In the last couple of years, the main theme of my newsletter article has been the effect of the industry downturn on academia and education as well as our efforts to cope with it. More favorable oil price and the positive financial outlook of the E&P business in 2017-18 have finally brought back optimism about the future of our industry and provided some relief. Moreover, as shown in Figure 1 (see next page for all figures), the rebounding of our BS placement rate to 89% last year indicates that our efforts to equip our students with higher technical competence and qualifications to prevail in the more stringent job market have been successful (our graduate student placement rate was 100% last year). These placement figures are a statement of the impeccable stature of the CSM PE Department and its alumni in the industry.

To add more to our confidence about the future, Figure 2 shows the changing placement trend of the CSM BS PE graduates in comparison with the average CSM BS placement rates.

Placement figures for 2018 are yet to be released by the Career Center (the complete data becomes available usually by November), but the raw data and feedback from our students indicate a strong year for summer internships and permanent job offers. A good indication of the summer internship offers is the interest in our on-campus Externship Program.

In the past two years (2016 and 2017), we offered a five week on-campus, summer Externship Program for those who were unable to secure an industry internship. The program was a great success based on feedback we received from both the students and the companies interested in hiring them. After running three parallel tracks for 54 students in 2016 and 51 students in 2017, we only need to offer one Externship track this summer on Reserve Estimations and Production Data Analysis for four students; the result of a substantial increase in the industry internship offers to our students. While the need for the Externship Program is decreasing, we are indebted to the industry and private donors for their cash and in-kind contributions. Through this program, we can give our students the assurance that they had made an excellent major selection, and despite the challenges, the industry continues its support of the education of the future technical workforce.

This year we also officially founded a PE Student Board to create a platform for student voices of the department and build lasting solutions for academic prosperity. A few board accomplishments in academic year 2017-2018 were completing the structure of the board as well as the grievance process by which the student body communicates to the department; heavily aiding in the decision to have only graduate students TA classes, with very few exceptions; assisting in bring-
ing more PE classes back to Marquez Hall; and starting the process for opening Registrar-controlled computer labs in Marquez Hall for the Undergraduate Students. Next year will bring a new round of problems to solve for this fantastic group of students, and we look forward to working through the process with them.

Despite the positive twists in many fronts, we predict that the enrollment will still continue dropping for some time because the ripple effects of the changing industry climate usually reach universities with some lag time. We are currently at about 43% of our 2014 enrollment and we expect this level of enrollment to persist for some time. Table 1 presents a comparison of the enrollment and graduation statistics from 2014 through 2018: There is a considerable drop in freshman declarations from 2014 but the number has stabilized in the last couple of years (remember that our students are not required to declare a major until their second semester of the sophomore year). Our total undergraduate student numbers for the upcoming Fall are sitting around 104 so far this summer.

In Fall 2018, we will have our ABET evaluation for the next six years. This is a major undertaking for the school and the department. Dr. Miskimins, Dr. McClelland, and Ms. Boster spearheaded our efforts to prepare for the visit and the entire faculty and staff worked diligently to provide the detailed data and information about our undergraduate program. We have done our homework and we feel confident about another very successful ABET Accreditation visit.

In the previous newsletters, we told you about some curriculum revisions. Most importantly, our new minor programs in midstream engineering and petroleum data analytics have successfully kicked off. With the new computer science minor and the existing geology and energy economics minors, we are now offering more options for our students to diversify their skill sets. We are also preparing for other major curriculum revision/modernization projects to be initiated after the ABET visit.

In 2018, we reinitiated our Program Advisory Board (in addition to the Visiting Committee which reported directly to the CSM President), which is comprised of high-profile leaders from both industry and academia. The board will meet twice yearly to review the quality and effectiveness of our program and provide us with guidance and suggestions on improving it. The first Program Advisory Board meeting took place in April 2018 and after reviewing the data presented, the board provided a very positive and encouraging report. They immediately initiated sub-committees to collect institutional and industry data about the program, support the department, and provide valuable input for our opera-

Table 1 – Undergraduate Enrollment & Graduation Statistics

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<td>Fall Freshman Declarations</td>
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<td>134</td>
<td>69</td>
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<td>Sophomores</td>
<td>178</td>
<td>125</td>
<td>101</td>
<td>67</td>
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<td>Juniors</td>
<td>157</td>
<td>172</td>
<td>102</td>
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<td>Seniors</td>
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<td>393</td>
<td>367</td>
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<td>Total Undergraduates</td>
<td>886</td>
<td>824</td>
<td>639</td>
<td>460</td>
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<td>Spring Graduating Class</td>
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<td>166</td>
<td>132</td>
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<td><strong>Graduate Program</strong></td>
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<td>ME</td>
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<td>14</td>
<td>17</td>
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<td>15</td>
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<td>MS</td>
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<td>PhD</td>
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<td>48</td>
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<tr>
<td>Total Graduate Students</td>
<td>103</td>
<td>106</td>
<td>100</td>
<td>108</td>
<td>101</td>
</tr>
<tr>
<td>Graduating Students</td>
<td>38</td>
<td>37</td>
<td>26</td>
<td>36</td>
<td>12 (SM: 5MS; 2PhD)</td>
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tions. We are pleased with the depth and breadth of the board members’ experience and vision and grateful for their commitment and dedication to contribute to the success of the department.

You will find more individual success stories from our faculty, staff, and students in this newsletter. As always, they are the source of everything we have accomplished. Therefore, I would like to take this opportunity to thank them for the great work they have been doing and to remind them how special they are.

And for you, the alumni, thanks for your continuing support and please stay in touch.

RAMONA GRAVES

This past academic year has been a rollercoaster of emotions for me. The super highs were the many recognitions I received from Mines, SPE and the petroleum industry:

• Distinguished Achievement Award for Petroleum Engineering Faculty from SPE International.
• I was a featured chapter in the book *Learned in the Trenches: Insights into Leadership and Resilience*. This book was co-authored by Mines alumna Maria Angela Capello.
• Pinnacle Award from Hart Energy for Lifetime Achievement and Contributions to the Industry – One of the most influential women in energy.
• Colorado School of Mines Foundation Faculty & Staff Philanthropy Award.
• Featured in the Silver Salute (code for Senior) section of the Grand Island (NE) Independent newspaper. Article entitled “Dannebrog Native Scales New Heights”. My mother was very proud.
• An anonymous donor gave $1 million toward establishing an endowed chair in my name.

I was honored, humbled, and a bit embarrassed by all of this recognition. My career as a petroleum engineering professor at Mines has allowed me to work with students, travel the world, meet amazing people, and learn about cultures far removed from my Nebraska roots. I’ve been doing a job I love for the past almost 40 years. Working with Mines faculty and students has been a joy .... and a challenge!

The super low was I tripped in a parking lot and broke my foot last November. Surgery, six weeks of no weight bearing, being house bound for over two months, and months of physical therapy was difficult but manageable. However, I’m having the most difficulty with knowing that I will never be able to wear my red boots again!

The super, super high was that Lacey gave me a perfect granddaughter – Hazel Ophelia Scarlett.

This rollercoaster year has given me the opportunity to reflect on my career and what I still want to do with my life. I came to the decision that it is time to retire in August 2019. Depending on the day this decision is either a high or a low! If I’m hanging out with my grandkids it is a good decision. If I’m hanging out with the PE students and faculty it doesn’t seem like such a good decision. I don’t know what is next, but I know I will do it with the same philosophy I’ve had while at Mines – Work hard, laugh often, treat people with respect and don’t be afraid to fail.

LINDA BATTALORA

The 2017-2018 Academic year was full of exciting activities! In addition to my regular classes – PEGN312 Properties of Reservoir Fluids, PEGN315 Field Session 1, and PEGN681 Petroleum Seminar – I also taught PEGN430/530 Environmental Law & Sustainability, PEGN411 Mechanics of Production, and EDNS430 Corporate Social Responsibility. I advised over 200 PE UG students and served on the PE Undergraduate Curricu-ulum Committee and as a Collaborator with the 2018 Trefny Summer Course Revision Intensive. Additionally, I chaired both the Teaching Faculty Promotion Committee and the Search Committee for the Assistant Provost of International Affairs.

The past year was eventful with SPE activities. I became Chair of the Sustainable Development Technical Sec-
tion and joined the US Training Courses Committee and the Women in Energy Committee. I continue to work with the HSSE-SR Advisory Committee and also now serve on the Production and Facilities Advisory Committee. Last April, I served on the Social Responsibility Subcommittee of the 2018 International HSSE Conference in Abu Dhabi, United Arab Emirates and participated as a panelist and co-chair of two technical sessions. In September at the SPE 2018 ATCE in Dallas, Texas, I will be given the SPE International Award of Distinguished Member. This is truly an honor!

I continue to serve on the Education Advisory Board (EAB) of the Association of International Petroleum Negotiators (AIPN). I am also a volunteer with the Colorado Bar Association Environmental Law Section Advisory Council, the Junior League of Denver, and a member of the Denver Council on Foreign Relations. Along with SPE, these activities capture a variety of my interests and also provide opportunity for connections between my classroom, industry, regulatory sector, community, and alumni. Last year Schlumberger, the Environmental Protection Agency - Region 8, and Mines Alumni participated in classroom discussions, research, and activities in project-based learning assignments in my PEGN312 and PEGN430/530 courses.

This summer I co-taught a Master Class at Mines titled Industry and Communities: A New Paradigm Around Social Performance, with Dr. Chris Anderson, Yirri Global. I also taught for Petroleum Superschool on Environmental and Corporate Social Responsibility in the Oil and Gas Sector. I continue to enjoy ballet, yoga, theater, hiking, camping and cross-country skiing. The newest addition to my family is Daisy, a happy, intelligent, agile Boston Terrier puppy, 10 months old at the time of writing this article.

Thank you for your continuing support of the PE Department and Mines! I look forward to seeing many of you at 2018 ATCE in Dallas, Texas and 2019 Offshore Technology Conference in Houston, Texas. Of course, we always enjoy seeing you on campus for alumni events and recruitment!

ELIO DEAN

Thank you students, alumni, industry friends, and fellow CSM colleagues for all your help in trying to keep our course material up to date with the industry. This year I will be moving to a part time position at CSM, spending more time with Surtek, consulting on enhanced oil recovery (EOR). AT CSM, my focus remains with teaching our economics course, and in Spring 2019 I will teach the undergraduate data analytics course. I am especially excited by the data analytics course. For the past year, I have been working with Jim Crompton (industry guru in data analytics) and have had the honor to learn from him. Besides teaching the spring 2018 graduate data analytics course, Jim and I taught an industry short course in May 2018, which received great reviews, and will be presented again in October. Contact me if you might be interested.

At Surtek, I will continue to work with CSM in efforts to build up EOR capabilities. For those who don’t know, Surtek is across the street from the CSM PE department and has more than 40 years of EOR laboratory studies and field implementation. EOR is one of the hot topics...
for unconventional and for mature conventional reservoirs, and few companies have expertise in this area. Surtek has helped the PE department for many years in research, teaching EOR to students, and assisting our lab technician with laboratory equipment. One of my objectives is to strengthen this existing link.

More importantly, I encourage all those reading this to be sure to play as hard as you work. I am writing this from a sailboat off the island of Mallorca, and have had the opportunity to spend seven weeks “working” and playing abroad. I look forward to the 2018-2019 academic school year, and wish you all the best.

MANSUR ERMILA

This 2017-18 year has been a special year for my family and me. While the youngest of my children, Abdullah, has been accepted to Mines, my middle child has almost completed her bachelorettes in Public Health, and my oldest has started her new teaching job. I am a proud father who is watching his kids grow up to accomplish their dreams and strive for more education and success.

Around the time when I was their age, I was an undergrad at Tripoli University in the late 1980s when I first heard some of my professors speaking of the legendary Colorado School of Mines. I was intrigued from the very start and ever since, I never stopped dreaming about having the opportunity to be a student there one day. I had hopes of continuing my education and pursuing higher degrees outside of the country. During this time I had the opportunity to obtain a Masters’ degree in Hungary. After finishing that degree, I moved back to Libya and worked in the petroleum fields for a while. I gained a lot of experience from my work in the petroleum fields and I had a chance to practice all the knowledge I learned during my undergrad and master’s years. After working in the fields for a few years, I took the job of being a lecturer at Tripoli University. As the years passed, Mines seemed farther than ever before.

After years of hard work, I was informed that I had been selected to do my PhD abroad, and I took this opportunity to apply to the doctorate program at Mines. In addition to Mines, I applied to a few other universities around the world. The day I received my acceptance letter was a remarkable day in my life. I moved here in late 2006 with my family. Shortly after I received my PhD in Petroleum Engineering, I worked as a research assistant for two and a half years, and then in December of 2014 I was hired as a Teaching Associate Professor in the PE department. Teaching new classes and interacting with new students was a nerve wracking experience but there were always new opportunities to learn, spread my own knowledge and gain experience.

This year I also had the chance to do some field work with the PEGN 315 course, which was a short, but rewarding and fun experience! Not only did the students enjoy their time, learn new information and physically utilize that information, my colleagues and I were also able to have a good time and learn new things! My colleagues are such motivating and hardworking people and I truly do not know where I would be if I didn’t have their support and great advice with me along this journey. Studying and working at Mines has made my dreams and the dreams of my family come true and I will forever be grateful for this life-changing opportunity.

ALFRED “BILL” EUSTES

I am reminded that this is my 23rd year as a faculty member in the PE department. I am rapidly approaching retirement, yet I have so many things to do and a lot going on. Besides the classes which I and the other faculty are constantly improving, there is a lot more happening. We have the new data analytics minor ongoing, with new students was a nerve wracking experience but there were always new opportunities to learn, spread my own knowledge and gain experience.

This year I also had the chance to do some field work with the PEGN 315 course, which was a short, but rewarding and fun experience! Not only did the students enjoy their time, learn new information and physically utilize that information, my colleagues and I were also able to have a good time and learn new things! My colleagues are such motivating and hardworking people and I truly do not know where I would be if I didn’t have their support and great advice with me along this journey. Studying and working at Mines has made my dreams and the dreams of my family come true and I will forever be grateful for this life-changing opportunity.

I am still the AADE Faculty Advisor, and I am involved in many of the international initiatives.

In drilling research activities, I am a co-PI on a new NASA project. We are developing a way to characterize lunar regolith in the permanently shadowed craters (-400F,
vacuum) using drilling derived data. I am also leading a team in studying lost circulation materials in cooperation with King Fahd University of Petroleum and Minerals for Saudi Aramco. I am assisting on a DOE SBIR project on a novel LCM and I am finishing up the first five-year program for the Ice Drilling Program Office with a study of new fluid weighting agents. I am also competing for two new DOE projects with the Geothermal Technology Office on lost circulation in geothermal wells and drilling data analysis with machine learning, as well as supporting other projects for my teammates. The Apache Drill is continuing to be integrated into the curriculum and research program. In April, the drill team attached two “SlamSticks” which are 20,000 Hz three-axis accelerometers to the core rod on the drill (with duct tape—hey it worked). We were able to get very interesting acceleration data as we cored 10 feet. With a joint time/frequency analysis, you can see the performance of the drill system. There was a lot of noise, but the concept looks promising. The team used the data for their project for our new data analysis course, offered for the first time in the spring semester.

My family is doing well with my daughter at the University of Utah working on her doctorate in microbiology. My son is in the McGill University Music program in Montreal. My wife is now consulting in HR, and I am doing fine. Stay safe and see you at ATCE.

HOSSEIN KAZEMI — Chesebro’ Distinguished Chair

The 2017-2018 academic year was a great year—full of fun and accomplishments. Five of my PhD and two MS advisees graduated, leaving behind a near-empty nest. I already miss working with these graduates whose research projects spanned across both conventional and unconventional shale reservoirs. The projects included experimental work, reservoir performance evaluation and numerical modeling.

On another front, I was invited to speak at an international conference in Bolivia on Enhancing Gas Recovery from Naturally Fractured Reservoirs, held in late July 2017. Gas consumption is increasing at a rapid pace—significantly faster rate than oil production rate. The current global gas production is 130 trillion cubic feet per year and oil production 100 million barrels per day!

In mid-August 2017 I was invited to speak at a technical symposium, A New Era in Reservoir Characterization, in conjunction with the grand opening of the $97-mil-

Apache Drill in the Bodin Drift in the Edgar Experience Mine.

Celebrating our 30th anniversary.

Dr. Kazemi enjoying a Permian carbonate anticline during a field trip.
lion-dollar High Bay Research Facility at the University of Wyoming. And, in November, I attended the SPE Forum on Enhanced Oil Recovery in Unconventional Reservoirs as a discussion leader on the topic “What Constitutes EOR in Unconventional Shale Reservoirs?” This topic is of great interest because, with the current technology, we will produce, at best, ten percent of the oil in place (with an average of about six percent) from the liquid-rich shale reservoirs.

I had a great time at the above three conferences, and I very much appreciate the invitations.

In the academic front, I taught or co-taught four graduate courses—two in fall 2017 and two in spring 2018— and one undergraduate senior course in spring 2018. I really enjoyed the latter course; however, I owe much of the course contribution to my excellent teaching assistants. As for the graduate courses, I have a soft spot in my heart for the carbonate geology course, co-taught in spring 2018 with Dr. Rick Sarg of the Geology Department. This course traditionally attracts a large number of petroleum engineering graduate students. Rick is a great teacher and organizes a very educational field trip.

In closing, I look forward to the 2018-2019 academic year; and, from mid-June to mid-July, I am going to enjoy the Soccer World Cup. I have already seen some dramatic finishes in the first round of the tournament.

CARRIE MCCLELLAND

Hello to each of you. I am in my seventh year with the department, and there are still adventures to be had! I spent the last year working with our undergraduates to learn about fluid mechanics, to practice professional skills and to savor the joys of Massadona. In Fluid Mechanics, students got to practice their course concepts with a project designing pipelines for an isolated and socially complicated location in South America. In the PE Senior Seminar class, students learned about professionalism, technical writing, making presentations, social license to operate, communicating with the public and networking. A big thank you to our alumni who took the time to talk with our students about community engagement. Since one of my favorite childhood toys was a rock identification kit, it is easy to see why I had a great time teaching the 316 Field Session in Massadona. It is exciting to help students see how the amazing geology there affects petroleum production.

Traveling this year took me to quite a few interesting events. It was fun to see some of you at SPE in San Antonio. I learned more about effectively teaching our students at a conference at Virginia Tech. And I got to go to Geneva, Switzerland to work with the UN European Commission on calibrating their resource classification system to other industry systems such as PRMS and to discuss how to attract more women to the energy industry. It was exciting to attend meetings at the United Nations.

I hope that this year has been a good one for you. Thank you for all that you do to support our program. As always, if you are in Golden, please stop by to say hello!
Students in the computational methods class got exposed to two languages last fall: the traditional Excel VBA and Python. Each had their proponents. Some students liked VBA for its ease of debugging and clear applicability to solving many types of programming tasks. One Python text admits that Excel is the most common data analysis program. Other students liked Python because of its ability to handle large quantities of data. VBA really starts slowing down when you start writing data sets that are greater than a few hundred thousand lines long. It can do it, but it is so slow. For this coming year, students will again see both languages.

After two years of not being offered, I was able to revive the Introduction to the Petroleum Industry class. Students enjoyed having many of the department’s faculty talk about their specialty areas. In particular, Professor Emeritus Craig W. Van Kirk was able to perform his famous “Coke Experiments” for the students. They enjoyed seeing the substantial effect of proper reservoir management. About one-third of the students were petroleum engineering seniors looking for an easy A, one-third were seniors from other departments looking to enhance their career prospects, and one-third were the freshman and sophomore target audience. It made for a busy semester. Between this class and the production class, I had a class every day of the week.

I was fortunate to be able to accompany Linda Battalora, Kayla Boster, and a bunch of students to California for the first field session. It was great seeing our alumni. They truly helped the students figure out what petroleum engineering is all about. I heard from several students how seeing the equipment and talking to the host companies really clarified the work and types of things that a career in petroleum engineering entails. Both AERA and California Resources Corporation did a fantastic job. More of the activities can be found in the Field Session section.

Hello all! Once again I’m drafting my newsletter while sitting out at the Massadona field camp. It’s “visit Chevron” day, and we are all happy to be inside - the +90° temperatures, bugs and snakes are all starting to come out en masse. We did have one very unique experience at camp this year, when a C-17 transport jet basically buzzed us while we were out on Raven Ridge. That was a BIG plane to have come right over top of us. I’ve included a photo of it along with the field session article. It doesn’t quite do it justice to have something that size pop up over an outcrop, but you’ll get the idea.

So, let’s see, what have I been up to this year other than the usual professorial items? I guess the foremost item is that I’m serving my final year on the SPE International Board of Directors as the first-ever Completions Director. As your three year service progresses on the Board, one generally takes on more and more tasks, so overall that role has kept me quite busy. When I finish up that role in September, I’ll be taking over another task for SPE as one of the two SPE representatives to the AIME.
Board of Trustees. That will be a new and interesting undertaking, and I'm looking forward to it.

At school, the FAST (Fracturing, Acidizing, Stimulation Technology) Consortium is doing well. With the industry stabilizing (and somewhat up-ticking), the support for programs like FAST has also stabilized somewhat—but there's always room for more if you have an interest! We currently have around ten students working on various projects including areas like well-to-well fracture interference, cluster efficiency, and proppant transport, among others.

From a personal standpoint, last year I mentioned that I was building a new house. That finally is finished and I am officially moved in. Still hanging some pictures (ok, I only have three total hung in that entire house), but I am sure happy to have that behind me!

This year's photo is a picture of me and Darcy Spady, the current SPE President, on my birthday (we won't discuss which one). For those of you that don’t know, Darcy is an extremely accomplished musician, and I felt quite privileged. How many people can say that they were serenaded by a president with his accordion on their birthday!

Hope to see you at SPE ATCE in Dallas this year or someplace soon!!

JORGE Sampaio

After the first academic year with the new structure for PEGN311 (Drilling and Completion I) and PEGN361 (Drilling and Completion II), the results were a success. As expected, PEGN311 provided a complete introduction to Drilling and Completions, not only for PE Junior students, but also to students of other departments and graduate students either with course deficiencies, or preparing for the qualifying exams. Students came much better prepared for the challenges of PEGN361, a design based course. This was reflected in the higher quality projects in general, and a higher final grade average. Particularly in PEGN361, the use of real (field) data exposed the students to the difficulty and challenge of playing with noise and the various methods to filter them, compared to using academic, well-behaved data.

In the PEGN311 Mud Lab for fall 2018, a set of 12 new rheometers will replace the aged Fann VG units. These new rheometers are fully digital, able to utilize a wider and continuous range of rotor speeds and capable of running a full rheology test with a touch of a button; students will have to use the manual process to exercise the API procedure. However, in the first lab session (Session “0”) they will have to use the manual rheometers since there is a chance that the students, after graduating and getting a job in drilling and/or completions, will very likely be faced with the old manual Fann VG meter. Only in the following sessions they will use the digital rheometers. Doing so, students will gain experience with both meters, and be more efficient in the next sessions, focusing on the principles and test results instead of spending time with manual switches and speed shifts. In addition to being more efficient, these rheometers can be connected to the lab network and provide batch fluid tests for research purposes.

My MS student (Patrick) concluded his program with a successful thesis defense, got a job and joined the industry workforce. Two PhD students (Chris and Anvar) started under my advisory. Chris is working with fiber optics and Anvar will work on assisted methods to improve drilling efficiency. Another PhD student (Ahmed) should embark on his program in August this year.

Last summer I had the pleasure and satisfaction of being an Organizing Committee member of the ASME-OMAE conference in Trondheim, Norway (see picture with the Midnight sunset in Trondheim’s harbor). Although the conference covers a very wide spectrum of subjects, it has a growing Petroleum Engineering Section. I encourage graduate students in submitting papers for the next conference (OMAE-2019) in Glasgow, Scotland. This summer I will be chairing the OMAE-2018 Drilling Mechanics Topic in Madrid, Ole!
AZRA NUR TUTUNCU — HARRY D. CAMPBELL CHAIR

Congratulations to our newest UNGI alumni Faisal Al-howaish, Rayan Alidi and Bryan McDowell for their MS degrees and Somayeh Karimi, Younki Cho and Cong Wang for their PhDs. Several UNGI alumni had an impressive year. Jessica Iriarte (MS ’17) represented UNGI at two SPE Conferences and was also selected by Denver Business Journal as one of the top 10 influential women in the industry. Our paper with Theerapat Suppachoknirun (MS ’16) at the 50th US Rock Mechanics/Geomechanics Symposium and the true triaxial paper presented by Bekdar Baizhanov (MS ’17) and Dr. Daisuke Katsuki at the 51st US Rock Mechanics/Geomechanics Symposium were selected as top 10 best papers at these two Symposia and as journal papers for special issues of the Rock Mechanics and Rock Engineering Journal. We had three book chapters printed detailing selected findings on the role of rock-fluid interactions in production optimization. A full list of our publications, current team members/alumni and projects can be reviewed at our website (http://ungi.mines.edu). It is so gratifying to witness the recognition of our students and elevation of research quality every year.

We are continuing our unique experimental and modeling research in Eagle Ford, Niobrara, Bakken and Vaca Muerta while also initiating Permian Delaware research at UNGI Consortia. The annual meeting in April provided us further confidence of our projects staying of true interest to our industry partners. We added fiber optic along with other field data into our modeling research while also implementing our learnings and UNGI in-house developed and commercial models from tight reservoirs in geothermal pilots together with NREL in geothermal fields.

I had the honor to be a panel speaker at the Offshore Completion and Stimulation Technologies Workshop organized by National Academy of Sciences (NAS) Roundtable on Unconventional Hydrocarbon Development in Washington DC in October, and in May 2018, a similar forum on Producing Water Issues held in Denver. In August, I served as a member of the review committee for Gulf Research Program of the NASEM.

UNGI hosted the “Petroleum Geology” and “Petroleum Technology Hands on Experience” modules of our beloved TOPCORP Regulators and Policymakers training workshop for participants from 20 states, plus 4 Canadian provinces, in mid-May. The training workshops showcased our unique laboratory facilities at Mines. The participants had the opportunity to network and visit Niobrara field sites, complementing the online training with drilling and hydraulic fracturing visits. The last afternoon of the workshop was dedicated to a Government-Industry-Academia Collaboration Forum where distinguished speakers from several regulatory organizations, as well as corporations, shared their experiences with the participants and answering their questions. Our speakers and partners contribute toward enhancing communication between the government regulatory agencies, oil industry and academia for environmentally sensitive developments of shale gas and tight oil.

I look forward to collaborating with you all during the new academic year and hope to spread our research contribution toward even wider development areas for improved recovery efficiency in tight resources, deepwater reservoirs and geothermal resources in an environmentally responsible and economically viable manner.
PHIL WINTERFELD

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

Our DOE sponsored carbon storage project, “Quantitative Characterization of Impacts of Coupled Geomechanics and Flow on Safe and Permanent Geological Storage of CO2 in Fractured Aquifers,” is in its final year and will end this September. The project is concerned with the likelihood of sequestered CO2 escaping through faults or fractures in the caprocks that overlay the saline storage aquifer. We made a great deal of progress in our modeling and laboratory work over the past year. We are planning to present some of our modeling work at the 2018 TOUGH Symposium, to be held at Lawrence Berkeley National Laboratory this October, and at the 2019 SPE Reservoir Simulation Conference early next year.

I also have been working on a project called EGS (Enhanced Geothermal Systems) Collab SIGMA-V. This project is a multi-lab and university collaborative research effort and we are doing this research jointly with NREL. One of the project's objectives is to develop an understanding of and the ability to create sustained and distributed permeability for heat extraction from EGS reservoirs by generating new fractures that complement existing fractures. This research consists of stimulation and fluid flow experiments, conducted at the Sanford Underground Research Facility in South Dakota (a gold mine that was converted into a research facility), along with the development of thermal-hydrological-mechanical-chemical (THMC) simulators. I have been involved with the THMC simulator development and have been enhancing the capabilities of our TOUGH2-CSM and TOUGH2-EGS simulators for EGS modeling.

YU-SHU WU

The past academic year happened to be the 10th year for the PE Department and live in CO. I am so happy and thankful for the 10 years, the best time of my career and my life! This is because I have been associated with Mnes’ PE program and had this rare opportunity to work with our wonderful PE students, faculty and staff as well as live a Colorado life! During the past academic year, in particular, I have made a gradual transition from my undergraduate teaching (Reservoir II) to more focused graduate teaching and research activities. In addition to teaching my routine graduate course, Reservoir Engineering Principles, I tried to start a new graduate course, Advanced Fluid Flow in Porous and Fractured Reservoirs, which is a missing course in our PE undergraduate and graduate curriculum, much needed as we go after more unconventional resources.

In this past year, we have all witnessed that our petroleum industry, after a long down turn, is finally improving. The petroleum industry has been for a century, and will be for decades to come, the most important energy supplier in the world. No alternative of sustainable, clean energy resources to oil/gas has been developed, due to the lack in progress in related science and tech-
Also, I would like to report to you that in the past year, our research center (Energy Modeling Group - EMG), consisting of graduate students, post-doc researchers, and faculty, has been continually growing in our research volume and impacts. We maintained a 10-person research team and conducted state-of-the-art research in reservoir flow, stimulation, and simulation. We produced highly impacting research products. For example, we have enhanced and improved our modeling capabilities in thermal-hydrologic-mechanical (THM) coupled processes. Our own software package: SUNGAS, FracCSM, and FracOPT, for optimization of design and operation of multi-stage hydraulic fracturing by fracturing modeling in combination with simulation of tight gas reservoir production. In the past year, this software has passed real-time field tests on a fracking site. In addition, we continually made our research efforts in several frontiers of reservoir simulation for coupled thermal-hydrologic-mechanic-chemical (THMC) processes in reservoirs, leading the field of reservoir and hydraulic fracturing simulation in incorporating geomechanics in reservoir flow and simulation. We also made some progress in developing new research projects and secured three research projects from domestic and international petroleum companies during the past academic year.


**XIAOLONG YIN**

In my research group, I graduated two PhD students this year. Younki Cho, a PhD student that I co-advised with Dr. Hossein Kazemi, graduated in fall 2017. His dissertation was on characterization of multiphase flows in Bakken cores and pore-scale simulation. Jae Kyong Cho, another PhD student, successfully defended his PhD dissertation in spring 2018. His dissertation was on pore-scale simulation of contaminant transport and direct comparison with experiments. Two undergraduate students also graduated and left the group: Ryan Lo worked on measurement of capillary condensation in Niobrara samples, and Martin Lozano worked on visualization of multiphase flows in microfluidic porous media models. They have all done great jobs, and I want to use this opportunity to congratulate them on their graduation, and thank them for their contributions over the years to our research program. Their “torches” are now passed onto other students in the group.

2017-2018 was a very productive year. We made good progress in several directions, including modeling and simulation of multiphase equilibria, measurement of hydrocarbon component separation in tight rocks and non-intrusive measurements of fluid pressure in micrometer-level space using laser interferometry. Perhaps the most interesting of all is the application of machine learning and image recognition algorithms in direct determination of permeability from images. This work comes from a fruitful collaboration with a research group at Virginia Tech., and the preliminary outcome of the study was well received at this year’s Interpore Conference in New Orleans.

Currently, my group has six PhD students, three MS students, one undergraduate student and one visiting student. For the latest research topics, publications and news, please visit http://multiphase.mines.edu and the websites of research groups that I have affiliation with: http://petroleum.mines.edu/research/urep and http://petroleum.mines.edu/emg.
LUIS ZERPA

My fifth year contributing to the Petroleum Engineering Department at Mines has been another excellent and exciting year. It started with an externship on production data analysis for reserve estimation in the Summer 2017 with the participation of 12 students. Then, I taught PEGN423 Petroleum Reservoir Engineering I in the Fall 2017 semester, and PEGN439 Multidisciplinary Petroleum Design in the Spring 2018 semester, while advising graduate and undergraduate students in their research projects.

The objective of the externship was to analyze production data from six unconventional reservoirs using diverse methodologies for reserve estimation. This was possible by the support from DrillingInfo and Kappa Engineering. Participating students had access to DrillingInfo’s database and web applications for decline curve analysis, and to software provided by Kappa Engineering. I would like to thank Dr. John Seidle from MHA Consultants, who graciously provide a training session to the participating students on Decline Curves and Economics for Unconventional Wells.

For the senior design class, I gave it an unconventional twist to the Sooner field data set by asking students to design an exploitation strategy within the Sooner unit, located in Weld County, Colorado, targeting the unconventional Niobrara formation. After a semester-long project, 30 groups of students developed a design that integrated geological, geophysical and petroleum engineering data and methodologies. It was very interesting to observe the progress and the diverse final outcomes obtained by the teams. I would like to acknowledge the support from industry mentors from Anadarko and Noble Energy, with special thanks to Sean Kelly (Anadarko) and Hunter Dunham (Noble) for coordinating the efforts from their teams throughout the activities with students during the semester.

In December 2017, Alberto Ramirez (MS) and Zhijian Liu (PhD) graduated with their respective degrees in Petroleum Engineering. Alberto’s project was on geomechanics effects of polymer injection for enhanced oil recovery, and Zhijian’s project was on gas hydrate deposits formation and sloughing in natural gas pipelines. I had two undergraduate students present their research results in the Graduate Research and Discovery Symposium (GRADS) at Mines during the Spring 2018 semester. Marcus Merrit was working on Virtual Characterization of Miscible EOR Displacement, and Daniela Machnik was working on Modeling Evaluation of Water Ice Extraction from the Moon by Direct Heating of Icy Regolith. Daniela also presented her work in the 1st Undergraduate Research Symposium at Mines and won second place for her poster presentation – Congratulations Daniela! I would like to congratulate Jagmit Singh and Nerine Joewondo for successfully defending their MS theses.

At the end of the Spring 2018 semester, I received the Enger Teaching award granted by the Department of Petroleum Engineering at Mines in recognition of my dedication, passion and hard work. I take this award as a recognition of my efforts in teaching, which I share with my team of Teaching Assistants; it is because of their excellent work that we can achieve our teaching goals for the benefit of our students. I wish you an outstanding year and even higher oil prices.
STAFF UPDATES

PROGRAM MANAGER UPDATE

When I started at Mines 6 years ago, I never thought that I would move to the academic side, let alone the Petroleum Engineering Department. Now that I’ve been in the department for almost 2 years, I can honestly say that I feel very lucky for the move. The staff, faculty and students are unlike any other that I have met at Mines, and I feel very privileged to be a part of this family.

We had a number of exciting things happen this year; some are still in planning or early development, others are on the horizon. Dr. Ozkan touched on many of them in his piece, but I would like to draw attention to the ones that I have had the most impact on.

The downturn had an effect on many things in the department, student engagement, internships and job opportunities, as well as finances. For us, we have always been lucky enough to have enough resources from our amazing donors to operate our daily business. In the past two years, we have seen a significant drop in the donations coming in, which gave us the opportunity to realign our spending and budget more efficiently. I’ve really enjoyed this challenge and believe the department has figured out how to be resourceful without sacrificing our program and the education of our students.

We started a PE Short Course serious for professionals with our first course this May, Data Analytics. It was a success and we plan on continuing to both expand this course and bring in other topics in order to continue serving our alumni and other professionals. Please don’t hesitate to reach out if you are interested or have suggestions for topics we can present.

This past year the PE Student Board was re-designed to better serve our students. The presidents of the four student clubs (AADE, ARMA, SPE and PET) are automatically put on the board as well as a Junior, Senior and Graduate Student at large. The department believes that this structure better represents the student body and so far it has been working great.

We continue to engage our amazing donors and try to come up with new ways of exposing them to our students. I love meeting with them in order to find out what they need from us and to give them updates on the amazing things happening in the department. Every meeting I walk away knowing more about the company or industry then when I walked in, and I’m grateful for the amazing connections with all of you.

It was a great year, and I look forward to continue serving our students, alumni and friends in order to provide the best education and experience possible.

STAFF UPDATE

Our staff has settled into the organizational changes and is now looking for ways to be more efficient. Rachel McDonald feels established in her role as Program Assistant. She discovered it’s harder than expected to see students she’s known for a couple years graduate and leave, but Rachel is planning an international trip in a couple years to take advantage of having local contacts in so many places.

Visiting alumni in Malaysia has been on the bucket list for Denise Winn-Bower, Terri Snyder and Joe Chen for a few years. Their opportunity happened this past May, when they vacationed in Thailand, Singapore, Taiwan and MALAYSIA!! They started out separately, and joined up in Kuala Lumpur. Throughout the time they were hosted by many alumni in Miri, Penang, Langkawi and Kuala Lumpur. Two...
different nights were dedicated to alumni gatherings, where many great memories where shared along with student’s “mug shots” from Rock Properties and catching up where our alumni are at in their own lives. A lot of hugs and laughs were shared during these dinners. Our alumni are some of the most gracious, kind and giving individuals. This was a very special trip for us and we will cherish the memories we had in Malaysia.

As always, changes are constantly occurring. Drs. Tadesse Teklu and Somayeh Karimi enjoyed helping teach Rock Properties over the past year and will take over the course entirely from Dr. Graves this fall. Can you imagine Dr. Graves stepping aside to let another teach PEGN 308? She has been teaching the course for 30 years! Drs. Teklu and Karimi will do a wonderful job taking over the duties of teaching the course. Debra Marrufo has taken up a new opportunity working for Geophysics. We will miss her, but at least we’ll still get to see her since we cooperate a lot with Geophysics.

CHEVRON SHORT COURSE SERIES

We had five sessions of the Chevron Short Course Series this year. They included: G0HFER 3D Hydraulic Fracture Simulator Introduction, presented by Dr. Bob Barree of Barree & Associates; Trouble Free Drilling, presented by John Mitchell; Decline Curve Analysis, presented by Ryan Mohrman of 3esi-Enersight; Gas Lift, presented by James Stanton of Dover Artificial Lift; and Spotfire, presented by Courtney Brown of Blue River Analytics.

125 students, mostly seniors with a few juniors and grad students, particiapted in the series this year. Upon completion of the short course, the students received a certificate of completion as well as additional skills, knowledge, and training to put on their resume. Students were excited for the opportunity to learn skills and software that were immediately useful in classes and internships. We are always looking for interesting and useful instructors and courses, so please contact Dr. Azra Tutuncu (atutuncu@mines.edu) if you would like to participate or share an opportunity for a course students would benefit from.

A big thanks to Chevron for their continued support.
DISTINGUISHED SEMINAR SERIES

We are working on strengthening and expanding our seminar series so it can become an established series like the Heiland or Van Tuyl lecture series in Geophysics and Geology. We invited local and out of state speakers from industry and academia to come and speak to our graduate students on a variety of topics. The presentations were an hour long on Friday mornings every two weeks.

Our graduate students loved the breadth of topics this year, especially getting to hear from speakers in related fields. One student commented, “I’ve been here for over five years and this is the best year. All the presenters were excellent.” The Climate Change Forum was so compelling that a climate change course has been developed and is being offered for the first time this fall.

We want to continue building interest and momentum. To do so, we need to continue getting compelling and distinguished presenters who can cover topics ranging from technical issues to developing soft skills.

We are still looking for speakers for this academic year. The students have requested speakers who can address the following:

- Career development — the role of PhDs in industry, career advice for international students, unconventional career progressions, interdisciplinary programs, being an interdisciplinary engineer
- Soft skills — building self leadership, networking and communication, how to select a research topic, how to set up a research project.

We are still looking for speakers for this academic year. The students have requested speakers who can address the following:

- Future opportunities — research opportunities in new techniques, future of the field
- Technical topics — fiber optics applications, pore scale network phenomena, phase behavior in a confined space, rate-pressure analysis in unconventional oilfields, case studies in oilfield development
- Related topics — artificial intelligence, banking and its involvement in O&G, analysis and data

Please contact Dr. Jorge Sampaio at (303) 384-2370 or sampaio@mines.edu with speaker referrals or to volunteer to speak on these or related topics.

Students and faculty from across campus attended the Climate Change Forum.

Presenters in AY 17-18

**Fall 2017**

- Amos Nur, Stanford — *Challenging Problems at the Intersection of Rock Physics, Rock Mechanics and Tectonics*
- PE Faculty Intros
- Reinaldo Michelena, iReservoir — *Using seismic data to constrain natural fracture models for flow simulation*
- John Brantly, IBM — *Using Artificial Intelligence at the Enercom*
- David Greaves, Exxon — *Practical Facilities & Pipelines Troubleshooting: How to think smarter on day one in the oilfield*
- Rick Allen, S&P Global — *Export Dependence: Why US Gas Producers are now Captive to Foreign Demand*
- Climate Change Forum, participants from CSM, NREL, University of Denver and UC Boulder

**Spring 2018**

- Will Fleckenstein, CSM — *SPE Distinguished Lecture: Shale Development – Does Cheap Energy Really Mean Flaming Tap Water?*
- Zoya Heidari, UT at Austin — *Multi-Scale Formation Evaluation of Unconventional Reservoirs*
- Akhil Datta-Gupta, Texas A&M — *Fast Marching Methods: A New Paradigm for Modeling Unconventional Reservoirs*
- Kamin Singh, CSM — *A Tale of Two Porosities: Exploring Why Contaminant Transport Doesn’t Always Behave the Way It Should*
- Tzahi Cath, CSM — *Treatment of Oil and Gas Wastewater: 7 years of Research Experience at Mines*
SPECIAL PROGRAMS

SUPPORTING PE STUDENTS

Scholarships provide much needed financial assistance to students pursuing studies in the Department of Petroleum Engineering, especially to those who demonstrate a passion for learning and applying new knowledge in support of the science and engineering community.

You can support our students by making a gift, in any amount.

Go Online: giving.mines.edu/give
Please be sure to include the scholarship name as your gift designation.

Mail a Check: Use the enclosed envelope.

Visit Us: Starzer Welcome Center
1812 Illinois St
Golden, CO 80401

You can donate to any of the petroleum engineering scholarships found on our website or to our new scholar’s program.

As one of the leading petroleum engineering (PE) programs in the country, the Colorado School of Mines PE Department continually seeks to improve the quality of its program and students. To that end, Department Head Dr. Erdal Ozkan would like to create an endowed scholars program. Students with the aptitude, drive and passion for a career in the oil and gas industry will be given the opportunity to participate in this unique program.

Please contact Dr. Erdal Ozkan if interested in learning more.

EXTERNSHIP

For a third consecutive year we have offered the Externship Program to our students. It is good to see a significant number of our students obtaining internships with different companies, but for the few who stayed around campus, we had one Externship track on Production Data Analysis and Reserve Estimation, with instructor Luis Zerpa. In this externship track, students applied diverse methodologies for the analysis of production data for the estimation of reserves in unconventional petroleum reservoirs. The estimation of reserves was performed by applying conventional and alternative decline curve analysis models, and using a model-based rate transient analysis methodology to selected wells.

The Externship Program continues to offer our students the opportunity to get valuable experience while working with industry-provided data sets and get trained on industry software packages. We could not have provided this opportunity without the generous support of numerous companies and individuals. Financial support for the Externship was provided by BHP, Chevron and Shell. Additionally, we thank the continuous technical support from DrillingInfo and Kappa Engineering, by providing access to databases and software to our externs this year.

We hope to continue with your support by providing these opportunities again next summer. If you would like to get involved next year, please contact Erdal Ozkan (eozkan@mines.edu) of Jennifer Miskimins (jmiskimi@mines.edu) for more information on how to get involved.

PhD candidate Shaken Kenzkhanov presents to the externship participants.

TA Tryphosa Amos, participants Alexi Redies, Steven Martinez, Elias Limon, (Alex Koller not pictured), Dr. Zerpa and TA Shaken Kenzkhanov at the conclusion of the program.
AMERICAN ASSOCIATION OF DRILLING ENGINEERS (AADE)

While AADE is the oldest CSM student chapter, it continues to focus on meaningful, engaging growth opportunities for all of those involved. Within the CSM group structure, AADE has successfully increased membership to become a Tier 4 organization. AADE has provided numerous short courses and Lunch & Learns alongside meaningful field trips to the oilfield for those interested in drilling. Last year AADE increased membership by 23%, and intends to stay in Tier 4. During this year, AADE hosted 7 short courses, 20+ Lunch & Learns, 2 conferences, 6 oilfield field trips and a training class. Even more spectacularly, AADE has volunteered for Habitat for Humanity (Golden), judged science fair projects at the local high school and has hosted or co-hosted on-campus events like the Mudbug Masquerade and Friday movie nights. In summary, AADE has a great deal of momentum propelling itself into the 2018-2019 year, and we are looking to increase the breadth of short courses as well as mentor the next set of officers to keep the depth positive. Keep on drilling!

AMERICAN ROCK MECHANICS ASSOCIATION (ARMA)

Another year has passed making it the seventh year of CSM ARMA’s existence. It has certainly been a great journey since the chapters establishment in March 2011. With strong devotion to the geomechanics community, our CSM ARMA organization has continually improved services on campus by offering an eclectic portfolio of events at Mines. Such activities include participation in charitable community services and coordination of distinguished speaker series jointly with the Unconventional Natural Gas Institute (UNGI) and other professional chapter societies such as the Society of Petroleum Engineers (SPE) and the American Association of Drilling Engineers (AADE), primarily focusing on industry challenges and technological advancements.

CSM ARMA organized a series of activities for the 2017-2018 academic year, expanding on our Lunch & Learn lecture series to include 2 - 3 hour technical seminars, such as utilizing PETREL software for the evaluation of hydraulic fracture propagation. Similar events co-hosted with SPE, AADE and AAPG (American Association of Petroleum Geologists) occurred during the year.

During the Fall of 2017, ARMA hosted a one hour Lunch & Learn event discussing the history of drill bit geomechanics technology and a three hour technical seminar titled, ‘Current Uses and Abuses of Geomechanics in Unconventionals’ both conducted by Fracture ID. The technical seminar was the first to be hosted by ARMA and had an encouraging turnout of 25 students. They engaged in the presentation from Fracture ID which highlighted key concepts promoting the acquisition of geomechanical properties in real time and allowing critical decisions for perforation enhancement and placement to be made.
We conducted the second natural fractures field trip in New Mexico in September 2017. John Lorenz and Scott Cooper of Fracture Studies LLC led a group of 10 student members to the San Ysidro Area in the southeastern San Juan basin to gain more understating on the existence and contribution of natural fractures to reservoir development.

More recently, we collaborated with AADE for an informative Lunch & Learn conducted by Liberty Oilfield Services on trending technological improvements and burgeoning career opportunities in the oil and gas industry.

In a bid to participate in more social events, we also conducted our first-ever bowling event during the dead week of the spring semester. This served as a relaxing time for our student members as they took a break from working on final projects and exam study. ARMA also collaborated with SPE, AADE and AAPG on monthly social hours during the course of the fall and spring semesters.

As of fall 2017, we have 25 active student members in both the Mines chapter and ARMA International. Our membership continues to grow as we continue to promote geomechanical awareness across campus. We are currently set in fulfilling the requirements to progress to the next Tier structure by being active as a student organization in CSM.

The success of the aforementioned events during the 2017-2018 academic session would not have been possible without the devoted efforts of the past and current ARMA officers, members alike, our devoted ARMA Faculty supervisor Dr. Azra N. Tutuncu and sponsorship from Chevron ExxonMobil. Our CSM ARMA organization has a lot more to offer and I strongly encourage new and current student members as well as professionals to participate in the activities of the organization.

The future of the organization promises to have several more accomplishments. Here is looking to continued success in the coming years. We certainly encourage undergraduate and graduate students from every engineering discipline to join our organization. Participating in our events certainly promotes leadership skills and builds the professional network of our student members.
PI EPSILON TAU (PET)

Pi Epsilon Tau, the CSM Petroleum Engineering Honor Society, had an amazing 2017-2018 academic year. This can be attributed to new leadership within our executive team, and to an increase in member participation throughout both semesters. In the fall semester, our members attended multiple club meetings, and began volunteering at events put on by both our club and the school. Some members became mentors to underclassmen where they gave academic advising to students throughout the year. Others volunteered by tutoring at department tutoring sessions, or by promoting the petroleum department and industry at incoming student welcoming events. All members were encouraged to complete at least two hours of community service for the organization for each semester, and every active member completed this task which was a dramatic increase from previous years.

In the spring semester, our club inducted 27 new members into the organization after completing a selective application and interview process. Once new members were inducted, we purchased club jackets to become more unified as a team. At the end of the academic year, we brought in our first industry speaker, and held a very empowering professional development workshop which received great feedback from our members. We also held multiple social events.

Looking forward, the organization has increased the amount of officer positions on the executive team. The goal of this decision was to bring in new ideas and hold more events throughout the year. The organization is looking to increase the amount of volunteering events offered to our members, while also increasing our presence on campus events such as “The M Climb,” and “Celebration at Mines.” In addition, we plan on holding more social events so our members can network with one another while improving their social and leadership skills. We hope to bring in more industry professionals, and we plan to partner with other school clubs to be more involved in activities and events. Overall, Pi Epsilon Tau has large plans and goals for this upcoming academic year. Our main objective is to ensure that our members improve their engineering and social skillset so they can contribute to building a better tomorrow.

SOCIETY OF PETROLEUM ENGINEERS (SPE)

The Colorado School of Mines SPE Student Chapter has continued to deliver events and programs this academic year involving industry engagement, community service, technical presentations, and career development including mock interviews and a mentorship program.

We had a variety of events during this academic year. We held a myriad of Lunch & Learns with a variety of companies, where students could eat lunch and listen to technical and non-technical presentations from oil and gas companies. With regards
to career development, we held mock interviews before each career day to prepare students for their interviews. We also continued our mentorship program where we paired a student with a professional to allow students to have a better idea of the industry. Along with AADE and AAPG, we held a crawfish boil on campus where students, faculty, and professionals could enjoy crawfish flown from Louisiana and network. Furthermore, we co-hosted an event with SEG and AAPG where the international presidents of the three organizations came to campus at the same time were able to interact with students and faculty.

With regards to our flagship events, we were able to send 45 students to the 2017 Annual Technical Conference and Exhibition (ATCE) held in San Antonio. We also sent several students to the 2018 North America Student Symposium (NASS), including our Petrobowl team. For the first time, Mines hosted the 2018 Rocky Mountain Student Paper Contest, where students from the Rocky Mountain region competed to present their papers at next year’s ATCE. Together with Denver SPE, we hosted a Joint Session in downtown Denver where both professionals and students could meet and network while listening to Sami Al-Nuaim, the 2019 SPE President, giving a keynote presentation.

We are looking forward as a club to continue working hard and getting involved as much as we can in the 2018/2019 academic year. Our biggest upcoming events include going to Dallas for the 2018 ATCE, as well as going to the 2019 NASS.

UPDATE: CSM SPE was awarded the Gold Standard designation for 2018 by SPE International! This was given in recognition of the “chapter’s programs in industry engagement, operations and planning, community involvement, professional development, and innovation.” It’s wonderful to see all of their hard work recognized.
Thanks to the generosity and enthusiasm of our many alumni and friends, the 2018 PEGN 315 California Field Session was a great success. Mark Miller, Kayla Boster, 32 students, three Teaching Assistants (Ayush Rastogi, Faraj Ahmad, and Olawale Adekunle) and I enjoyed an action-packed session in Southern California.

Our first field tour was hosted by Aera Energy in Bakersfield. Mines alums Peter Ashton, Christine Birkholz, Matt Erbes, George Hunsaker, Joseph Kenrick, Ilsa Krane (Gustafson), Linda Mohammad, Tanner Ottaway, Ryan Steff, and Jennifer Valdez (Mahoney) hosted us for breakfast, a tour of field operations, vendor services, and lunch. We also enjoyed a presentation by AERA’s CEO and President, Christina Sistrunk. Thank you Aera and PE alums for providing an informative and exciting first day in the field!

California Resources Corporation (CRC) and Mines alum Jeff Quintana arranged our second day in the field. Our morning began with a safety meeting and presentation on the history and operations at Elk Hills followed by a comprehensive site tour including the Consolidated Control Facility. We traveled to the West Kern Oil Museum in Taft for a delicious BBQ lunch hosted by Fred Holmes (Holmes Western Oil Corporation), with assistance by Josh Yurkanin (PE alum). During lunch, Joe Nahama (PE alum, President of PetroRock) provided thought provoking career advice including a rap song performance based on the Broadway musical Hamilton. After lunch, Jeff led us to a CRC location for a drilling rig tour. Many thanks to Jeff, Fred, Josh, and Joe for a memorable second day in the field.

Miller Newlon, Aera Production/Process Reliability Engineer and PE alum, coordinated an educational and interactive third day tour at Aera’s San Ardo Field. The students enjoyed learning about production problems, solutions to the problems, and fishing tools. A “food truck” lunch was enjoyed by all. We are very appreciative of Miller’s time and effort to lead this field tour. We also thank Aera for their support (Belridge Field and San Ardo Field tours) throughout the field session.

We were fortunate again this year that Jon Schwalbach, accompanied by PE alum Dave Mayer (CRC), led us on a coastal hydrocarbon systems geology field trip featuring instruction on source rocks, fractured reservoirs, and conventional clastic reservoirs. The beach geology field trip is always a highlight of the field session. With the Pacific Ocean as a back drop, the students enjoy sending selfies to their friends on the Texas and Wyoming field session trips.

Our last day in the field was hosted by Mines alums Tom Turner (CRC), Dan Fletcher (CRC), Robert Sebag (CRC) and Will Stevenson (City of Long Beach). 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 Freeman for a tour of the facilities and drilling.
rig. Earlier that day, we visited C & J Energy Services/Tiger Wireline in Signal Hill where the students learned about wireline services including logging, well perforating, and pipe recovery equipment and services. We appreciate the hospitality shown to us by CRC (Elk Hills and Long Beach/THUMS tours) and Tiger during our time 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!

PEGN 315 — FOUR CORNERS by Bill Eustes

Number eighteen is in the books. This year, we went to the four corner’s region of Colorado and New Mexico with a stop in Grand Junction along the way. We started on a rainy Sunday afternoon, which rapidly cleared as we exited the west end of the Eisenhower Tunnel. We ended up in Rifle ready for the start of another field session. With me was stalwart Denise Winn-Bower and first-timer Dr. Mansur Ermila. Assisting was Kirt McKenna, a student in my van back in 2010, and newcomer Jennifer DiCarlo.

We started with Helmerich and Payne Rig #290 east of Collbran, CO. We had a cadre of H&P people leading the students around the rig in a thorough tour of their operations: Jace Dinkle (BSPE ’15), Vic Garcia, James Kolb, Juan Posada, Travis Swezey, Lance Counts, and Cody Unrast. From there on to Grand Junction and the Halliburton Camp. I had a hole in my schedule a week before and Halliburton jumped right in to help us out. Wendell Salas in Denver worked it out with Mark Mayo there in Grand Junction. We visited the labs, bulk plant, and vehicle yard. Our guides were Larry Kent, Mark Mayo, Wyatt Vidmar (BSPE ’16), Patrick Ealey, Shaun Burns, Wayne Henry, and Deba Nkana.

Last summer, I worked with the Bureau of Reclamation on their deep injection well at the Paradox Valley Unit. They invited me to bring some students to visit one day, so I took them up on their offer. It is a fascinating drive out there. The Paradox Valley is a beautiful but isolated location. Andrew Nicholas, the manager there and a BOR Geologist, Reece Carpenter, explained how salt water is being intercepted and injected deep underground; all done to protect the Colorado River and meet our treaty obligations. We drove on down to Durango for an alumni mixer at the Carver Brewery in downtown. There are a lot of alumni in the four corners!

Wednesday, we started at BP’s Durango office with Olivia Bommarito (BSPE 03, MEPE 05) leading us through all
sorts of operations. She really had lined up a well-organized tour and made the field session successful. She showed us various production facilities and their impact on the local population. That afternoon, we visited Williams's Ignacio Gas Plant with Nate and Rylan and joining us, Caleb Dean. Then on to BP's Pinon Compressor Plant with Aaron Dunlap and Chris Covert. These fit well with our new mid-stream minor.

For lunch, we had a panel discussion of eight alumni about “life after Mines”. It does happen. Making up the panel was John Mummery (BS?? ??), Sara Work (BSChE '09), James Lane (BSEE '89, MSMN '92), as well as Olivia, all from BP. From Red Willow Production we had Forest Bommarito (BSPE '03, MEPE '05 - and TA for one of my field sessions) and Neil Little (BSPE '12). In addition, from Williams was Nate Work (BSChE '09) and Ryan Hess (BSChE '14, MSETM '15). I asked the students for a “reflection” after the panel discussion. The students really listened hard! The number one item they picked up on? “Communication” across the spectrum from the public to the field and up the chain of command. Engineers must be able to speak and explain to all.

Thursday, we drove down to Farmington to tour Energy Pump and Supply and to watch them tear down one of Olivia's rod pumps. Gary Noyes was our host. Then on to NOV Tuboscope and lunch. John Thurstonson organized it but was away that day. In his place, we had Tom Brown, Bruce Hare, and Dan Sundt show us their inspection operations. Returning to Colorado, we stopped by BP’s drill site where Aztec Rig #920 was located. They were drilling some multi-lateral wells. Mike Colbert, Lauren Briscoe, and VP of Drilling, Harold Jordan (MSMinEc ‘90), were our hosts.

Friday, we spent reviewing the environmental impact of oil and gas with the COGCC. Stuart Ellsworth was our host and working with him at the Texas Creek Gas Seep Project was Steve Lebowskie and Jim Hughes. That site is a unique way to handle surface gas leaks and generate electricity to boot. For lunch, Christi Zeller of the Energy Council explained more about the impact of oil and gas operations in the multiple county area in southwest Colorado.

Finally, on Saturday after starting our day in Alamosa, Andrew Valdez, National Park Service Geologist, explained about the geology of the Great Sand Dunes National Park and Preserve and the potential impact of oil and gas operations nearby. This has been big news in the Denver Post of late. However, I do note that while technically the proposed operations are within a few miles of the national park border, they on the east side of the Sangre de Christo Mountains whereas the dunes are on the west side. It makes for interesting reading.

Another field session is on the books. Friends were made and acquaintances renewed. Overall, another fine trip, thanks to all that worked with us to make this another successful, and more importantly, another educational experience unique to the Colorado School of Mines Petroleum Engineering Department.

PEGN 315 — COLORADO/WYOMING by Luis Zerpa

This summer we designed the Colorado/Wyoming field session to explore industry facilities all the way from upstream to downstream. On the upstream side, we visited drilling, hydraulic fracturing, well completions, and production facilities. For midstream, we visited upstream production facilities, a gas compressor station, an oil stabilization facility and a gas processing facility. On the downstream side, we visited a petroleum refinery. The main goal was to present a global picture of the petroleum industry to our students, following the produced fluids from the reservoir to the final processing facilities. An important component at every site we visited was industry safety practices and their corporate social responsibility approaches.

The Colorado/Wyoming field session group consisted of 28 students, four TAs and three instructors. Our first
stop was with Western Gas (Anadarko’s Midstream Division) in Platteville, Colorado. We learned about their midstream facilities for gas compression, oil stabilization and gas processing. Our second stop in Colorado was at the Wattenberg field with Noble Energy. Noble Energy gave us a tour of their training facility at Greeley, Colorado, where we were able to see the inside of separation vessels and learn about the artificial lift techniques they apply in unconventional horizontal wells in the Wattenberg field. Then, the Noble Energy team took us to the field to visit a drilling rig, a hydraulic fracturing job, and surface production facilities. It is always great to get into a drilling floor and see the look of awe in our students’ faces. At the end of our tour with Noble Energy we headed to Rawlins, Wyoming.

On our third day, we visited the Sinclair Wyoming Refinery, where we learned about the different crude processing stations they have at the refinery, and how hydrocarbon molecules are modified to obtain the end products (e.g., gasoline, diesel, and jet fuel). At the Sinclair refinery, we also learned about the extreme safety practices they have implemented in their facility, and their efforts and involvement with the community as their corporate social responsibility practices. After our visit to the Sinclair Refinery we moved to Rock Springs, Wyoming.

In our fourth day, we visited the Halliburton facility at Rock Springs. With Halliburton, we had a lab demonstration about the different cements in well completion operations and hydraulic fracturing fluid properties. Also, we visited the shop with their wireline tools, walked around the trucks used in fracturing and cementing jobs, and learned about the assembly of perforating guns used for well completions.

Our last visit was to Jonah Energy’s operations in the Jonah gas field. With Jonah Energy we learned about their drilling strategies in fluvial sand lenses using deviated wells. Jonah Energy took us to see one of their drilling rigs, a hydraulic fracturing job, their surface production facilities and fully automated water treatment facilities.

We appreciate very much the support from these companies, their excellent presentations and guidance during the tours, and their willingness to work around our schedule. Also, we enjoyed meeting Mines’ Orediggers during our visits to these industry facilities; in a way this shows our students their bright future after Mines.
The annual migration to Massadona, CO, took place this year over four weeks – two sessions of two weeks each. If you’ve been keeping track, you’ll notice that that’s one session less than in the past few years and corresponds to our dropping enrollment. Given the heat and bugs that come out during the third session, we are very happy to be down to just two!

During the two sessions, we ran 104 students through the camp. Three faculty (myself, Carrie McClelland, and Wes Buchanan) along with five TA’s handled the full four weeks. By the end, we were just as happy as the students to be hitting the road home.

As they have for so many years, Chevron, once again led by Roy Cramer, and Production Logging Services, led by Craig Stratton, hosted us and provided excellent presentations on the Rangely Field and production logging techniques, respectively. Leona, and the folks at the Bedrock Depot in Dinosaur, CO, continued to also help us this year with providing access to certain mapping areas in Skull Creek. If you’re ever heading through Dinosaur, stop by and get some of their wonderful ice cream! But be careful, she might just start quizzing you about the local stratigraphic column.

This year I thought I’d share some of the quotes that we heard during camp – at least the ones that can be put in print. I thought that they might make you smile and possibly bring back a few memories. All provided anonymously of course...

Don’t eat the paint chips (referring to the cabins)!

Question: What’s on top of the Castlegate formation? Answer: Other rocks.

Ut oh, they’re handing out the special paper, this can’t be good.

Question: This correlation doesn’t work. Answer: Just be an engineer and jam it in there.

You know what my favorite part of field camp is? Waiting around in parking lots.

Do you want it this way, or does nature want it this way?

Question: What are the three scales of heterogeneity? Answer: Micro, macro, and metro.

This bread is moldy. Oh well. Whatever. (And proceeds to eat it...)

I lost my paper clip – the TA’s are going to get mad at me...

Student #1: We’ve been messing around on this for an hour. Student #2: No, 39 minutes...I counted.

Hopefully, you’ll enjoy this commentary and the memories that might go along with it. To spur your memories even more, we’ve included some field session photos to show you what you’re missing!!
Remember this?

Heads up!

Above: Session A. Below: Session B.
Save the Date!
MINES PE ALUMNI RECEPTION
ATCE, DALLAS
Please watch your mailbox for registration information.

MONDAY, SEPT. 24
6:00-7:30PM
Omni Dallas Hotel
Level 2, Greenville Ave Room

ALUMNI SURVEY
We want to continue to strengthen the department, and this requires a few minutes of our Alumni’s time. Please follow the below link to a short survey. Your participation is greatly appreciated!
https://www.surveymonkey.com/r/3236H67

FACULTY ACHIEVEMENTS
• Manika Prasad - Virgil Kauffman Gold Medal
• Manika Prasad - Honorary Member Award by the Houston Geophysical Society
• Bill Eustes – NASA Early Stage Innovating Funding for Intelligent Drilling System
• Jennifer Miskimins, Yu-Shu Wu and Phil Winterfeld – DOE Geothermal project – EGS Collab Sigma-V Project
• Azra Tutuncu – Applied Rock Mechanics Research Award
• Erdal Ozkan – Elected as the SPE Technical Director Reservoir for 2018-2011
• Erdal Ozkan – Rocky Mountain North America recipient of the 2018 Regional Reservoir Description and Dynamics Award.
• Linda Battalora - Distinguished Membership, SPE International 2018
• Will Fleckenstein - CSM 2018 Inventor of the Year Award
• Will Fleckenstein - Innovation Week’s Most Innovative Design
• Will Fleckenstein - SPE Distinguished Lecture Tour
• Ramona Graves – Inaugural Pinnacle award from Oil and Gas Investor
• Ramona Graves – International Distinguished Achievement Award for PE Faculty from SPE
• Luis Zerpa - Inaugural Enger Teaching Award recipient
• Azra Tutuncu – Elected Chair for the SEG Research Committee starting October annual meeting (2018-2020).
• Azra Tutuncu – TOPCORP training program received 2017 Interstate Oil and Gas Chairman’s Stewardship Honorable Mention Award for Energy Education

#IDIGMINES GIVING DAY
This past spring was the second #idigmines Giving Day. Departments and organizations across campus competed to see who could get the largest numbers of donations in 24 hours. On the line was bragging rights and a share of the bonus $30k. PE received 55 donations totaling $12,810 and qualified for $777.20 in bonus money.

We want to do even better next time! Please put February 7th, 2019 on your calendar and be ready to participate so we can claim our spot on top! With our large alumni base, we can be victorious in nabbing both the bragging rights and top prize.