PE PROFESSOR, RECOGNIZED WITH THE MOST PRESTIGIOUS 2015 SPE INTERNATIONAL AWARD



Dr. Hazim Abass

Hazim Abass, Mines PE Professor, has been awarded the 2015 SPE/AIME International Award of Honorary Membership. Honorary Membership is the highest honor that SPE presents to an individual and is limited to 0.1% of the SPE total membership. It is awarded to the elite group who contributes outstanding service to SPE or demonstrates distinguished scientific or engineering achievements in the fields within the technical scope of SPE.

at the Advanced Research Center of Saudi Aramco (2001-2014). Earlier experiences included: Development Engineer at the Halliburton Research Center in Oklahoma (1988-1996), Halliburton-Consultant at the PDVSA Research Center in Los Teques, Venezuela (1996-2001), and a petroleum engineer at the Northern Petroleum Organization in Kirkuk, Iraq (1977-1978). He holds a B.Sc. from the University of Baghdad (1977), an M.Sc. (1985) & Ph.D. (1988) from the Colorado School of Mines – all in Petroleum Engineering.

Professor Abass is the 2015 recipient of the 2012 SPE International Award – Completion Optimizations and Technology, the 2012 SPE Middle East Regional award – Completion Optimizations and Technology, the 2009 SPE International Award – Distinguished Member, and the 2008 SPE Middle East Regional award – Production Operations. He mobilized practical applications of the rock mechanics discipline to solve petroleum engineering related problems. He introduced new concepts and innovative technologies related to oriented perforation, oriented fracturing, sanding tendency, fracturing horizontal wells, acid and proppant hydraulic fracturing, water coning, gas hydrates, and coalbed methane. He served the SPE in many committees and technical events as chairman, co-chairman, member, technical editor, distinguished lecturer, discussion leader, and speaker. He holds 11 US patents, has written more than 50 technical papers, and contributed to 3 industrial books.

"It is an honor to represent CSM of this international recognition; I am indebted to all who contributed to building my career over the years," remarked Abass upon the news. Abass will be presented this prestigious award by the SPE President, Dr. Helge Hove Haldorsen, at the President's luncheon during the SPE Annual Conference and Exhibition in Houston, Texas, USA, on September 29th, 2015.

Before joining CSM in 2014, Dr. Abass was a senior consultant and the Unconventional-Resources Focus Area Champion

**Congratulations to Hazim Abass and CSM!**

### LINDA ANN BATTALORA



Dr. Linda Ann Battalora

Now in our fourth academic year in our beautiful building, Marquez Hall, the hallways, offices, study rooms and classrooms are overflowing. Not only has enrollment increased but also new faculty members joined our team. The Petroleum Engineering (PE) Department is thriving.

This semester I am teaching PEGN681 Petroleum Seminar and two sections of PEGN310 Petroleum Reservoir Fluids with

Coordinator for our four PEGN315 Field Sessions. My promotion from Teaching Associate Professor to Teaching Professor was announced at the Faculty Forum in April. In May, I led a group of 52 students to Southern California (Ventura, Bakersfield and Long Beach) on the annual California PEGN315 Field Session. Most of my summer was spent hiking, camping, traveling and writing.

I continue to serve the Society of Petroleum Engineers International (SPE) in a variety of capacities: Faculty Advisor to the CSM Student Chapter, Denver Section Board Member, Sustainable Development Technical Section Steering Committee member, Process Safety Workgroup member, HSSE-SR Advisory Committee member, 2016 SPE International HSSE-SR Conference HSE Management Subcommittee Chair and more. Not only are these volunteer activities enjoyable, but they also provide a bridge from industry to the classroom as I invite industry colleagues to participate in classroom discussions and activities with my students. Last spring, a team of PEGN681 students presented their final project case study during the SPE sustainability training course at the 2015 SPE HSE Conference in Colorado.

Dr. Mansur Ermila. Last spring I taught one section of our PEGN439 Multidisciplinary Engineering capstone course with Drs. Tom Davis and Steven Sonnenberg. I also taught Environmental Law for both the PE Department and the Civil & Environmental Engineering (CEE) Department and was



## BATTALORA CONTINUED

Our SPE Student Chapter had a fantastic year, thanks to leadership and organizational skills of our Student Chapter officers! We received over \$38,000 in undergraduate scholarships from SPE Denver Section as well as financial support for our Petro Bowl Team competitions and travel to



Rocky Mountain National Park, Calypso Falls

ATCE. The student chapter organized their annual major fundraisers, a golf tournament and a clay shoot. Both of these activities had great industry turnout and they are slated again this year.

The annual Joint Session Meeting with the SPE Denver Section was a tremendous success. For the fourth year, the

event was held at CSM in Freidhoff Hall. The keynote speaker was previous SPE President Dr. Nathan Michan. We were pleased with the tremendous turn out from the SPE Denver Section and industry and are grateful for their financial support. We are also very proud of our SPE Student Chapter Officers for their tremendous leadership, professionalism and organizational skills that made this event so successful.

I continue to work closely with the Association of International Petroleum Negotiators (AIPN). One of my favorite "duties" as a member of the Education Committee is to judge the annual Writing Competition that is open to all universities that have an affiliation with AIPN. I enjoy the opportunity to read and rate the papers and to work with other members of the

Education Committee to select winners to attend the Annual Conference. Additionally, I advised a graduate student from the LAIS MIPER program who was awarded \$5000.00 to perform summer research related to her Master's thesis topic.

Outside of CSM, I maintain my legal consulting practice in environmental and international oil and gas law. It is a pleasure to work with my colleagues Laure Bonna, Philippe Auzas, and Audrey Grosset at Bonna Auzas Avocats of Paris, France and to occasionally have them co-teach with me a short course on international hydrocarbon agreements.

I continue to take ballet and pointe classes, yoga, and cardio classes. A member of the Colorado Mountain Club, I logged in many miles snow shoeing, cross-country skiing and hiking since the last newsletter. I look forward to more of the same in 2016. "Rosebud," my brilliant Boston Terrier, will be seven years old in December. Where does the time go? This summer she had medial patellar luxation surgery and recovered beautifully. She is as spunky as ever! (smiling)

Thank you for your continuing support of the PE Department and Mines! We look forward to seeing many of you at ATCE 2015 in Houston and of course, we always enjoy seeing you on campus for alumni events and recruiting!



"Rosebud"

## ROSMER M. BRITO



Rosmer M. Brito

In 2011, I attended the ATCE in Denver and found the city beautiful and exciting to say nothing of the breathtaking views around it; in that moment I did not imagine that five years later I would get an offer for a Tenure-Track Assistant Professor position at CSM and that Golden would become my new home. This was amazing and exciting news for me after a tough interview. I should admit that I was scared when Dr. Kazemi, with a tough voice,

asked what was novel about my research. I think I was able to convince him when before he left the room, he tapped my shoulder and told me, "Good job!" I really enjoyed when Al and Joe showed me the laboratories, especially the High Bay lab where I look forward to building experimental facilities related to production. One of the final moments of my interview was my presentation for the students and professors. After a whole day of meetings my voice was almost gone but I was really happy to talk about my research at the University of Tulsa. I want to thank all the faculty and staff at the department that made me feel welcome and showed me why I would like to be part of the department.

At the University of Tulsa Horizontal Well and Artificial Lift Projects (TUHWALP) research group, I am studying the effect of well trajectory on horizontal gas and condensate well performance. I performed experimental studies in an outdoor

### BRITO CONTINUED

experimental facility for different well configurations and flow conditions and developed a model to predict where and when liquid accumulates in the well based on the well geometry, completion, and expected production decline. This will help production engineers to optimize the well construction, artificial lift design, and operation to plan ahead-of-time well interventions to minimize well downtime and production losses, optimize the well production, and finally reduce operational cost. This has a significant impact, particularly in the current conditions in the oil industry where the call to reduce costs is universal.



My last night at the rig before coming to the USA to pursue my graduate studies ...



Fellow TU students and me taking some free time during the ATCE 2011 to go around Denver...

Before coming to the USA, I worked as a production engineer at a Joint Venture between Shell and Petroleos de Venezuela in Venezuela. As a production engineer, I was responsible for the functional design and technical integrity of the oil production systems from the reservoir to the surface to optimize well production and guaranty its integrity.

My first semester at CSM will be in Spring 2016, I look forward to working and collaborating with the professors and students and developing new classes and research in the following areas: production system optimization and re-engineering, nodal analysis, well modeling, multiphase flow, transient flow modeling, slug flow characterization, severe slugging, liquid loading, and artificial lift systems. If you would like to get involved in this research area, I will be happy to give you more information about it.

### ELIO DEAN



In front of the CEPSA tower in Madrid (where I spent most of 2014)

Greetings from the new guy. I will use this as an opportunity to introduce myself to the Petroleum Engineering Mines community, which I have been a part of since my undergraduate days. The first thing to say is that coming back to Mines as faculty has been a surreal experience – much like going back to Massadona this summer (PEGN 316), a decade after I took it as a student, to find that the rats haven't completely eaten the seismic trailer (yet) and that there are now "rules". It's

also fun to think that Ramona (official title: Dean Graves) is my boss and many of my past professors are now my colleagues. I'm thankful they don't, or at least pretend to not remember how big of a pain I was during my undergraduate days.

I have two degrees from Mines, a Bachelor's degree in Petroleum Engineering and a Master's Degree in Mineral and Energy Economics. I worked for ExxonMobil Development Company (Angola and Russia) and since 2011 have worked



Geology, geology, geology PEGN 316



### DEAN CONTINUED



Looking at Core in Kuwait (Surtek, KOC and KEC) – Notice Anfal Farag (CSM '14), she is the one on the left.

for Surtek (Chemical EOR consulting firm and laboratory services) as a senior reservoir engineer on several international EOR projects.

This summer has filled my travel quota so that I can avoid it during the school year. During the summer I found myself in Suriname, Guyana, Kuwait, Germany, Anguilla, St. Marteen, St. Barths, Massadona, and Spain. Luckily my travels were a balance of vacation and business.

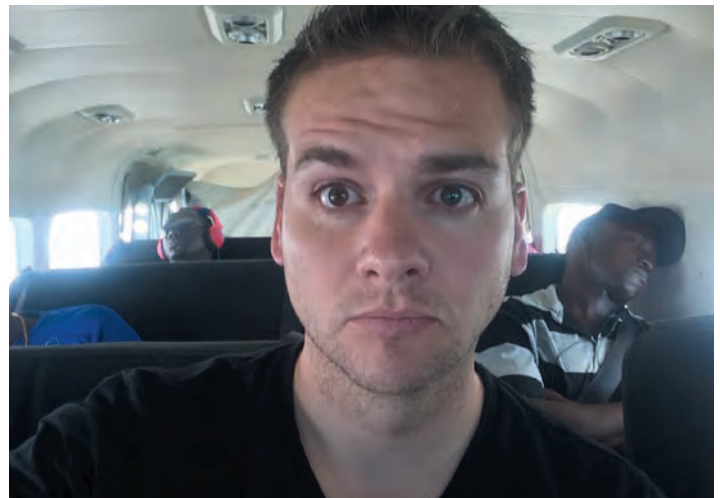
I am married, have two children, and expect a third soon. I'm a fan of traveling (when my family can accompany me), sailing, snowboarding, and just being outdoors.

I started as an adjunct professor, teaching a section of PEGN 439 Senior Design, in January 2015 and will be teaching it

again in the spring semester. In the fall, I will teach PEGN 422 Petroleum Economics and will co-teach PEGN 414 Well Test Analysis with Dr. Ozkan.

I'm looking forward to the 2015-2016 academic school year, getting to know the students, and hope to be able to teach them something.

Cheers,  
- Elio



Selfie on a 10 person plane flying from Guyana to Suriname.

### MANSUR ERMILA



Mansur Ermila

fortunate enough to do my bachelors or my masters at CSM I still had high hopes of being here someday. After getting my masters in petroleum engineering from Hungary, I went back to

It has always been my dream to come to Colorado School of Mines. And until this day I cannot believe that I have been fortunate enough to do my PhD at my dream school and to also get to be a member of the incredible CSM staff. In 1988 I was studying petroleum engineering at the University of Tripoli in Libya. While I was doing my bachelors a lot of my professors used to talk about Colorado School of Mines, so it became my dream to study in it one day. Even though I wasn't

Libya and worked in the petroleum fields for a while, I gained a lot of experience from working there and I got to practice all the knowledge I had learned during my undergrad and masters years in the fields. After working in the fields for a few years, I moved on to being a professor at Tripoli University. After teaching there, the University offered me a scholarship to do my PhD anywhere in the world. I applied to a few colleges around the world including CSM with little hope of being accepted. The day I received my acceptance letter was the best day of my life. I was finally able to make my dream come true. I moved here in late 2006 with my family. At that time my oldest daughter, Marwa, was 12 years old, Rehana was 8, and Abdullah was 6. Now Marwa is 21, Rehana is 17, and Abdullah is 15. Marwa is a student at Metropolitan State University and Rehana is a student at University of Colorado at Denver, my youngest child is 15 years old and will be a senior in high school in the fall as he was able to skip a couple of grades. They are all doing really well even though it was a bit hard for them to get used to the environment here at first and to learn a new language. Now they are all fluent in English as well as Arabic, and Colorado has become their home.

## ERMILA CONTINUED

Shortly after we moved here, I started taking PhD classes in petroleum on January 2007 and I graduated in May 2012. Shortly after I received my degree, I started working as a research assistant for two and a half years. Last January 2015 I was hired as a teaching associate professor in the PE department. Throughout my experience in the U.S. I have learned from the amazing people around me. I have been to the field sessions five times so far and I have learned more than I ever thought I would. I loved interacting with everyone there and learning new things from them. I enjoyed working

with the students and supervising them. I am very grateful to be working amongst such motivated and hardworking people. My colleagues have had a huge impact on the success that I have achieved. They have always been willing to help if I ever had any questions, they always gave me great advice when I was shaky about making certain decisions, and they continue to guide me when I stumble upon anything with which I am not familiar. CSM has given me a chance to achieve not just my dreams, but also the dreams of my family; it has become a part of us, and I hope to be a part of it for a long time.



## ALFRED W. EUSTES



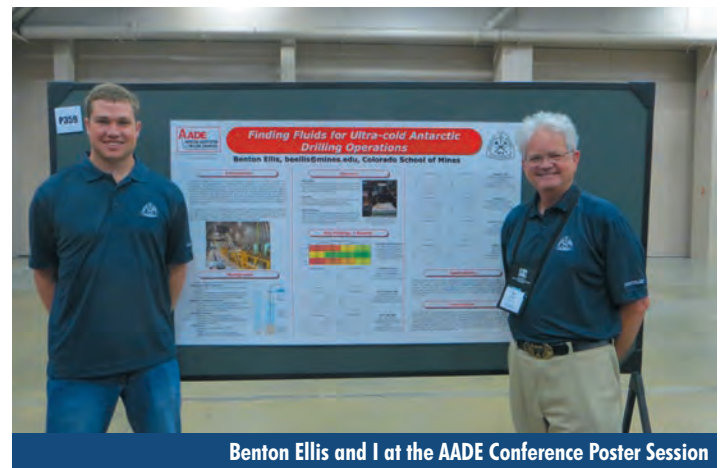
Susan, Lacey, and I hiking in the Flatirons

Well, I am back. As noted last year, I was on sabbatical for the 2013-14 academic year. But, I returned to academia at full force. This last academic year, in the fall, PEGN 311, Drilling Engineering, had 233 students in four sections and ten labs. In the spring, PEGN 361, Completion Engineering, had 220 students in three sections, PEGN 102, Introduction to Petroleum Engineering, had 91 students and PEGN 594, Directional Drilling, had 19 students. I bring these up because I am already seeing a decrease in the number of students this fall (down to 204 as of this time). That is a commentary on the state of our business. However, given my thirty-seven years in this business, this is the fifth decline I have seen (sigh...). The 1987 one was brutal; however, it set me on this path towards academia and this career. And in each time, the business changed and improved. So, even the bad times can have a silver lining, to mix metaphors.

In the area of interesting activities, Will Fleckenstein and I am still working with CU Boulder on the National Science Foundation's (NSF) Sustainable Research Network on Unconventional Natural Gas Development in the Rocky Mountain Region. We have students working on finite element models on wellbore integrity and a team working on delineating the historical risks and probability of aquifer

contamination. Two papers have come out this year at the SPE's Western Regional Meeting in April and the Kuwait Oil and Gas Conference this coming October.

- SPE 174002 Modeling Fugitive Gas Migration in Unconventional D-J Basin Wells Under Lifetime Stresses D.C. Wilson, A.W. Eustes, W.W. Fleckenstein
- SPE 175401-MS An Assessment of Risk of Migration of Hydrocarbons or Fracturing Fluids to Fresh Water Aquifers: Wattenberg Field, CO; W. Fleckenstein, A. Eustes, C. Stone, P. Howell



Benton Ellis and I at the AADE Conference Poster Session

I continue to work with the NSF's ice drilling and coring community as their industrial liaison. One of our students did a study of ice coring drilling fluid under extreme cold temperatures (including a stint at the National Ice Core Laboratory in Lakewood). He presented at the 2015 AADE Technical Conference in San Antonio and won first place in the student contest!

- Finding Fluids for Ultra-cold Antarctic Drilling Operations B. Ellis, A. Eustes, T. Kuhl, C. Gibson, M. Albert



## EUSTES CONTINUED



Dr. Abass and I soaked from sitting in the rain at the Spring Commencement.

- There are two current projects with the National Renewable Energy Laboratory in geothermal applications. The first is a project looking at exporting oil and gas drilling technology and management techniques to geothermal drilling operations where applicable. We are using many undergraduates and a few graduates to ferret out drilling improvements by scrutinizing drilling data records. The other project is looking at the feasibility of using unconventional resource processes, such as horizontal drilling and fracture stimulation, to enhance geothermal resources. We have had four papers from this, two at the Stanford Geothermal Workshop in January and two at the Geothermal Resources Council meeting in Reno this September.
- SGP-TR-204 Optimizing Geothermal Drilling: Oil and Gas Technology Transfer M. Tilley, A. Eustes, C. Visser, W. Baker, D. Bolton, J. Bell, U. Nagandran, R. Quick
- SGP-TR-204 Design Considerations for Applying Multi-Zonal Isolation Techniques in Horizontal Wells in a Geothermal Setting J. Olsen, C. Augustine, A. Eustes, W. Fleckenstein
- GRC Optimizing Geothermal Drilling with Petroleum Technology K. Denninger, A. Eustes, C. Visser, W. Baker, D. Bolton, J. Bell, S. Bell, A. Jacobs, U. Nagandran, M. Tilley, R. Quick
- GRC Completion Design Considerations for a Horizontal Enhanced Geothermal System J. Olsen, A. Eustes, W. Fleckenstein, E. Eker, R. Baker, C. Augustine

Among other things going on, we have hired a new drilling faculty member, Dr. Jorge Sampaio. I am looking forward to working with him. I continue to work with the SPE Drilling Systems Automation Technology Section as well as the Education and Accreditation committee. I am still the AADE faculty advisor. I am also working with Dr. Tutuncu on the US State Department's Unconventional Gas Technology Engagement Program (UGTEP). Drs. Tutuncu, Ozkan, and I traveled to Kiev, Ukraine in March as part of the program. We also hosted a group from nine different nations in July. In addition, I continue with work with the Topcorp program. There should be a web video series coming out soon for regulators and policy makers.

My daughter is now a PhD student in pathology at the University of Utah, my son just finished up two years at Colorado State University, my wife continues her work at IHS, and I am still here at Mines.

I need to make a comment on social media. I don't. Well, at least most of them. I know some of you are on Facebook. I have an account; but, I typically check it once a quarter year. Maybe. I don't do Twitter, Google Plus, Instagram, whatever. I do look at LinkedIn and try to respond to that; but, it is a basic account. So, if you want to use social media with me, please use LinkedIn.

See you at the ATCE in Houston. Or the GRC in Reno the week before that! Or the IADC/SPE conference in Fort Worth. Or maybe here on campus?



Dr. Tutuncu and I in front of the "State Service for Geology and Bowels of Ukraine"

## WILLIAM FLECKENSTEIN



Stone-Henge

Greetings from Golden.

It has been another interesting year, with much travel to places as diverse as London and the Middle East. I launched several initiatives that began when I was the Interim Petroleum Engineering Department Head, which I am continuing to pursue. I traveled to Madrid, Spain last year to teach a class in Subsurface Engineering and meet with Repsol to discuss a closer relationship with Mines that Dean Ramona Graves is finalizing. We continue to collaborate with the Kuwait Oil Company to establish a world-class research center outside of Kuwait City as we are working on a longer-term relationship. This will help Kuwait meet their oil and energy challenges and give Mines the opportunity to perform research needed to find solutions for those challenges. I found the Kuwaitis to be marvelously hospitable hosts, and we reciprocated the hospitality when they came to Golden. The weather cooperated in June when we hosted a workshop to negotiate a Master Research Agreement, providing rain showers nearly every day and maintaining temperatures at a cool 70 degrees. Meanwhile it was a mere 50 degrees in Kuwait, but in Celsius, so they really enjoyed cooler weather. The delegation was also very impressed with NREL, and CoorsTek, who both gave

great tours of their capabilities. The experience impressed the Kuwait delegation with the world-class nature of research presented by Mines and its neighbors.

Dr. Eustes and I have continued to research the sustainability of natural gas production as part of a NSF funded project. We have found little evidence of migration of natural gas to aquifers through wellbores, and no evidence of fracturing fluid entering aquifers through wellbores during fracturing operations or during subsequent well production. The EPA recently published a report on the impact of shale development on water supplies that stated: "we

found specific instances where one or more mechanisms led to impacts on drinking water resources, including contamination of drinking water wells. The number of identified cases, however, was small compared to the number of hydraulically fractured wells." These are results that agree with the research we have done in Colorado, and the drilling community can be proud of their efforts to protect our water resources.

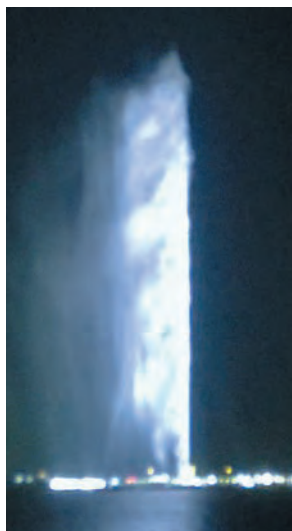
Everyone is well aware of current lower prices of oil and gas that consumers, particularly in the United States, are enjoying. I traveled to many locales, including New Zealand and KAUST, in Saudi Arabia, to discuss the impacts of shale development. The obvious outcome to this increase in shale production is lower prices, and not surprisingly we are in a much lower oil price environment. This has slowed oil and gas investment around the world, but has also helped economies to continue to recover from the recession caused by the financial crisis and brought new prosperity to millions. This price drop has made research and innovation even more important to address the challenges of producing oil and gas.

I have continued to work on the commercialization potential of my research, and had my first patent issue this year. I have several other technologies in the patenting and prototype phase, and contacts with possible commercialization partners have been positive. Naturally, the drop in oil prices is impacting the market for new technologies, but opportunities persist. One technology I am developing with Dr. Eustes and NREL, is the application of shale development technology to geothermal energy. Our concept is a very simple adaptation of an enhanced geothermal system, where a series of horizontal wells are drilled and hydraulically fractured using the multistage fracturing techniques common in shale development, to create multiple fractures, induced or natural, between the horizontal wells. Cold water would be injected in one horizontal, and would harvest heat by traveling between the injection and production laterals through the fracture system. Geothermal power is a simple concept to generate electricity, but one needs sufficient heat and rate to make it economic. We just need a deep-pocketed partner to build the system and demonstrate the economics.

I hope everyone has had a wonderful year and I look forward to seeing many of you at the CSM Alumni Reception at the SPE ATCE in Houston this fall.



Kuwait city Water Towers

1000 ft. fountain in Jeddah  
Saudi Arabia



## HOSSEIN KAZEMI - CHESEBRO' DISTINGUISHED CHAIR



With my eldest granddaughter at her graduation from high school.

It is July 15, but sadly summer is approaching the end. I enjoyed the summer break immensely because I could spend quality time on topics of interest to me and work with my students because we focused on research without worrying about classroom lectures and homework. Here is the story of the last twelve months:

**Academics:** In addition to research activity, I supervised one MS and twelve PhD graduate students and taught five graduate courses (Reservoir Simulation, Compositional Modeling, Fractured Reservoirs, Enhanced Oil Recovery, and One-third of Carbonate Reservoirs – Exploration to Production). My research interests revolved around pore scale physics and production enhancement both in conventional and unconventional reservoirs. For instance, I worked with students on the role of low salinity on wettability alteration in carbonate cores, and studied the role of salinity contrast in generating osmotic pressure to displace oil from shale core plugs. In the unconventional area, I worked on improving oil recovery from Bakken, Eagle Ford, and Niobrara wells. Two of my students and I continued our involvement with a project on wet-gas production from the low-permeability Lance formation in Jonah field, Wyoming. The objective of this project was to determine whether the completion technology used in shale reservoirs would benefit hydrocarbon production from low-permeability sandstones. This project is of great interest to me because both shale and tight sandstone reservoirs have very low permeabilities; otherwise, there are significant differences in stratigraphy, pore structure, hydrocarbon source, and migration. A second horizontal well has been drilled in the area and we are about to evaluate its performance.

**Travel:** In early June, I travelled to Missoula, Montana to attend my eldest granddaughter's graduation from high school (Picture 1).

**Entertainment:** I love sports, and summer is often a wonderful time for watching great international competition. This year, I watched the NBA championship series and the Women Soccer World Cup in Canada where the US women won the world championship (very exciting).

In late June, I attended the Montana State Youth Championship Tournament in Billings. My three granddaughters were competing in the U-16G and U-18G divisions. Happily, the



My three granddaughters (two are twins) with their championship medals

three of them won the state championship in respective age groups (Pictures 2 and 3). Finally, I played in two soccer games in the over-sixty league! I am planning to continue playing in the fall (in more than two games).

**New Academic Year:** As for the new school year (2015-2016), I look forward to teaching, working with students and colleagues, and our sponsors. Lots of new and exciting projects are on the horizon, which I hope materialize.



With my three granddaughters (two are twins)

## CARRIE McCLELLAND



Having a conversation during Senior Seminar class, as photographed by Dan Boyce from KUNC.

It is time once again to greet all of our CSM alumni and friends... This has been a busy, productive year both professionally and personally for me. I continued teaching a wide variety of undergraduate courses for the department, including the PE version of fluid mechanics, Senior Seminar, Multi-disciplinary Senior Design, and field session. These courses focus on everything from the technical to the

professional skills that engineers need. This year I added a course to my repertoire and delved into the world of liberal arts. I co-taught a McBride Honors course investigating the intersections between energy and society, which proved to be incredibly interesting and stimulating. Another "first" for me was being interviewed for an NPR news story about the boom of students studying. They followed up with me last spring to talk about the impact the falling oil prices are having as well. It is a joy and an adventure for me to teach and continue to improve the educational experiences of our students, and an honor to get to do that at Mines.

I was fortunate to get to attend some conferences this year. The SPE-ATCE conference was a great experience. The highlights include winning a SPE Innovative Teaching award that includes a grant to help improve our classes, learning cutting edge information through training courses, and of course, touring through Amsterdam. I also attended two other conferences that focus on the science of teaching and the design of courses.



Celebrating our 20th wedding anniversary hiking in Hawaii

Next year I am slated to speak at one of them about my experiences engaging students in the classroom.

This year's adventures outside of Mines include practicing yoga and traveling with my family. Our travels this year took us to Amsterdam (for ATCE), Phoenix, Lake Powell, and Hawaii. I also celebrated my 20th anniversary with my dear husband and fellow Mines alum, Garry. Garry and I got to put our Mines education to work this year when we were asked to design and construct "Dragon" for a production of the play "Shrek-the Musical."

We didn't know what we were getting ourselves into when we agreed to build it!

I wish you all a wonderful year, and hope to get the opportunity to see some of you in the near future. If you are on campus, don't hesitate to stop by and say hello!



My daughter operating the mouth and eyes on the Dragon "puppet" we designed and built.

## MARK G. MILLER



Mark and PE student, Amy Mao at the Massadona Field Camp

In addition to helping with field session, I was fortunate to lead one of this year's multidisciplinary classes. Up until now, we have had petroleum engineering, geology and geophysical engineering students in one gigantic section. Needless to say, it was not an optimal arrangement. Group sizes were getting so large that one person could ride on the coattails of his fellow students and barely be noticed. In addition, the number of petroleum students was vastly greater than the other disciplines. Dean Graves made a decision to break the class into much smaller sections. Instead of one 200 person class, this spring we had four classes, each with about 50 students. Rather than doing the Sooner field project, I went back to the offshore Gulf of Mexico, Main Pass 138 dataset. Because we had not used it for about five years, I thought that the students would actually have to work, rather than just copy from last year's assignments. Unfortunately, this backfired to an



## MILLER CONT.

extent, as the dataset had mysteriously corrupted during the course of time. The students had to start with virtually nothing. Fortunately Bob Benson, Geophysics Department, came to our rescue with much needed seismic data. The Bureau of Safety and Environmental Enforcement, part of what was formerly the MMS, provided the production data and, for a mere \$20, over a gigabyte of public data, including logs and various notices. Unfortunately, the logs were not in digital format.

In spite of having being put on randomly chosen teams twice in the semester, and not a lot of geology or geophysics help, the teams were able to bring the data into Petrel, develop a fault model, plan a well, develop a production forecast, and run economic sensitivity cases. On top of that, some teams used the Halliburton Visualization room to display their seismic and well data in 3D. This has been a long term goal of the room. Next year, because the data will be fresh and the learning curve not as steep, we hope to progress much further. Till then.



## JORGE SAMPAIO



Jorge and his wife, Chistina in Torquay, southwest of Melbourne, Victoria (Australia).

First of all, and most importantly, I would like to thank CSM and the people of the PE Department for the opportunity, and ultimately for having extended to me the position of faculty member in the department, which I have accepted with pride and delight.

Nineteen years have passed since my PhD graduation, back in 1996, and the emotion I felt while visiting the campus for my interview early this year is much larger than my capacity to express it in words, so I won't try.

I was then appointed Associate Professor last spring. Therefore, before expressing my plans, roles, and duties, I must present myself to the readers, with special attention to the students, as is the calling of faculty.

I graduated as mechanical engineer long ago, in 1980, from the Military Institute of Engineering in Brazil, one of the best ranked engineering schools in the country, the oldest engineering school of the Americas, and the third oldest in the World. It originated back in 1792 CE. I mention this because every graduate must be proud of their Alma Mater, as I am sure all CSM students are.

Right after my BS graduation, I was hired by the Brazilian National Oil Company, with absolutely no idea of what petroleum engineering entailed. To make things worse, after one month in the introductory training course I acquired hepatitis and was forced into a three-month sick leave. Afterwards I was sent to an onshore drilling site in the countryside of Brazil's northeast region for an eight month drilling internship. The best thing that happened to me in that period was meeting a young lady named Christina, who eventually became my wife. During another year of theoretical training, I realized that many things I'd seen during the onshore internship were... wrong! I was "ready" for the real stuff. I got married and moved back to Rio de Janeiro to work offshore in the fields now known as the post-salt area of the Campos basin (the Brazilian pre-salt was only discovered in 2006). Fourteen years passed, during which I spent five in directional drilling, obtained my MS in PE in 1989 from UNICAMP (another very well ranked university in the State of São Paulo), and my PhD in PE in 1996, here at CSM.

My interest in research and development dates back to the period before the master program, while working basically in directional drilling. Particularly, I got involved with FEM applied to directional drillstring behavior analysis and software development applied to directional drilling including anti-collision and uncertainty ellipsoid analysis, horizontal drilling and related areas. I also became interested in the then-active area of artificial intelligence, having developed some drilling applications using expert systems and neural networks. After the PhD program and returning to Brazil, I found myself involved in new technological developments including drillstring fatigue, 3D, horizontal and extended reach well drilling, underbalanced drilling, multilaterals, deep and ultradeep waters, that is, in all heated areas of drilling engineering in the 90's and early 2000's. The well engineering was maturing worldwide, breaking records, and becoming one of the most sophisticated and complex engineering areas. At the time I was working at CENPES, Petrobras' renowned research center.

## SAMPAIO CONTINUED

In a career track that seemed to be destined for one, single company, and certainly influenced by several factors like personal and family interests, economical moment conditions, friends examples and suggestive activities, I decided in 2002 to change gears and accepted an academic position in an American university – a big challenge for an experienced engineer whose teaching was limited to some short industry courses taught in his mother language. It ended up a passionate nine year period in academia, from 2002 to 2011, shared between the US and Australia. Areas of research in the period included thermal spallation drilling, laser coring, DEM applied to cuttings transport, neural network applied to natural gas behavior, wellbore stability, 3D directional planning, 3D torque and drag simulation, fuzzy and case based reasoning for pipe-sticking analysis, deep exploration for mining engineering and others. Lecturing activities covered every area of well engineering, from fundamental to advanced topics. I supervised almost fifty MS and PhD PE students. During this academic period I accumulated additional industry experiences in O&G, mining, and geothermal.

In 2011 familial obligation brought me back to Brazil. The demanding market due to the pre-salt facilitated the transition and in early 2012 I assumed the position of Technology R&D Manager in Well Engineering with a large O&G company. For three years I established and managed a number of large R&D projects including the development of a riserless drilling system for ultradeep water MODU operations, the implementation of a novel magnetic vibration assisted drilling system, and the introduction of a disposable downhole casing motor.

I am quite confident that the volume of industry and academic experience accumulated in these 35 years will be used to the benefit and growth of the PE Department. I then ask all the budding engineers I have the honor to call my students, that they demand my involvement and draw on my experience.

You are all welcome. See you soon.

## AZRA NUR TUTUNCU - HARRY D. CAMPBELL CHAIR, DIRECTOR OF UNCONVENTIONAL NATURAL GAS AND OIL INSTITUTE (UNGI)



Dr. Tutuncu is speaking at a panel session at the GE Oil and Gas Annual and at the GE Oil and Gas University 10th Anniversary celebration Dinner in Florence, Italy (Pictures courtesy of GE Oil & Gas).

I would like to congratulate our recent PhDs Luke Frash, Lei Wang, Najeeb Alharthy, Tadesse Teklu, Mehdi Mokhtari and MS/ME graduates Jennifer Curnow, Andrew Dietrich, Tan Ngo, Matthew McConnell and Suhendro Suhendro for making prominent contributions toward UNGI integrated research and looking forward to hearing their continuing achievement in the coming years.

The UNGI Coupled Integrated Multiscale Measurements and Modeling (CIMMM) consortium Phase I has been successfully completed and Phase II has been initiated. We are continuing research with our inaugural members plus a few new members to enhance our understanding of shale gas and tight oil reservoirs for better optimization of the operations to make them economically viable regardless of how long the low oil and gas prices will last. DOE sponsorship for a geothermal research is also complemented by UNGI CIMMM Phase I research findings in geothermal energy utilization.

The role of fluid disposal operations including the hydraulic fracturing fluid injection and hydrocarbon withdrawals on the induced seismicity has been a major contributor to the UNGI CIMMM consortium research. Using coupled geomechanics, acoustic, fluid flow, resistivity and failure anisotropy measurements at in situ stress state, elevated pore pressure, elevated temperature conditions and utilizing new 4th generation true triaxial core assembly recently added into the UNGI geomechanics laboratory, our research has comprehended coupling the laboratory and field data with the associated models also developed through the UNGI projects.

Through support from SEG Research Committee and SEG Annual Meeting Organizing Committee, we have organized a Special Session on Injection Induced Seismicity at the SEG Annual Meeting in New Orleans this fall for further aiding the shale and tight oil developments with less safety risks. I am also chairing ARMA Induced Seismicity Committee (ARMA-IS) pursuing responsible disposal and production operations while stirring research and education on this important challenge for industry. Two UNGI alumni, Dr. Luke Frash



GE Oil and Gas University 10th Anniversary celebration Dinner in February in Florence, Italy (Pictures courtesy of GE Oil & Gas).



## TUTUNCU CONTINUED

and Talgat Kosset, presented their Mines research at the 49th US Rock Mechanics/Geomechanics Symposium in San Francisco this summer. The 50th Symposium will be in Houston next June. We look forward to seeing all Mines alumni there.



**Drs. Tutuncu, Ozkan and Eustes in Kyiv, Ukraine welcomed by Ukrainian State Geological Services Acting Head Mr. Mykola Boyarkin at UNGI-UGTEP Workshop. The US DOS Kyiv Embassy staff Nathan Reich, a Mines Alumni, sitting at the furthest right.**

UNGI has partnered with the US Department of State in the Unconventional Gas Technical Engagement Program (UGTEP) for the last two years providing assistance to US ally countries with unconventional resources to achieve their energy security with strong environmental commitment. I have visited many countries together with colleagues from the DOS Bureau of Energy Resources and DOI to help utilize their unconventional natural gas resources elucidating the technical challenges and complexities involved and how to overcome these difficulties in shale reservoirs for development of the vast resources safely and environmentally sensitive manner with viable economics. As part of the UNGI-UGTEP program, we organized an international workshop at the Ukrainian State Geological Survey facilities in Kyiv during the spring break. Dr. Ozkan, Dr. Eustes and I had a warm welcome in Kyiv with excellent logistics assistance from the US Embassy Kyiv colleagues as well as panel speakers from Shell and Halliburton Ukraine representatives. Another UGTEP workshop was held in Golden with the participation of regulators and policy makers from 9 countries. Besides technical lectures, the curriculum included participation from speakers including Paul Hueper (Department of State), Cindy Beeler (EPA), Dr. Michael Lewan and Robert Williams (USGS), Sarah Landry (Colorado Oil and Gas Association), Margaret Ash and Steve Elsworth (Colorado Oil and Gas Conservation Commission), Lonny Bagley (BLM), former COGCC director David Neslin, Alon Mandel (Noble Energy) and Steve Cumella (Whiting Petroleum) and to CalFrac (Matthew Sinkey) and K. P. Kauffman Company (Susana Lara-Mesa) field facilities in Denver Julesburg basin and Niobrara. I would like to thank all of our speakers and companies opening up their facilities to us for their time and contributions to the program and looking forward to collaborate at many similar events.

CSM UNGI has developed an online training program (TOPCORP) jointly with PSU and UT Austin in support of shale gas regulatory effort. It is offered complimentary to US state regulatory agencies, courtesy of ExxonMobil and GE Oil & Gas companies. The training brings together most state and federal regulatory agencies establishing networking opportunity to continue the US ground breaking effort in unconventional developments collaboratively with technology

updates from the technical training. The first two years 4 pilots have been held at Mines, PSU and UT Austin. I would like to thank our sponsors Exxon and GE Oil & Gas for funding our frontier effort and their partnership. The collaboration from the colleagues at COGCC, TRRC, DEP, BLM, EPA IOGCC and WPSU has contributed to the success of this program. Our partnership with expert faculty members at Mines, PSU and UT Austin has produced a unique program that is growing and even expending into the international arena.

Early in the year, I visited the research facilities of an UNGI CIMMM Consortium sponsor, ENI, in Milan and had a seminar on injection induced seismicity broadcasted within ENI around the globe. I had the pleasure to receive a special invitation from the president of GE Oil & Gas, Lorenzo Simonelli, as a panel member at their annual meeting in Florence on "Skills for the Future", also participated the opening ceremony of GE Oil and Gas University in the same trip for their 10th anniversary celebration dinner with graduates and sponsors of the program in the Academia Gallery in Florence in the room right in front of Michelangelo's David statute, the astonishing Renaissance sculpture created centuries back. I ended the academic year with a keynote speech at Houston Geological Society, Unconventional Geomechanics Conference held in Houston followed by a hydraulic fracturing lecture at Mines campus at 2015 American Chemical Society Summer School on Green Chemistry and Sustainable Energy and the PE Super School.

The UNGI/ARMA distinguished speaker series during the academic year brought unique experts from industry and government including Dr. Michael Lewan, Dr. Charles Mueller and Robert Williams (USGS), Drs. Nicholas Rosenau, Reinaldo Michelena, Mohammed Al Duhailan, Luis Zerpa and Tom Bratton. We express our gratitude to Shell Oil Company and ExxonMobil for their annual funding to UNGI in helping with the ARMA and UNGI student activities. Further appreciation and thanks to our speakers, ARMA Student chapter and UNGI event contributors and UNGI consortia sponsors on their support for another productive year and looking forward to your continuing collaboration and support in the coming academic year. I would like to extend my deepest gratitude to CMG, Schlumberger, Itasca, Golder Associates and Drilling Info for providing software licenses to my classes as part of our partnership programs at UNGI. Have a fruitful year and hope you plan visiting us soon in Golden...



**Dr. Tutuncu is with the group of regulators from nine countries and several panel speakers on the last day of UNGI-UGTEP Training Workshop celebrating the successful completion of the workshop.**

## CRAIG VAN KIRK



Craig and Denise with all 7 grandkids last Thanksgiving at the top of the tramway on Mount San Jacinto, near Palm Springs.

It is with pleasure and gratitude that I share my update with you in this annual PE Department Newsletter. My part for the last prior Newsletter was composed in August 2014 and was mailed out last November. So, this update now covers approximately the past 12 months, more or less.

Any of my “new news” is intended to supplement last year’s article, and everything I wrote a year ago is still true in my life today. So, if you look back at last November’s PE Newsletter you will see.

My wife Denise and I continue to enjoy good health and good fortune, and so do our 2 kids and 7 grandkids. We are grateful for the satisfaction in our personal lives, as well as the pleasure we get from our continuing life-long professional “careers”.

Here’s one little interesting note about “life-long” activities—this summer I was notified by the SPE that I am not dead yet. The SPE has recognized me as a member of the SPE Legion of Honor, for 50 years of continuous membership and service to the SPE and our industry. With a little humor and lots of humility, I am pleasantly surprised to be so recognized by the SPE.

For you younger readers, I will remind you yet again about something you have heard before—not only does life go by rapidly, it accelerates with time. I hope yours are full and satisfying; mine has been.

As an undergrad at USC majoring in PE I joined the SPE when I was a 19-year old soph in 1965. Prior to the Oil Embargo of October 1973 enrollments in PE were low, and I had some classes in which I was the only student. I enjoyed and appreciated the personal attention, but not the professors who “graded on a curve”. My 50 years with the SPE and the petroleum industry have been far more rewarding than I had imagined as a youngster, and I encourage everyone to be engaged at all ages with a wide variety of organizations.

One of the many aspects I have enjoyed about my career has been the fact that during my first several decades in the industry I got to work with many elder statesmen and pioneers. Since there were so few of us graduating in PE during the 1960’s

and through the late 1970’s, we lucky few were exposed to many significant global projects, working alongside some famous and very capable “tribal elders” who were 20 to 30 years older.

As I wrote in my article last year, I continue to act as a “substitute” teacher at CSM and look forward to this coming school year to sub for several classes again. Also, I continue to be very busy with domestic and international/global current events regarding oil and gas production levels and economic consequences.



Craig and kids Connie and Sam in Germany in July 2015.

Almost daily I provide my knowledge, ideas, and advice in response to many inquiries from partners around the world. This part of my activities has been, and continues to be, among the most satisfying things I do and have done since 1974.

For example, during the past year I enjoyed several days on several occasions at the US Army War College in Carlisle Pennsylvania as an invited speaker and instructor, and as a participant in very open discussions and debates. Part of the function there is to host and educate in an integrated environment a large number of domestic and international partners for almost a year. This year there were representatives from 73 different countries from a wide variety of interested and interconnected disciplines.

As always, I look forward to the next time I hear from you or see you at a meeting or airport. Please do keep in touch. All my best to you and yours, sincerely, Craig Van Kirk



Craig, Denise, and kids with 6 of 7 grandkids in Germany in July 2015.



## YU-SHU WU - COMPUTER MODELING GROUP (CMG) CHAIR



At CMG booth of 2014 SPE ATCE Conference in Amsterdam, the Netherlands

This past year has been very different for me because I was out of school or out of country for the majority of the year as it fell on my sabbatical leave. This is my first year-long break since I joined CSM as a PE faculty member. During the sabbatical leave, I spent several months visiting and working at two universities: China University of Petroleum (CUP) at Qingdao during the fall of 2015 and King Abdullah University of Science and Technology (KAUST) of Saudi Arabia for the early part of 2015. At CUP and KAUST I had opportunities to prepare and teach short courses on reservoir engineering. More importantly, I finally got some time to complete a book draft on multiphase fluid flow in reservoirs, which will be published in January of 2016.



On Campus of KAUST University of Saudi Arabia, January, 2015

During the late part of my sabbatical break of this year, I worked at Saudi Aramco Petroleum Company in Dhahran, Saudi Arabia. This experience provided me a unique chance to work on interesting reservoir engineering problems from the world's largest oil producer. This is important to improve my skills in developing and applying reservoir simulation technologies.

In addition, I was so happy to work with several well-known reservoir simulation experts, whom I have known for decades. They have been on the forefront in developing and applying the-state-of-the-air reservoir simulation technology to solve real-world problems of optimizing reservoir performance and oil production. Working with them updated my knowledge in reservoir simulation, simulator development, and better understanding current reservoir engineering issues facing the industry.

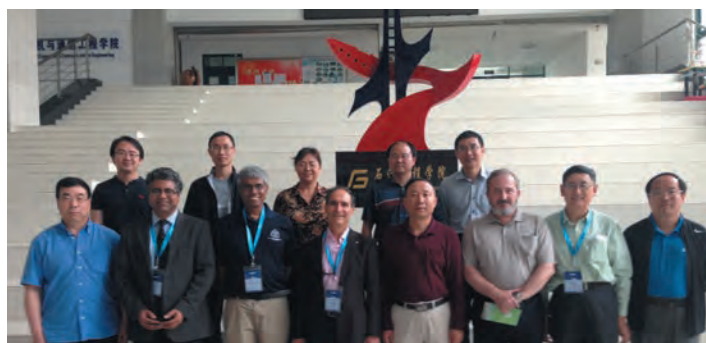
On a personal level, this is the first time I have spent longer than a half year in China since I left there 30 years ago and I saw so many changes in the country. It is also the first time that I have ever lived in a Mideast country for six months.

In China and in Saudi Arabia, I saw many former students, old friends, and former colleagues as well as met many new friends. In particular, I have now more appreciation and deeper understanding of the culture and life of the Mideast people.

The highlights of the past year include my successful five-year renewal of my Foundation CMG Chairmanship as well as the wonderful times I had in China and in Saudi Arabia, as shown the four pictures.



Alumni gathering at Saudi Aramco in Dhahran, Saudi Arabia, in May, 2015



Visiting China University of Petroleum at Qingdao with CSM and CUP colleagues in May, 2015



In Core Area of Saudi Aramco in Dhahran, Saudi Arabia, in June, 2015

### XIAOLONG YIN

Dear Friends and Alumni,

In May 2015, I was promoted to the rank of Associate Professor with tenure. I started my sabbatical leave in June 2015. Currently, I am working in the Department of Energy Resources at Peking University, Beijing, China, as a visiting professor, carrying out research on fluid flow and phase behavior in shale gas and tight oil.

In the past year, I maintained good productivity. My research group, which focuses on fluid dynamics and fluid properties, currently has three PhD students and five MS students. This is the size that I would like to sustain in the next few years. In addition to SPE Journal, I recently accepted an invitation to be the associate editor of Journal of Natural Gas Science and Engineering.

As I am away, I do not want this letter to be overly long. I hope to use the opportunity of sabbatical leave to develop collaborations, organize my research, and think about new ways to teach my courses. I will return to Mines in August 2016 and will report my sabbatical trips in the next newsletter.

Our group's new research website should be ready in the summer!

Xiaolong Yin from Beijing on July 18, 2015.



I took this photo in Lanzhou, the city where I grew up. Behind me, is the first steel bridge built across the Yellow River. In the three years that this bridge was built (1906-1909), all the steel parts, made in Germany, had to be hauled 600 miles from the nearest railway post by horses through unpaved roads. Since then, the bridge became the icon of the city.

### LUIS E. ZERPA



Me and baby Eva with her cousins and uncles.

This was certainly a very interesting academic year. I call this one the teaching year; it felt like I was teaching or preparing lectures all the time, but I only taught three courses. I continue teaching PEGN423 Reservoir Engineering I during the fall semester. For the spring semester, I was supposed to co-teach PEGN424 Reservoir Engineering II along with two other instructors, but things changed, and sadly Todd and Ronny left Mines to continue their careers at other academic institutions.

I wish those guys the best, but I eventually taught the course myself. Because I was supposed to co-teach PEGN424, I offered a new graduate numerical methods course. This one was intended to improve the programming skills and numerical analysis of our graduate students, so they will be better prepared to take other modeling intensive courses in our graduate program.

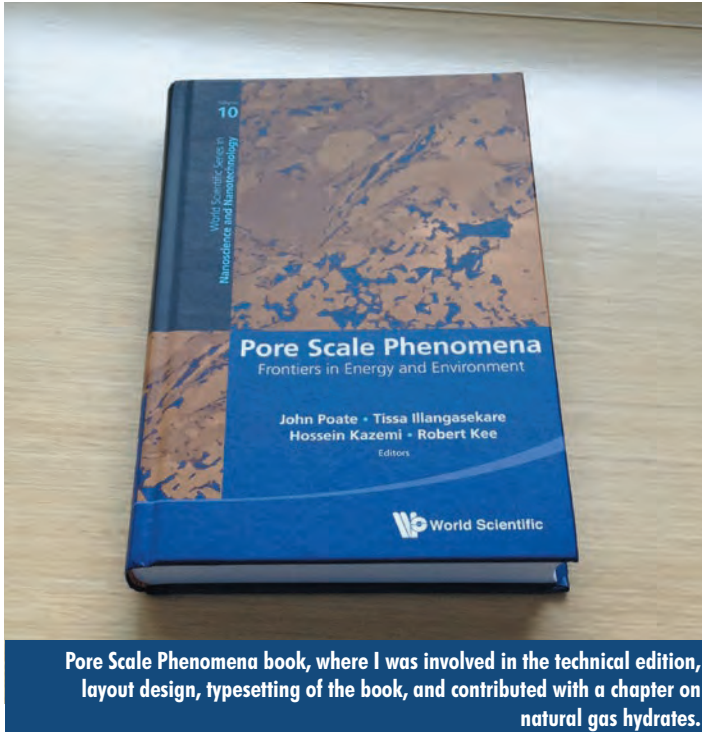
The numerical methods course, along with the Res. II course, required the preparation of new lectures, assignments, projects and exams. This is probably why I felt that I was working on teaching all the time. I appreciate the patience of the graduate students with the delivery of the new course. I learned a lot that will improve future experiences. I am grateful for the assistance of the TAs that help me with the delivery of the undergraduate courses. Having a senior class of 200+ students, the TAs service was outstanding. At the end, all the teaching-related work paid off, and I received, for the second year in a row, the Outstanding Faculty Award granted by the graduating senior class.

I did not have the chance to say good-bye to the graduating class of 2015. This time I was celebrating my daughter's first year, which was a big family celebration with relatives coming from Venezuela and Brazil who needed my attention. I wish all graduates of the Spring 2015 commencement ceremony



## ZERPA CONT.

a successful professional career and a prosperous life as Petroleum Engineers. We count on you as representatives of Mines to keep moving forward our profession with the highest standards of ethics and professionalism, and I am sure all of you are up to the challenge.



**Pore Scale Phenomena book, where I was involved in the technical edition, layout design, typesetting of the book, and contributed with a chapter on natural gas hydrates.**

Besides my teaching load, I have continued with a diverse portfolio of research projects. I got an extension for a second year of the DOE grant to study sedimentary geothermal energy extraction, in collaboration with NREL. In this project I was working with two graduate students and eight undergraduate students, collecting data and building a reservoir model of the Lyons formation in the Wattenberg field in Colorado. Jae Kyoung Cho, one of the graduate students, successfully defended his master thesis in December 2014, graduated in May 2015 (Congratulations!), and decided to continue for a PhD here at Mines. Jae Kyoung has been a key player in this project, and deserves the recognition.

I continue my collaboration with Dr. Kazemi in the Marathon Center for Excellence for Reservoir Studies (MCERS), where we are working on the final stage of the project on integration of microseismic with reservoir modeling for the management of waterflood projects. Also, we published a book on pore scale science this year, where I was involved in the technical edition, layout design, typesetting of the book, and contributed with a chapter on natural gas hydrates. This book was edited by Emeritus Vice President for Research John Poate, Civil and Environmental Engineering Professor Tissa Illangasekare, Petroleum Engineering Professor Hossein

Kazemi, and Mechanical Engineering Professor Robert Kee, and showcases the research performed at CSM in the areas of oil and gas reservoirs, hydrogeology, material science and biology by faculty from different departments. Additionally, I am supervising three PhD students of the Center for Hydrate Research, where we are working on the development of a hydrate flow assurance prediction tool. If you would like to learn more about these projects or get involve in similar research areas, I will be happy to provide information about these subjects.

This was for me another busy, challenging, and exciting academic year. It is gratifying get to see the students mature intellectually and get ready to start their careers. Hopefully, I will get to know more about your professional achievements over this next year. I would like to call next year the "research year", but for sure it will be a remarkable academic year. I wish you the best in your career and personal endeavors.



**Saying good-bye to visiting undergraduate students from Brazil, Rodrigo and Giovane, who participated on the geothermal research project.**



### PHIL WINTERFELD



Dr. Winterfeld and family on vacation in Breckenridge, CO.

This past year has seen a number of exciting developments in my research for the Energy Modeling Group (EMG).

We closed out the DOE CO<sub>2</sub> storage project that I began working on when I joined CSM over five years ago, "Simulation of Coupled Processes of Flow, Transport, and Storage of CO<sub>2</sub> in Saline Aquifers." They say when one door closes, another one opens. In this case, the door that opened was another CO<sub>2</sub> storage project that began in the fall of 2104, called "Quantitative Characterization of Impacts of Coupled Geomechanics and Flow on Safe and Permanent Geological

Storage of CO<sub>2</sub> in Fractured Aquifers." This project is in many ways a continuation of the work we were doing on the first one. In the first project, we coupled fluid flow and geomechanics using a simplified geomechanical formulation to simulate CO<sub>2</sub> injection into deep saline aquifers. This new project is concerned with the likelihood of sequestered CO<sub>2</sub> escaping through faults or fractures in the caprock that overlays the saline aquifer. We will be using an enhanced version of our geomechanical formulation to simulate these geomechanical effects, and we will also be doing laboratory work to develop correlations related to fault activation and caprock failure for use in our simulators.

I have been continuing work on a project for CNPC (China National Petroleum Corporation) to develop a simulator for coupled reservoir flow and hydraulic fracturing. We are negotiating the next phase of the project where we will add advancements to our simulator coupling hydraulic fracturing and reservoir flow.

Unlike last year, when I visited Beijing and Chengdu, China, this year's travel schedule was more subdued. I visited Pittsburgh a couple of times for meetings related to our DOE funded projects and had a relaxing vacation with my family in Breckenridge, Colorado.



### AL SAMI



Al and daughter, Dr. Azadeh near their residence in suburban Paris.

To look at the positive side of the recently distressed oil industry, with all its negative impact on the US economy and job market, it has created an opportunity for us, the educators. That is to steer our focus towards a quality of education that can offer new strategies and methodology for a more effective, efficient and profitable operation.

Most importantly, new technology and innovative methods of operation and production that can cut the cost. To mention a few, laser drilling, geothermal, oceanic energy, wind, solar etc.

In conclusion, with a patriotic collaboration between oil industry, institutions and government, the impacts can be a lot more tolerable for the country's economy





## FROM THE PE OFFICE STAFF



Joe on a tour of Zaanse Schans- a well-known windmill village near Amsterdam.

Howdy from the PE staff – Joe, Terri and Denise. Well, let us tell you about our adventure going ATCE in Amsterdam. We started out a few days earlier going to Ghent and Bruges in Belgium, taking the train and then enjoying the relaxing atmosphere of Belgium. On to the fast train to Amsterdam, arrived in the night and didn't get to see or enjoy the beauty of this city until

the next day. It was spectacular to see with the canals and all the bicycles. What's the statistic – there are 81,100 people in Amsterdam and there are 830,000 bikes. Be careful; don't step off the tram and straight into that bike lane. We saw a few altercations with pedestrians and bicyclists on the bike lane. Great to watch our student team in the Petro Bowl, and we were very proud of them in the competition. Also, enjoyed seeing alumni and vendors that we know and care about at ATCE. The last part of our trip was to Paris and staying at a rented apartment "with a view of the Eiffel Tower." Yes, that is how Denise described the apartment every time she mentioned it to someone. We took about 200 pictures just of the Eiffel Tower and walked past it every day. We did the cheesy tourist

tour of "hop on – hop off" bus ride and enjoyed ourselves all day. Denise's unexpended and memorable moment was, by chance, she was able to meet Jimmy Page (Led Zeppelin). Terri's adventure was finding and enjoying Luxemburg Gardens in Paris. Joe's was the bike ride out of Bruges to Damme. We wish you well and enjoy hearing from you all.



Denise and Terri, on a bicycle trip from Bruges to Damme in Belgium.

## PE FACULTY



1st Row- Erdal Ozkan, Azra Tutuncu, Hazim Abass, Linda Battalora, Al Sami, Carrie McClelland, Hossein Kazemi, Ramona Graves.  
2nd Row- Mark Miller, Jorge Sampaio, Elio Dean, Bill Eustes, Yu Shu-Wu, Will Fleckenstein, Mansur Ermila, Manika Prasad. ( Not pictured- Luis Zerpa, Xiaolong Yin)

### SOCIETY OF PETROLEUM ENGINEERS



2015 CSM-SPE Chapter Secretary,  
Angela Dang

As oil prices continue to loom in the forties, it becomes increasingly important for our students to receive opportunities to expand and strengthen their technical skills and professional network. In order to meet this demand, the Colorado School of Mines Society of Petroleum Engineers (CSM-SPE) continues to grow and expand in scope. In addition to our annual fundraising and networking events, we added more Lunch and Learns, an Industry Bowling Night, and more leadership

opportunities to help our members become more competitive on the job market.

Our two major fundraising events, the Fall Golf Tournament and Spring Clay Shoot were headed up by our Fundraising Chairs, Brian McDowell and Sara Heskin. Both events went off without a hitch, giving our members the chance to spend the afternoon with industry members and building meaningful connections. The 2014 SPE Annual Technical Conference and Expo (ATCE) was held in Amsterdam, Netherlands. It was a formative experience for many of our members who were able to attend due to our fundraising efforts. We continued our winning streak by placing third in the annual Petrobowl Competition. This year, we're headed to ATCE in Houston with a second place rank in North America. Our road to Houston will be guided by our 2015 ATCE Planning Chairs, Jordan Tucker and Kirk Gilbert. Our Spring Semester networking event, Joint Session is a partnership with our sponsoring professional SPE section, Denver. This fantastic event was headed by Holly Smith and Cassie Whalen. CSM-SPE members and Denver-SPE members mixed and mingled over dinner and drinks. The highlight of the event, however, was the keynote speech made by incoming SPE President Nathan Meehan.

Our little CSM-SPE chapter continues to grow each year. Over the past academic year, our organization added two major events, a new leadership position, and a Twitter account. The Bowling Night, the brain-child of 2015 Vice President Jennifer Mahoney, was a wild success. We bussed our members from campus to the venue for a night of bowling and networking. We were also joined by several faculty members, which allowed us to continue to develop a more integrated department.

Our second major development was the scheduling of regular Lunch and Learns, organized by 2015 Secretary Angela Dang.

This allowed our members to carefully plan their schedule around our events and increased our presence within the department. Last semester, we brought in a myriad of speakers. PackersPlus came to talk about the different techniques for hydraulic fracturing. Encana gave us resume and offer negotiation tips. Perhaps the most influential Lunch and Learn was a panel comprised of Diana Burn (Colorado Oil and Gas Conservation Commission), Dr. Linda Battalora (CSM), Paul Onsager (Edge Energy), Jeff Cutler (WPX Energy), Stephan Wolfe (Bonanza Creek) and Dayleen Alcocer (IHS). They helped us answer the question, "What else can I do with a Petroleum Engineering Degree?"



CSM-SPE officers showing off our selfie skills with incoming 2016 SPE President Nathan Meehan at Joint Session 2015.

Last semester also brought on new technological developments. As we continue to manage and develop our Facebook presence (Colorado School of Mines SPE), we also began a Twitter account (@CSM\_SPE) in order to engage with our members, sponsoring chapter, and SPE student chapters from around the world. Twitter also gives us a great opportunity to show our appreciation to companies who sponsor our events. In addition to Twitter, we've also begun to adopt online registration methods for our major events and general membership.

With each year, we hope to cultivate our organization so our members can flourish in their academic and professional pursuits. We have high hopes for the 2015-2016 school year.

**President:** Allan Kittle  
**Vice President:** Holly Smith  
**Secretary:** Angela Dang  
**Treasurer:** Shaun Hamblin  
**Fundraising Directors:** Krista Hickey & Amanda Piz  
**Ambassador:** Kavish Patel  
**Outreach Directors:** Alex Restrepo & Hannah Thomas  
**Social Media Director:** Erik Lee  
**ATCE Directors:** Jordan Tucker & Kirk Gilbert  
**Conference Directors:** Trey Sloan & Matt Enger  
**Joint Session Directors:** Mohammad Faruque & Nabeel Sheikh



## STUDENT ORGANIZATIONS

### PI EPSILON TAU



Jordan Tucker

Another year has come and gone and the Petroleum Department at Mines continues to grow and flourish. Our high-quality faculty and staff continue to attract students from all over the world to our department here in Golden.

My name is Jordan Tucker, and I am the current chapter president of Pi Epsilon Tau. It is such an honor to be a part of this organization which represents the Petroleum Engineering Honor Society for Colorado

School of Mines. Pi Epsilon Tau was started at the University of Oklahoma in 1947, and our CSM chapter was founded in 1983. We are a group that represents both graduate and undergraduate students who display not only high academic standards, but also leadership, and outstanding character. Pi Epsilon Tau is dedicated to enhancing student involvement on campus, in industry, and in the community. Our group conducts and participates in different events each year such as Castle of Cans as well as Discover and Preview Mines, as well as a new mentorship program within the department. Each spring we hold an initiation event where we welcome the newly selected students to the organization.

Pi Epsilon Tau has been given the honor and responsibility to represent the department in many facets. We continue to serve as ambassadors to the department for high school students in the fall and the spring during both the Preview and Discover Mines events put on by the admissions department. This event is a favorite among members as it gives us the chance to show off our wonderful building, Marquez Hall, and to share with high school students the exciting opportunities the Petroleum Engineering department at Mines has to offer.

We were also very excited to once again participate in the Castle of Cans event at Mines. Castle of Cans is a school-wide food bank drive that occurs right around Thanksgiving. I am proud to announce that we successfully defended our title and the Castle of Cans trophy once again sits in Marquez Hall. Other events from this past year included a plunger lift class put on by Golden's own Well Master Corporation and a tour of Emerson's Micro Motion Coriolis Flow and Density Meters manufacturing plant in Boulder. These events were



Pi Epsilon Tau advisor Dr. Mark Miller with the 2014-2015 officer team.

both great opportunities for our members to enhance their learning experience.

One of the greatest successes of the past year was the founding of the Pi Epsilon Tau mentorship program. This program connects junior and senior petroleum engineering students with underclassmen who are either interested in Petroleum Engineering or have already started their petroleum engineering coursework. The program will serve as a way for students to receive guidance and to strength the bond between students in the department. I am very excited to see the mentorship program grow in the future.

We capped off the year by initiating another very impressive class of petroleum engineers into Pi Epsilon Tau. The class consisted of 55 well-qualified graduate and undergraduate students who exhibited integrity and will represent Mines in the best possible light.

I would like to take a minute to thank the whole officer team for another successful year and welcome our new officers. The officers with the help of our wonderful faculty advisor Dr. Miller were able to advance Pi Epsilon Tau and help to improve the experience for students in the department. I am very excited for what this upcoming school year has in store. We have an incredible new officer team consisting of Trey Sloan, Matthew Balderston, Eric Bryan, Emily Knott, Krista Hickey, and Brianna Robinson. This is an excellent group of individuals and I believe Pi Epsilon Tau will have another successful year under their leadership.

Finally, I would like to thank our faculty and staff for all that they do to make this department one of the premier Petroleum Engineering programs. With their help and guidance, the Colorado School of Mines Petroleum Engineering program will continue to be one of the best in the world.

Regards,  
Jordan Tucker



2015 new members at the initiation ceremony

# AMERICAN ASSOCIATION OF DRILLING ENGINEERS



Justin A. Cameron

The great Mark Twain was quoted as saying, "Don't let schooling interfere with your education." We are blessed here at the Colorado School of Mines with a first-rate school and campus support for student run professional organizations such as the American Association of Drilling Engineers. Despite the industry downturn, the AADE organization geared up its on and off campus educational activities in the last year. Campus membership

remains strong at 200 students, and the past year has been an exciting and productive one for the AADE organization. The campus section provided members with numerous professional lunchtime learning opportunities, afterhours lecture presentations, and petroleum industry certifications.



AADE representatives attending PEGN 316

In February the CSM AADE Section sponsored a dinner event for its members and select industry representatives. Following the dinner, our faculty advisor, Dr. Alfred William Eustes III presented a lecture on Martian drilling entitled, "Extraterrestrial Drilling: How on Earth Can Martian Drilling Help Us?" Open to campus, and held in Friedhoff Hall, approximately 225 people from various departments attended the presentation on martian geology, as well as the current drilling technology and techniques utilized in space exploration. This was the first time the organization held an open campus event, and with its overwhelming success, we are currently seeking an interdepartmental drilling/energy presenter for the upcoming year.

I am pleased to announce that in April, at the 2015 AADE National Technical Conference and Exhibition in San Antonio, that the CSM AADE Section was the largest university section in attendance with 45 representatives. Our very own Benton Ellis was awarded 1st place for the undergraduate student presentations for his research on ice drilling.



Fall 2014 Wild Well Control graduates

It is always a pleasure to visit with the Mike Vertner, Steve Richert, and Steve Vorenkamp from Wild Well Control. Their personal and company support enabled the AADE Section to sponsor two separate wild well certification events over the year. The Wild Well Control certification combines classroom and simulator training for a variety of well control situations. That company's dedication provided 48 of our members with industry recognized Wild Well Control Fundamental Certification. The AADE organization is very grateful for the Wild Well Control team's support and we look forward to having Wild Well Control back in the upcoming year.



Extraterrestrial Drilling Attendees

A semester of work and no play is a dull semester and this year the CSM AADE team volunteered at the 5th annual Denver AADE 5F event in September. This is the Denver Chapter's primary fundraising event with \$40,000 of proceeds donated to the Foodbank of the Rockies and Children's Hospital of Colorado. The event is a great opportunity for the CSM section to support and network with the Denver AADE chapter. We greatly appreciate the support and commitment of the AADE Denver chapter, as they provide incredible networking opportunities throughout the school year at their bi-monthly meetings and offset the dinner/meeting costs for student members.

The last AADE campus hurrah came in the form of a great E-Day's event entitled The Oilfield Olympics. The Oilfield Olympics is an E-Days field day event and is co-sponsored with the Society of Petroleum Engineers. This year, the two student



## STUDENT ORGANIZATIONS

### AADE CONTINUED

run petroleum organizations sponsored six events including a bit-toss, mechanical bull, and super-sized Skee-ball. This event proved to be a real hit with the non-petroleum student body and overall campus.

It has been an honor serving as the President of the CSM Section of AADE, and I would like to thank my Vice President Elizabeth "Lizzy" Reale, our faculty advisor Dr. Alfred William Eustes, each of my officers, and the entire AADE student membership.

Cordially,  
Justin A. Cameron



8-second Oilfield Olympics ride



AADE 2015 National Technical Conference and Exhibition



### AMERICAN ROCK MECHANICS ASSOCIATION



Bryan McDowell, ARMA-CSM President  
2014-2015

The CSM student chapter of the American Rock Mechanics Association is focused on the exchange of technical knowledge for individuals interested in rock mechanics and its practical applications. Our organization provides a platform for education and networking among students with similar interests, primarily in oil and gas exploration and development.

The recent boom in unconventional reservoirs has propelled rock mechanics to the forefront of research as energy companies attempt to access hydrocarbons that were considered inaccessible just a few decades ago. These "ultra-tight" formations require new and/or improved techniques and methodologies as well as

interdisciplinary research. Rock mechanics has assumed many of these new roles as a cross road between geomechanics, petroleum engineering, geology, and geophysics.

The ARMA chapter started off the academic year by hosting a booth at the annual "Celebration of Mines." Dr. Michael Dolan and Dr. Nicholas Rosenau (Dolan Integration Group) introduced students to the use of geochemistry in unconventional reservoir evaluation while Mike Lewan of USGS has looked at the kinematic changes in maturation process and pyrolyzation experiments. Tom Bratton (Colorado School of Mines) led an introduction to the Petrel software platform. Dr. Reinaldo Michelena (Reservoir Inc.) spoke about unconventional reservoir calibration. At joint sessions of AADE/ARMA Brandon Harris (Drilling Specialties) presented on fluid effects on wellbore stability and Dr. Bill Koederitz and Kirtland McKenna (NOV) have provided enhancements in well integrity. Dr. Mohammed Al Duhailan (Colorado School of Mines) wrapped up the fall semester for ARMA with a talk on expulsion fractures in organic-rich shales.

## STUDENT ORGANIZATIONS

### AMERICAN ROCK MECHANICS ASSOCIATION

Our spring semester started with Mike Vincent (Fracwell Consulting) during a joint L&L with the CSM AAPG student chapter on the importance of multi-disciplinary teams to optimize reservoir stimulation. Dr. Mike Lewan (Lewan GeoConsulting/USGS Emeritus) returned this year to teach a workshop covering petrophysical changes during thermal maturation. Dr. Luis Zerpa (Colorado School of Mines) spoke to the group about gas hydrates and their role as a source of hydrocarbons. And finally, Robert Williams and Dr. Charles Mueller (U.S. Geological Survey) presented recent work on induced seismicity within the United States, an increasingly hot topic between industry, academia, and government.

Binh Bui (Webmaster). We would also like to extend special thanks to Chelsea Grimm for her pivotal part in the Switch movie event.



ARMA booth-Celebration of Mines

We hope you will become an ARMA member for the upcoming year. Membership forms can be found in the PE office. Officer elections are held in September and serve as a great way to get involved with the club. We look forward to another great year and hope to see you there!

Best regards,  
Bryan McDowell  
President, CSM ARMA Student Chapter  
2014 - 2015



The student chapter's biggest event of the year was a screening of Switch, a documentary focused on energy sources around the world. The screening was held in conjunction with the Jefferson County Energy Project (JEAP) as well as the AAPG, AADE, and SPE student chapters at Colorado School of Mines. The event was preceded with an introduction by JEAP and followed by a lively panel discussion on current energy issues in Colorado. Nearly 400 people attended from the public and campus community. We greatly appreciate the help and dedication from the previously mentioned groups as well as Chevron for providing refreshments before the show.

The success of the 2014-2015 academic year would not have been possible without a great team of officers and our faculty advisor, Dr. Azra Tutuncu. Our team members included Andrew Rixon (Vice President), Mehdi Mohktari (Treasurer), Andrew Dietrich (Secretary), Jennifer Curnow (L&L Coordinator), and



Dr. Luis Zerpa speaking on Gas Hydrates to ARMA



Distinguished speaker, Robert Williams (USGS) with ARMA group



## ALYSE WHITE



Joshua Shew, Daniel Reeves, and Sarah Horen standing by the entrance to the main building at Montanuniversität Leoben (MUL) in Leoben, Austria during their Spring 2015 study abroad.

As Petroleum Engineering students we have the opportunity to study abroad at six different universities around the world: Montanuniversität Leoben (MUL) in Leoben, Austria, Petroleum Institute (PI) Abu Dhabi, UAE, Delft University of Technology (TU Delft) in Delft, The Netherlands, Norwegian University of Science and Technology (NTNU) in Trondheim, Norway, Clausthal University of Technology (TU Clausthal) in Clausthal, Germany, and University of Adelaide in Adelaide, Australia. Study abroad gives students the

opportunity to learn at different universities, explore the world, immerse themselves in another culture, and make friends with different backgrounds. One of the highlights of the Petroleum Engineering study abroad program is that students going abroad take the same classes that they would take at Mines, which means that a study abroad does not add any time before they graduate. Also, the Petroleum Department and Office of International Programs on campus help students with the paperwork and arrangements for their study abroad. This makes going abroad very attractive to interested students and their families.



Kate Denninger hiking around Fortescue Bay Beach in Tasmania during her Spring 2014 study abroad at the University of Adelaide in Adelaide, Australia.

Spring 2014 was an exciting semester for the Petroleum Department, as we sent 10 students abroad to Austria, The Netherlands, Norway, and Australia. During Spring 2015 we sent three students to Austria for study abroad. Although the number reduced, we were still very excited to have our students take advantage of this wonderful opportunity.



Kohl Knutson joined the sky diving club during his Spring 2014 study abroad at Norwegian University of Science and Technology (NTNU) in Trondheim, Norway.

Keeping with the supportive nature of the Petroleum Department, the students who returned from their Spring 2014 study abroad semesters connected with PE students who were interested in studying abroad. Alyse White, along with students at Mines on study abroad from Australia and Austria, gave a presentation to Dr. Grave's PEGN 308 class. This presentation was well received and many interested students set up meetings to chat with those who had completed study abroad semesters. The idea of studying abroad can seem both exciting and overwhelming and it helps to be able to connect with students who have completed their abroad semester. Being a resource for those interested in going abroad will continue and show students how important it is to connect with others in the global oil and gas industry!

Thank you for all the support!  
Alyse White



Eric Brown, Kyle Petry, Parker Fawcett, Alex Truby, Alyse White, and Collin Leitko (not pictured Zachary Reinbold) enjoyed exploring Austria during their Spring 2014 study abroad at Montanuniversität Leoben (MUL) in Leoben, Austria.

## PEGN 315 - DENVER/NEW MEXICO/TEXAS FIELD SESSION

### WEEK ONE - By Xiaolong Yin

#### 12 days + 2000+ miles = a memorable trip

The 2015 Summer Field Session I started on May 11th of 2015. This year, our destinations were the San Juan Basin in Southwest Colorado / Northwest New Mexico and the Permian Basin in Southeast New Mexico and West Texas. Our group consisted of forty-two students, three teaching assistants (Olawale Adekunle, Wisam Assiri, Nathan Skitt), and three faculty / staff (Xiaolong Yin, Manika Prasad, Terri Snyder). In twelve days, we visited companies that ranged in size from small service companies to independents and major producers. We looked at a variety of geo-energy resources including coal-bed methane, unconventional gas, tight oil, CO<sub>2</sub> EOR and geothermal, and the field operations that are used to retrieve them.

The first day was a driving day from Golden to Durango. But, the rest stop at Colorado Gators Reptile Park turned out to be a great fun. Near Hooper, CO, this Gators Farm uses geothermal hot water to raise alligators that usually do not live well with the cool climate of Colorado. In addition, the park is also a fishery and a sanctuary for rescued reptiles.



We all made good friends with the baby gator and the snake.

On Day Two, we visited the San Juan Business Unit of **ConocoPhillips** in Farmington, New Mexico. The San Juan Basin Unit operates over 10,000 wells, and is a "legacy" unit of **ConocoPhillips** that, despite the low gas price, contributes significantly to the company's portfolio. Our hosts, Mr. Bill Clopine and Ms. Amanda Aragon, put together an impressive series of mini-lectures, starting from land acquisition, geology, to reservoir, drilling, completion, facility, and production. These lectures covered almost all aspects of a typical petroleum company's operation and everyone's daily job descriptions. Enlightened by the lectures, the students participated very actively in the panel discussion held afterwards.

In the morning of Day Three, we visited the facility of **NOV Tuboscope** near Aztec, New Mexico. In this facility, used drill pipes and production casings / tubings are inspected and



Dr. Clopine (Geologist, ConocoPhillips) introducing basic petroleum geology to students. Note the sleepers in the back row

refurbished so that they can be used again. In the afternoon, Tom Mullins (Mines PE 91', **Synergy Operating**) took us to **Merrion Oil & Gas** and gave the students a lecture on coal-bed methane, the major resource type in the San Juan Basin. Then, Tom took us to **Select Oil Tools**, a company that specializes in the fishing operation, that is, to retrieve tools or pipes dropped into the wellbore by accidents.



Neil Little (Mines PE 12') making a pose at a produced water injection site.

On Day Four, arranged by Neil Little (Mines PE 12'), we visited **Red Willow Production Company**, a company wholly owned by the Southern Ute Indian Tribe. In the San Juan Basin, **Red Willow** produces from the Fruitland coal-bed methane formation, from sites inside the tribal lands. During the day, the students visited several production sites and a produced water disposal site.

On Day Five, we visited the **BP** office near Durango. Our host was John Mummery (Mines PE 85'). The activities started with a panel discussion on what life is like working in a major oil company. Then, we visited a gas processing plant. Over the lunch break, John gave students a lecture on coal-bed methane production mechanisms in the San Juan Basin. After lunch, as the weather cleared up, we took a trip to a production site. There, **BP** installed an unusual kind of reciprocal pump to remove water that is accumulated at the bottom of coal-bed methane wells. This kind of pump has much smaller sizes than regular beam pumps. In the farmland, these pumps leave a very small footprint, and incorporate well with the surroundings.



### COLORADO/NEW MEXICO/TEXAS CONTINUED

Durango is a great place for mountain biking, hiking, and white water rafting. On Saturday, before we headed to Albuquerque, New Mexico, we took a rafting trip into the still-cold Animas River. Unfortunately, the weather was not great. It drizzled most of the time. And for a six mile stint of the river, the rain became a punishing hail. Despite that, the group had a great time. Obviously, they were all cold and wet and called for some "emergency" hot chocolate.



John Mummery (Mines PE 85') explaining to students a rather unique reciprocal pump installed at a BP site to remove water from the bottom of gas wells.

#### WEEK 2 - by Manika Prasad/Terri Snyder Encounters with Elks, Aliens, Soccer balls, and BBQ pits - and some oil fields and operations

Sunday the group headed out with high hopes of visiting White Sand National Monument with a short stop to have the oil changed in one of the vans. As we started our journey, oil lights of the other vans also started blinking like homing pigeons. Long story short – five hours later after five oil changes and one van replacement due to bald tires, we departed Albuquerque for the White Sands. The students made the most of their time, playing catch, texting and shopping at a nearby Walmart

for tee-shirts. We finally arrived in the late afternoon to catch a fast glimpse and roll down the beautiful white sands hills. Unfortunately, heading to Artesia brought more delays. One of the van drivers hit a very large elk. Thanks to Wale's fast thinking and quick reflexes, no one was hurt. However, the score for Van versus Elk was 0:1 for the elk. We all arrived safely to the hotel about midnight for a short night sleep.



Alyssa Davanzo (Mines PE 12') showing students Chevron's training facility

Despite the late night and breakfast delays, the students were on time for our visit to Devon. We toured the drilling rig, Cactus 138. This was a highlight since it was the first and only rig we saw during the field session. We also toured a producing well and production facility. We thank Blas and the Devon team for taking valuable time away from their duties for us and for a delicious Tex-Mex lunch. We then headed for Midland Texas for a good night sleep.

On Tuesday, Lonnie Grohman hosted us at **Chevron's** Training Facility where the group was able to see actual cutouts of various facilities. We were also treated to a wonderful lunch!



Group photo taken at the Mill. Manager Chad Ones is on the far right.



### COLORADO/NEW MEXICO/TEXAS CONTINUED

We want to thank the team- Lonnie, Alicia (Mines Alum), John, Marnie, Colton, and Wes for a very educating tour.



Enjoying great food, new friends and Field Session memories.

The next day we headed west again to Seminole for a tour with **Hess**. They highlighted the midstream portion, showcasing their CO<sub>2</sub> EOR. First, they displayed their facilities at their CDP. Flowing with the pipeline, we next saw their large-scale tank battery and surface separators. We finished with a tour of their gas plant where they recycled their CO<sub>2</sub> by removing residual hydrocarbons with TEG, ensured the filtration of sour gases, etc. Thank you to Cindy and the team for a great tour.

On Thursday, we braved a desert downpour and stopped in Santa Fe for lunch before reuniting in Colorado at Pagosa Springs - a gorgeous town. On our last night, we stayed at great lodge just out of town where we enjoyed a BBQ with all students pitching in to prepare and cook a delicious meal. Students played soccer (some with a ball and others with the professor's head), roasted marshmallows with new initiates on determining the sweet spot for 'roastedness', while reminiscing on our adventures from the past two weeks.

Our last day was full to the brim. We toured the small geothermal plant in town. There, the students were exposed to the emerging energy source promised by geothermal. The Pagosa natural hot springs are used to heat the town and reduce energy costs (as well as for their tendency to attract tourists looking to relax and enjoy the medicinal healing of the mineral-rich water). The challenges faced by the industry are the transportation of the fluids, the in-ground heat transfer mechanism, and attracting investors as the economics are tenuous. We didn't have time to visit Gasbuggy nearby, where they famously detonated a nuclear bomb as a sort of extreme completion. But, perhaps future trips will sojourn there.



Group photo in front of the gas plant at Hess



White Sands National Monument



### PEGN 315 CALIFORNIA FIELD SESSION 2015 By Linda Battalora

Thanks to the generosity and enthusiasm of our many alumni and friends, the 2015 PEGN 315 California Field Session was a great success! Fifty-two students, Al Sami, Teaching Assistants Jason Downey, Ganna Savchenko, Moutaz Saleh, Abba Rhouma and Soroush Saadat and I began the session in Ventura, moving on to Bakersfield and finishing our last tour in Long Beach.

#### VENTURA

On our first full day in Ventura, Jon Schwalbach (**Aera**), accompanied by Dave Mayer (**Aera**, PE alum), led us on a geology field trip on Arroyo Burro Beach. We reviewed basic geologic concepts, learned about regional fracture development, structural traps and worked through a team-based exploration and lease bidding problem. After an interesting tour of **Weatherford's** "Oil Country" on Wednesday morning, we traveled to the National Disaster Search Dog Foundation in Ojai to tour the zero liquid discharge clean water delivery system. Before leaving, we observed very impressive search dog training exercises.



Tour of Weatherford's "Oil Country"

Thursday was spent offshore on **Venoco Inc.'s** Platform Gail. The platform tour is always a highlight of the CA field session. We thank the **Venoco** folks for providing safety training and snacks in anticipation of the Thursday tours and for their generosity in arranging the exciting and informative platform tours!



Tour of Venoco's Platform Gail

Before heading to Bakersfield on Friday, we toured **PetroRock LLC/Vaquero Energy's** facilities in Gary. Many thanks to Joe Nahama (PE alum) for arranging this interesting field tour where the students learned about heavy oil production operations.



San Joaquin Valley Geology Field Trip

#### BAKERSFIELD

On Saturday in Bakersfield, geologist Tim Elam and Dave Mayer led a full-day field trip of San Joaquin Valley oil field history and geology. Highlights included stops at the Monterey Formation diatomite and siliceous shales at Chico Martinez Creek on the Twisselman Ranch, the McKittrick Tar Seeps, Lakeview Gusher and a delicious barbecue lunch hosted by Fred Holmes (**Holmes Western Oil Corporation**) at the West Kern Oil Museum in Taft. Many thanks to Tim, Dave and Fred for a memorable day in the field!



Dave Mayer, Fred Holmes and Linda at West Kern Oil Museum BBQ sponsored by Holmes Western Oil Corporation



## FIELD SESSIONS

### CALIFORNIA CONTINUED



"Evening with Industry" at Bakersfield Petroleum Club

On Saturday night, we enjoyed "Evening with Industry" at the Bakersfield Petroleum Club, an event organized by several of our PE alums. We would like to thank the following alums for organizing and their companies for financially supporting this annual event: Kelsey Gallegos (**Driltek, Inc.**), Tiffany Brewster and Dave Mayer (**Aera**), Michael LeBaron (**California Resources Corporation**), Lonnie Kerley (**Freeport McMoran**), Justin Blackman (**Linn Energy**) and Josh Yurkanin (**Holmes Western Oil Corporation**). This annual event provides a unique opportunity for students to talk one-on-one with CSM alums about career paths and industry experiences.

We enjoyed our tour on Monday with **Glasspoint Solar** where the students learned about solar steam generation and its use in thermal enhanced oil recovery. We also thank **Linn Energy** for a tour of their lease adjacent to **Glasspoint Solar**. In the afternoon, we visited the Bureau of Land Management (BLM) office for presentations by BLM and Division of Oil, Gas and Geothermal Resources representatives



Tour of GlassPoint Solar, McKittrick, CA



Group photo at West Kern Oil Museum



### CALIFORNIA CONTINUED

on the management, maintenance and regulation of oil and gas operations in California.

Our tour on Tuesday of **CRC's** Elk Hills Field was a fantastic opportunity for the students to learn about the former U.S. Naval Petroleum Reserve, the gas facility and amine plant, production operations and facilities, and emergency services center. Many thanks to Michael LeBaron (PE alum) for arranging our tour, lunch and hosting us at Elk Hills! We also enjoyed the drilling rig tour in the afternoon at Nabors Training Academy in Taft. Thanks again Fred!

On Wednesday, **Aera** engineers and CSM alums Ryan Stef, Ilsa Gustafson, Laura Lunsford, Christine Birkholz, Tanner Ottaway, George Hunsaker, and Matt Erbes hosted us at the Belridge Field for breakfast, tour of field operations and vendor services, and lunch. We also enjoyed the quiz bowl with prizes moderated by Ryan Stef and comments by Marvin St. Pierre. We thank all of our alums and Traco Matthews for another excellent day with **Aera**.

#### LONG BEACH

Our last day of field session was organized by **CRC** and CSM alums Mike McCarter, Tom Turner and Sergey Piletski. We visited **CRC's** Long Beach office for lunch and presentations on **CRC** assets, Wilmington Field and THUMS islands. After a safety meeting, we took a boat ride to Island White for a tour of the drilling rig and production facilities. We also enjoyed a site visit to **C & J Energy Services/Tiger Wireline** in Signal Hill where the students learned about wireline logging, well perforating and pipe recovery equipment and services. We appreciate the hospitality shown to us by **CRC** and **Tiger** on our last day in California.

The field session in Southern California would not be possible without the generosity of our alums and friends in the area. The students, TAs, Staff and Faculty had a wonderful learning experience and another enjoyable visit to California. Thanks again! We hope to see you next year!



Group photo at West Kern Oil Museum

## PEGN 315 FIELD SESSION - PENNSYLVANIA By Alfred Eustes

This was field session number sixteen for me. I lead one section of four to the northeast US. We spent one day in Denver, and then traveled to Baltimore (the only place Joe Chen could find us 15-passenger vans). Plus, it was relatively inexpensive. I had the usual excellent assistance of Denise Winn-Bower for the fourth field session and for the first time, a faculty member from Liberal Arts and International Studies, Rachel Osgood, as part of the leadership team. In addition, I had Reed Baker, one of my master's graduate students, and Paden Phillips as our Teaching Assistants. Since I was at the DOE's Geothermal Peer Review in Westminster, CO the first four days, Dr. Erdal Ozkan took my place. It was an outstanding team for the field session.

The first day was with **Calfrac Well Services** at their Louisville Laboratory. PE Alum, Matt Sinkey ('09') and Mark Elliot('01) were our hosts, along with the rest of the Calfrac team, showing their labs and field equipment. The students were able to do experiments with gelled fluids in their laboratory. Plus, they were able to examine frac equipment up close. Thanks to the whole Louisville Calfrac team.

The next day was the journey to Baltimore and on to Southwestern Pennsylvania where on Wednesday afternoon, the students met with PE Alum Kyle Flanagan from **Energy Corporation of America**. Kyle took the team out to a Patterson rig, production facilities, and a frac site. Our hosts were Kyle Flanagan ('10'), Sam Frazier ('13'), Josh Goddard, and Kyle Rader, all with **Energy Corporation of America** and Matt Eve of Patterson UTI.

Thursday, the students spent the day in the field with **EQT's** Dan Doebereiner of **EQT Production** leading them. I made it in to Pittsburgh that evening where I met up with Dana Greathouse, one of our alumni.

Friday saw me join the team and finally start on field session. We began in downtown Pittsburgh at **EQT's** headquarters. Steve Schlotterbeck, President of **EQT Production**, lead a diverse group of geologists and engineers explaining how petroleum engineers work. It was a good overview of the PEGN curriculum! We appreciated the efforts of Joseph Sinnott, Ben Rocke, Megan Deviney, Nick Cerone, Lisa Cooley, Jade Morel, Erin Centofanti, Travis Werner, and Randy Blood for all of their presentations. We are grateful to David Elkin for organizing the field and office visit and especially to Steve Schlotterbeck for hosting us once again.

One of the very important things about our industry not only includes the technical aspects but also the social impacts. Having Rachel along helped us to meet those that have a differing viewpoint. The first place we went was to meet Veronica Coptis of the Center for Coalfield Justice. We drove around the area Friday afternoon looking at the impact of resource development from a non-industry viewpoint. It was illuminating.

Saturday, we visited with **Noble Energy**. Mark Stringfield facilitated our visit. Stacey Brodak, Jim Jacobsen, and PE Alum Dan Burch('08) took us out to a well site in Greene County where they were "top-holing" a well. That is, drilling the surface hole on air and setting pipe. They had headsets with radios for the students to use as they walked around the rig.



Students in front of Nobles Top Hole Rig



Steve Schlotterbeck of EQT explaining about the Social License

That afternoon, Rachel had arranged for us to meet some members of the Isaak Walton League of America at one of the state parks. Charles Hunnell and Dallas Slagel gave us a passionate talk in a picnic pavilion in the rain on water contamination issues and economic impacts of energy development, both gas and coal. I don't totally agree with them; but, I do appreciate their passion and fervor. And I



## PENNSYLVANIA CONTINUED



Dan Burch with PE students after Noble's presentation

can see their concerns. That had a lasting impact on me and, based on the post reviews, interesting impacts on the students ranging from indifference to serious consideration. I think the key here was to listen to those whose thoughts you may not agree with but you must at least acknowledge. Thank you Rachel for organizing those visits.

Since Sunday is always a tough day for visits, I try to make them a "fun" day. This day, we visited the famous Drake well in Titusville. When we were there, we had a nice picnic in the pavilion the park gave us. That was good because there came a downpour of biblical proportions. Oh well, I do recommend a visit. There is a new museum to visit.



How to drill a well

Monday was a travel day with a stop in central PA with Dr. Terry Engelder of The Pennsylvania State University, Department of Geosciences. He talked about the Appalachian geology in general and the Marcellus in particular sitting under a McDonald's billboard. Then on to an outcrop to see real geology, especially the natural fracturing. Thank you Dr. Engelder. The next day saw us into New York and **Schlumberger's** Horsehead camp. There Nicolas Scudroni, Jason Putnam, and Adam Ralston showed us how coiled tubing units work and gave a nice lesson on drill bit technology from **Smith Bits**. Thanks goes to Steven Hall for helping us out. And, speaking of thanks, Rick Davis got me in contact with Darwin Trahern of **Weir Seaboard Wellheads** in Sayre, PA. After finding a non-existent road (as per my GPS system ... it was a brand new road), James Davis and his wellhead team showed us around their shop.



Dr. Engelder talking about Marcellus geology



Schlumberger's Coiled Tubing Unit In New York



## PENNSYLVANIA CONTINUED

That night, while staying in Mansfield, PA, a wicked thunderstorm struck the town. The power failed and did not return for seven hours – that’s one way of enforcing a curfew. The next day saw us visiting Shell Appalachia. PE Alum, Cody Teff(’98’), who organized the visit, along with John Rowell and Wayne Nichols showed us around the northeast Pennsylvania area visiting a top hole rig and a horizontal rig. That area is quite pretty, with rolling hills and forests. It was quite chilly that day; but, at least it was sunny. Thank you Shell.



Cody Teff of Shell explaining Drilling

We had to get to Washington D.C. by that evening, so we drove that afternoon. The journey took us by the famous Gettysburg National Military Park. We toured the park’s various byways, visiting the history that occurred there. I found the international student’s attention most interesting, as clearly this was a watershed event in the United States history. The next morning, we were at the U.S. Geologic Survey’s Reston, VA campus. Ms. Suzette Kimball, USGS Acting Director, welcomed us to the USGS. We had presentations by Geoffrey Plumlee, Acting Associate Director - Energy and Minerals, and Environmental Health, David Applegate, Associate Director - Natural Hazards, and Charles Mandeville, Program Coordinator - Volcano Hazards. Then we split up and toured the following laboratories: Argon Dating Lab, Electron Microprobe Facility, Electron Microprobe Facility, Environmental Organic Geochemistry Lab, Stable Isotope Lab, Core Analysis Lab, Groundwater Dating Lab, Microbiology Lab, and the Carbon 14 Lab. There was quite a crew supporting our tours. They included Karen Armstrong, Gary Nobles, Cheryl O’Brien, David Applegate, Charles Mandeville, Denise Akob, Darren Dunlap, John McGeehin, Karl Haase, Lucy Edwards, Wright Horton, John Bohlke, Tyler Coplen, William Oremy, Harvey Belkin, Ryan McAleer, Cindy Manuel, Fawn-Marie Golden, Kevin Zawistowsk, Alex Demas, and Duncan Douglas, who arranged it for us.



Field Session students following their TA's and Faculty

After a quiet lunch in the USGS cafeteria, we headed over to the Bureau of Safety and Environmental Enforcement. I saw them at the spring career fair and wondered about the connection. Well, Dr. Robert Middleton and his team consisting of Susan Dwarnick, Michael Else, Jarvis Abbott, Suzanne Chang, and Daniel Lind explained how the BSEE works, what they do, and even what it is like to work at the federal level. Thank you Dara Fennell-Baker for helping to organize this visit. Later that evening, we met up with PE Alum Seth Dickson(’13’), who was my TA for Field Session two years ago in Alaska.

The last day, we didn’t have any scheduled events until our flight out of Baltimore later in the day. So, I told the van drivers that I would see them at the Baltimore airport. I took my team and we went into downtown DC for a walking tour.



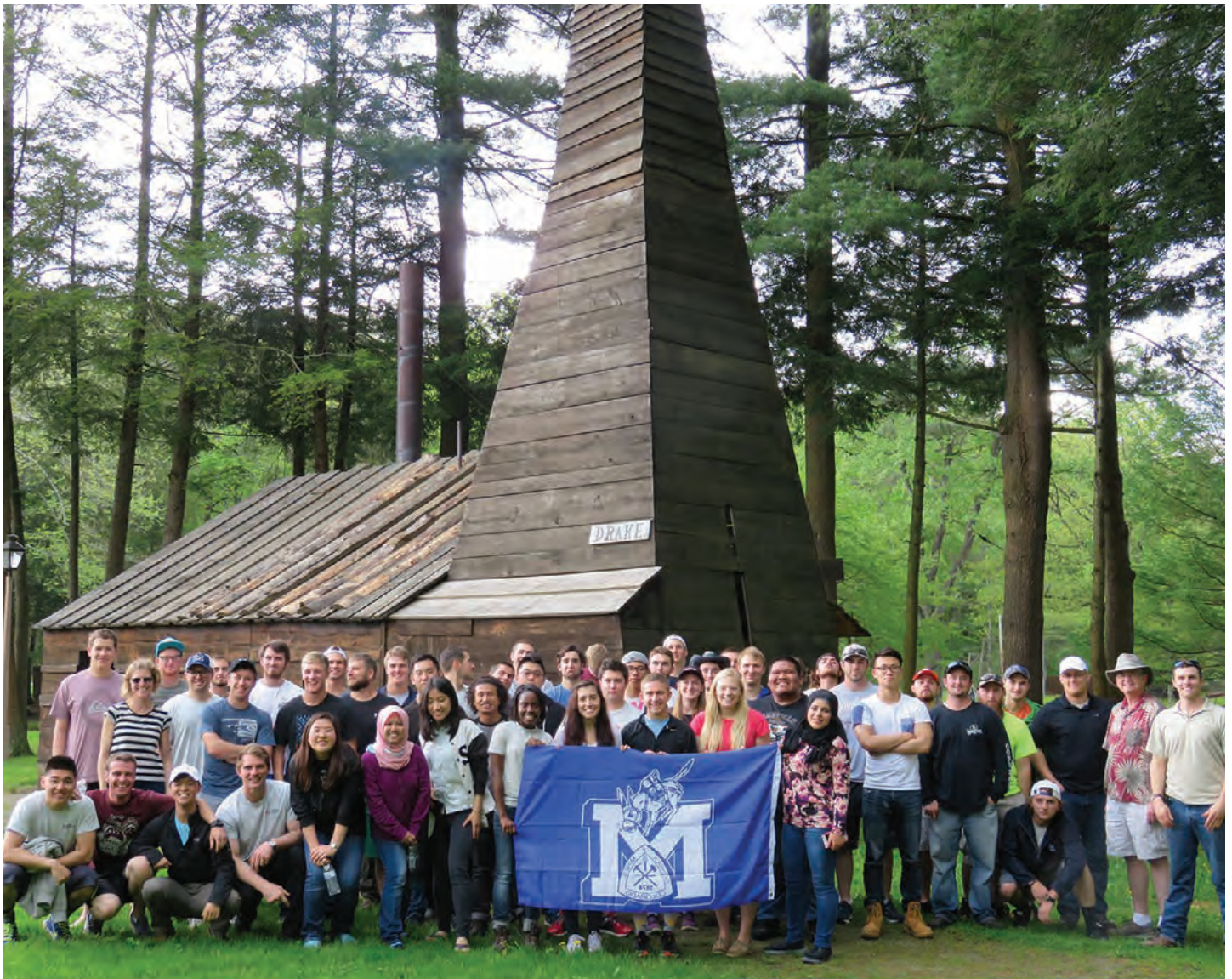
Visiting the BSSET



### PENNSYLVANIA CONTINUED

Then we wanted to see the Air and Space Museum so I found a parking space nearby. And I learned an expensive lesson. Look at the parking signs CLOSELY. It turns out parking was illegal there until 2:30 pm. Who knew? We walked out of the museum over to where I thought I left the rental truck. It is a sinking feeling when you cannot find your vehicle ("Isn't this where we parked?"). It turns out, the rental truck was towed to an impound lot which luckily, was on the way to Baltimore. The students and I flagged down a taxi and took off. In hindsight, that was good as the taxi driver dealt with the Friday afternoon traffic jam. Clearly I wasn't the only one to be towed. There were a score of taxis at the impound lot. Anyway, after paying my fines, we took off and made it to KBAL in plenty of time. Oh well.

Another fine field session has been completed. These field sessions are a highlight of our program and the envy of many other schools. If it wasn't for our generous alumni and partner companies, this signature event would not happen. If I have misspelled your name, got your graduation year wrong, or worse, left you off entirely, blame me and my sloppy notes. You would think I could write better. Please accept my apologies and just know that we really do appreciate all you do for our program. It is your effort and success that drives the Mines' reputation and good fortune. Thank you one and all. See you on our next field session.



The Field Session Team at the Drake Well



### PEGN 315 FIELD SESSION - WYOMING By Carrie McClelland

Once again, I had the privilege of touring through Wyoming with a group of our sophomores to give them a hands-on introduction to the industry. We started our journey in Rock Springs with a visit to the **Halliburton** facility in Rock Springs where students were given a great overview of the industry. We learned about cement, frac fluids, and perf guns, and had the opportunity to look at their equipment. Our next stop was Pinedale, where **QEP** toured us through their sites in the Pinedale Anticline area, and **Jonah Energy** showed us their Jonah Field operations. These companies helped us to understand more about geology, how hydraulic fracturing can be beneficial, and how important it is to work with the people and the environment where they are operating. In Cody, we saw how a more mature field can continue to operate and explored a more conventional operation along with some enhanced recovery methods. In Casper, we saw ESP's up close and learned about the tools and operations of **Baker Hughes**. And "somewhere" in Eastern Wyoming, **EOG**, with help from **Roadrunner Supply**, **Weatherford**, and **Summit** gave a great tour of their field and taught us about pumps and production.

Some of the things we did for fun included a quick tour of Yellowstone National Park, exploring Jackson Hole, touring the Mountain Man museum, and cooking many gourmet meals together on the hotel barbeque – steaks, steamed fish, bacon-wrapped stuffed jalapeños, and more (The food was amazing!). We were also fortunate enough to be able to have a barbeque dinner with some of our Alumni that was kindly organized by alum Dave Scriven (Mines 70'). The students enjoyed meeting those of you who came and loved hearing your stories. Thanks so much for taking the time to come to attend. I hope to make this a regular occurrence.



Learning about cement at Halliburton



Alumnus Zane Gordon showing students around a rig



The 2015 Field Session group in the field



## FIELD SESSIONS

### WYOMING CONTINUED



Near Cody learning about pump jacks from the great folks at Marathon



One of the gourmet meals that students cooked together



Talking with past and future CSM students

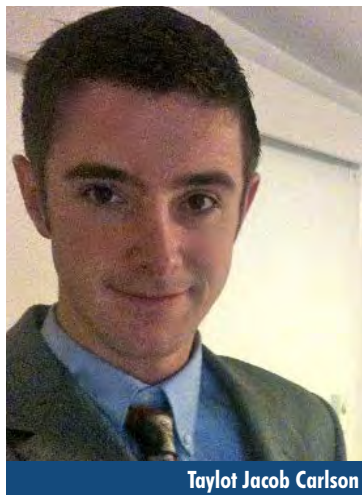


Braving the elements to cook for the crew – alumni and students together



The whole crew at the entrance to Yellowstone. Just like last year, it was a snowy affair. This year, we were treated to the best wildlife showing so far, including moose, bear, elk, bison, bald eagles, and wolves.

## A STUDENTS VIEW ON FIELD SESSION **By Taylor Jacob Carlson**



Taylor Jacob Carlson

Prestige. Pride. Privilege. The air percolated with these as we began our journey; we followed the ancient summer pilgrimage of Mines petroleum sophomores out to the oilfields. Our field session promised to lead us into thirsty deserts, through treacherous mountain passes, and display the payloads of a harvest developed over millions of years. We all knew the trek was steeped in more tradition than Texas Tea and

littered with the muddy footsteps of our predecessors. We wanted to add our own.

So we stuffed ourselves into a fleet of passenger vans and set off to Four Corners like a procession of white Twinkies. We bested starvation with Twizzlers, Gold Fish, and trail mix – not to mention all the finest BBQ and catered casino cuisine we could handle thanks to our hosts. We endured comfortable beds with high thread-count sheets. We barely escaped crushing stress by playing chicken with crocodiles and snakes, soaking in hot tubs, risking it all on high-stakes poker, leaping off sand dunes, dodging suicidal wildlife, and cruising down white water rapids in snowy Durango (oh yeah, it hailed on us).

But it wasn't all a horror story. Nor was it all games. In seriousness, I loved the trip to New Mexico and Texas. The grand views and pleasant company made the drives enjoyable. I learned so much from interacting with the field equipment and face-to-face interactions with working engineers. I had many questions due to our conversations that I didn't even know to ask before. As our hosts ranged from major producers like Conoco and BP to independent operators and service companies like Synergy and Select Oil Tools, the vastness and specializations of our discipline impacted me – so many places to find a niche, a home.

In Farmington, NM, Conoco presented on NGL extraction in the San Juan Basin and elucidated the major disciplines in petroleum engineering. We then met with Tom Mullins from Synergy, who provided the unique perspective of an independent operator. Our first actual visits to the field were channeled by Red Willow Production Company and BP, who both produced coalbed methane from the Fruitland Formation. Soon, our travels turned to West Texas' Permian Basin, towards oil and away from gas. Cement, became

SEement, and oil shortened to o'l. Devon Energy greeted us warmly with a presentation on their company's assets and wonderful Tex-Mex. We were all excited to have the chance to see Cactus, a drill rig, in operation. And Chevron provided a matchless opportunity to learn. They had a training site with a tank battery, pump jack, surface separation facilities, and a downhole drill stem. Cutouts exposed the inner workings, and each was color coded for clarity. As we turned back to Colorado, Hess toured us around their gas plant and midstream operations where they practiced CO2 EOR. We ended our voyage by exploring the potential of geothermal energy in Pagosa Springs before finally arriving, exhausted, back into the arms of Golden.

In retrospect, the technology, inventiveness, and commitment of each company was clear. Thanks to all of them. They made a huge contribution on our education that won't be lost. We missed seeing a frac job and standing on an offshore rig, but I'm sure we'll all have the chance if we remain committed to our work – and have a little luck with the commodity market. I hold high standards for myself, and am invigorated by the professionalism of my Mines family. The professors and the TA's were always engaged and helpful. Even though much was old news to them, they displayed consistent academic interest, and a genuine desire to help the students expand their understanding. I also know firsthand all the tedium and work that goes into planning the summer session and adaptive problem solving it demands despite the careful preparations. So I want to close by thanking all the professors, TA's, and PE office staff that made this possible for us.

### **Taylor Jacob Carlson**

Studying PE at CSM  
B.S. Chemistry 2013  
PE Dept. Staff





### PEGN 316 Field Session II - MASSADONA By Mark Miller

Similar to last year, weather again played a big part of field session. Students were sending email after email in the hope that falling snow would delay their field session experience. Unfortunately, their wishes and hopes were defeated by the sun coming out and obliterating the newly fallen snow. While lightning and heavy rain did give them a break from the field portion of a couple of exercises, the data needed to complete the exercises was patiently waiting for them back in camp.

We again had three back-to-back sessions, each with about 70 students. Mansur Ermila, Luis Zerpa, new professor Elio Dean and I were this year's petroleum faculty. John Detring once again donated his time as one of the most helpful geologists on the trip. Like last year, Geology TA Mitch Weller put in six weeks of effort. Over the past three years, Mitch helped lead ten sections of students around the outcrop. Thanks Mitch. Another geology TA, Bryan McDowell, did a



Student calculating the height of a formation



We can cook a gourmet meal anywhere!



Mitch Weller discussing geology in Dinosaur National Monument



### MASSADONA CONTINUED

great job of helping revamp the reading assignment book. The book, sponsored by a donation from **Anadarko**, is now broken down by different petroleum systems – Phosphoria, Mancos/Mowry, Mesaverde, and Green River.



The Frisbee Game- measuring track lines

Both **Chevron** and **Production Logging Services** again graciously helped our students and provided presentations to all three sessions. **Chevron's** Roy Cramer and Rick Moran showed how outcrop observations can help engineers understand what is happening in the subsurface of a giant oil

field. Rick brought in core samples of different Weber zones and some examples of Mancos calcite that led entrepreneurs to select the first Rangely well locations. Interestingly enough, while wandering around the hills surrounding the Massadona camp, I found similar calcite-filled fractures. **PLS's** Craig and Kevin Stratton gave the students a production logging primer. Because it is one of topics we don't cover in the production class, the department, and myself in particular, appreciate it very much.



Raven Ridge- determining the height of a rock layer.



2015 Section A



## FIELD SESSIONS

### MASSADONA CONTINUED



Presentation using PE students to show how coal is formed.

While the students did a great job of the traditional cleaning and sprucing up of camp, Dr. Zerpa and his student team deserve special thanks. As any student of the past few years knows, the seismic trailer roof has been leaking badly. While various repair attempts have been made, I believe Dr. Zerpa fixed it, at least for the time being. As mentioned previously, we had heavy rain over much of the first session. Faculty and TAs noticed rain during the second session causing a drip through the ceiling. At the start of the third session, students scraped, brushed and painted the trailer roof. It was just in time. The continuing rain had locals talking about how anomalous it was. Hail covered areas near camp, making them look like snow-blanketed fields. Thankfully, the repair held. Unfortunately, the trailer now needs a lot of work - maybe next year. It's our new mission.



2015 Section C



2015 PE Graduating Class



### **Department of Petroleum Engineering**

Colorado School of Mines

1500 Illinois Street

Golden, CO 80401

# **Alumni Reception at SPE ATCE**

## **To Our Alumni:**

Please join us for the Colorado School of Mines, Petroleum Engineering Alumni Reception to be held during the Annual SPE Technical Conference in Denver, Colorado.

## **September 28th - 30th, 2015**

The Alumni Reception will be held on

### **Monday Evening, September 28th at the Hilton Americas-Houston**

Level 4, Grand Ballrooms A-B

1600 Lamar Street, Houston, TX 77010

5:30 pm - 7:00 pm

### **Cost \$30**

As always, there will be plenty of food with a cash bar.

All are welcome to attend this reception, regardless of attendance at the SPE Conference.

You may now RSVP and pay online at: [www.minesalumni.com/SPEreception](http://www.minesalumni.com/SPEreception)

Don't hesitate to email Denise Winn-Bower ([dwinnbow@mines.edu](mailto:dwinnbow@mines.edu)) with any questions.