Pedro is a wonderful example of how our alumni continue to give back to the University in so many ways. Mr. Denton credits Dean Earl Beistline for inspiring him to focus on a career in mining engineering, and this influence continues on with his children. Collectively, this active family holds four degrees in engineering from the university system over the period of forty years: Pedro’s BS Mining Engineering degree; Steve Denton, (retired) manager of Usibelli Coal Mine, BS Mining Engineering ’75; Tina Buschmann, BS Mining Engineering ’82; and Kyle Denton, BS Civil Engineering ’96 from UAA. His brother-in-law, Bert Varnell, also graduated from the University of Alaska in 1962 with a degree in Metallurgical Engineering.

At least six of Pedro’s grandchildren have attended the University of Alaska, and now his great-granddaughter Sierra is enrolled in the Biological Sciences program at UAF. Pedro’s legacy continues on at the University!

Pedro has captured history with his in-depth knowledge of the mining industry in this series of oil paintings depicting some of the old mines throughout Alaska, as well as a number of pieces that depict the intricate details of underground mining in the profession. The collection of paintings includes Independence Mine at Hatcher Pass from the 1940s; an old mill site (Mohawk Mine) on Ester Dome in the 1950s; undercutting and caving frozen overburden at Gold Hill in the early 1950s; and the old town of Pedro on Pedro Creek soon after Felix Pedro’s discovery of gold in 1904. The collection also includes a painting of the first oil well in Alaska at Katalla, depicted around 1902.

As per the donors’ wishes, these pieces will soon be on display in special areas throughout the Duckering Building for all to enjoy.
A Letter From The Dean

Welcome to the Fall/Winter CEM newsletter, and to the continuation of another academic year. As proven by yet another year of record CEM enrollment, students continue to recognize the value of an engineering education. This in turn has made us one of the few academic units on the UAF campus to realize a net gain in student enrollment, emphasizing the positive impact our faculty and staff have on the student learning experience. With investments in CEM occurring on both a local and state level, we are positioned to expand our facilities and course offerings at a level never before realized.

As such, CEM is in the process of establishing the University of Alaska system’s first Chemical Engineering program. We have been fortunate to have the support of UAF Chancellor Rogers, UA President Gamble, and the UA Board of Regents in this endeavor, as well as recommendations and support from industry through the efforts of the CEM Advisory and Development Council. A proposal for the establishment of a Chemical Engineering Bachelors of Science (BS) program is currently before the State of Alaska. The proposal represents a partnership between the University, the State, and private corporations in an effort to reduce the need for State funding to less than half of the program cost. If accepted, we hope to solicit the first round of student applications in 2016.

In addition to the increase in the academic offerings of the college, we are well underway on the effort to increase the physical footprint. In spite of ongoing budget cuts, Governor Parnell showed his support for the new engineering building by including $5 million in his FY2014 budget request, an amount ultimately approved by the legislature. This has allowed us to enclose the building shell, and we anticipate that the new atrium adjoining the Duckering and Bunnell Buildings will officially open Fall 2015. For those in Fairbanks, I welcome you to observe the building’s progress the next time you are at the intersection of College Road and University Avenue.

I hope you find the content of this newsletter informative regarding the current state of CEM, and would like to thank you for your continued and ongoing support.

Douglas J. Goering, Dean

CEM Department News

Civil and Environmental Engineering

CEE continues to demonstrate that we are STRONG, FLEET, and MOBIL. Construction on the new engineering building may slow down while waiting for the funding to catch up, but the new “strong floor” of the building is ready for use. The four-foot thick reinforced concrete floor is vital for testing structural elements, such as bridge decks.

CEE’s first-time entry in the ASCE Northwest Region concrete canoe race completed several heats before “buoyancy problems” led to, well, buoyancy problems. The canoe was so strong that it could not be demolished to fit in a dumpster. Our sand filter, another first time entry, won admiration in the environmental contest.

Our researchers were awarded grants for University Transportation Centers funded by the U.S. Department of Transportation. Both of our centers, the PacTrans Region 10 University Transportation Center for Safety and the new Center for Environmentally Sustainable Transportation in Cold Climates, will lead to improvements in northern transportation.

Computer Science

UAF’s Collegiate Cyber-Defense Competition team, a group of eight students who defend a network of computers against a “Red Team” of hackers during a scored and timed competition, won the virtual regional competition organized by UAF’s Dr. Brian Hay, and placed third at the national contest in Texas this April. The team is already practicing for next year’s contest. UAF’s student robotics team, Aurora Robotics, designed and built a 100lb teleoperated mining robot which won the Judges’ Innovation Award at the NASA Robotic Mining Competition national finals in Florida this May. They were then invited to compete in Hawaii for the PRISM competition, where they won the Frank Schowengerdt Award. Both student teams are advised by Dr. Orion Lawlor.

Additionally, the CS Department recently received a $20,000 gift from Intel Corporation to help us continue our leadership in the development of cybersecurity educational materials hosted in the Remotely Accessible Virtualized Environment (RAVE).

Electrical and Computer Engineering

Students tell us that touching hardware is what they want to do, how they learn best. The Alaska Space Grant sponsored Space Systems Engineering Program (SSEP) provides electrical and computer engineering students an opportunity to work with other disciplines to design, build, and test projects of their own imagination. In a Maker Faire type lab, SSEP brings together freshmen through graduate students to learn how to design and build complex systems from each other. Currently students are finalizing a small satellite design, the Alaska Research CubeSat (ARC1), which is scheduled to launch into orbit in the summer of 2015 through NASA's CubeSat Launch Initiative. This satellite will be the lab’s first foray into space and will act as a technology demonstration mission to increase the technology readiness level of the ARC subsystems and to provide NASA relevant data of the launch environment. As this project comes to completion, students are already planning their next greatest mission! Stay tuned.

continues on page 5
The role of the College of Engineering and Mines Advisory and Development Council (CEMADC) is to advise the dean regarding matters within the industry and the challenges thereof into the future. We are certainly aware of challenges, internal to the University and external to industry. The State is facing declining oil revenues and increasing demands on state government. University leadership at every level is focusing on cutting the budget where possible, and making due with much less while still addressing the mission of the institution. This presents a daunting challenge indeed.

Supporting higher education requires making wise investments in our future. While focusing on reduced operating budgets in all areas, we are also moving forward to support what is currently working and subsequently necessary to continue our momentum.

Most importantly, we need to finish what we started, including the very visible and prominent new CEM Engineering and Learning Innovation Facility on the UAF campus. It is under construction, and will be fully enclosed within the next several months. The Alaska Legislature and Governor Parnell have provided all but $31.3 million to complete this structure, and it will be necessary to shut down construction if we are unable to secure state funding this legislative session to complete the building. Our sister institution at UAA received the final funding for their new engineering facility, and it is due to open Fall 2015. We have been working collaboratively with the UAA College of Engineering Advisory Board to advocate for funding for both of these facilities, and continue to enjoy this dynamic advocacy partnership.

The CEMADC has also been actively soliciting input from industry regarding the need for a new Chemical Engineering program at UAF. This new BS program will help to provide a highly-trained Alaskan workforce to meet the existing and future needs in Alaska. Currently, students must go Outside to obtain this degree, and many times, they do not return once they graduate. We have received overwhelming support for addressing this issue, and are moving forward with an approved budget request for creating a new ChemE program at UAF. This proposal is a partnership between the State, the University, industries, and students to build a baccalaureate degree (BS) in Chemical Engineering to meet industry demand. Funding for this program is very innovative, to include requests for: state funds $400k, and $450k as a combined total of tuition receipts and industry support. We believe this three-tiered mechanism is a collaborative, fair, and equitable way to provide this necessary program.

We are also supporting the following fiscal year 2016 UA budget initiatives:

- Alaska Center for Energy and Power Micro-grid Research: $3 million
- Rare Earth Minerals Research and Development: $150,000

Alaska Needs Engineers! We are making wise investments in our future. We look forward to the months ahead as we face the challenges and seek opportunities to support our future leaders. As I assume the chairmanship of the CEM Advisory and Development Council, I reach out to all of you to consider ways you can support the College.

For more information, see: www.AlaskaNeedsEngineers.com

UAF’s Alaska Center for Energy and Power Initiative

UAF’s Alaska Center for Energy and Power is one of Chancellor Brian Rogers’ top fundraising initiatives for UAF as we approach our centennial celebrations in 2017. Efforts are underway to complete the College of Engineering and Mines’ Engineering Learning and Innovation Facility. Simultaneous to gaining support from the state of Alaska, a remaining goal of $6.5–$7 million is needed in private funding to establish a dedicated home for the Alaska Center for Energy and Power on the fourth floor of the new engineering facility. There, faculty and staff will collaborate with students, visiting scientists, tribal leaders and industry partners to address critical energy challenges facing Alaska and the world. The completion of the new engineering facility presents a timely opportunity for the Alaska Center for Energy and Power to help shape the future of energy by providing critical, objective, and forward-thinking solutions for Alaska and beyond.

A dedicated fundraising committee, led by co-chairs Ethan Schutt, senior vice president of Cook Inlet Region Corporation, and Janet Weiss, regional president of BP Exploration (Alaska) Inc., is in place to help move this effort forward. To learn more, visit: www.uaf.edu/fs/departments/design-construction/projects/engineering/.

For more information, including naming opportunities within the engineering and Alaska Center for Energy and Power spaces, please contact Megan Damario, major gift officer in the UAF Office of Development and Alumni Relations, at mmdamario@alaska.edu or 907-474-2601.
The faculty, staff, and student researchers in the College of Engineering and Mines (CEM) had a busy summer and are going into an even busier Fall season. The diversity of projects in engineering makes our lives in the Institute of Northern Engineering (INE), the administrative unit for research in CEM, exciting every day. INE has made a substantial effort to diversify its research by offering job opportunities to faculty, staff, and students of many related disciplines.

The Water and Environmental Research Center (WERC) has long been home to a group of interdisciplinary researchers and research projects. The interaction between water, ecosystems, and people has always demanded this approach and WERC has been there to deliver. Ongoing projects this year include Dr. Lorrie Rea’s project “Sea Lion Diet & Contaminants,” and Dr. Nicole Misarti’s project “Walrus Adaptability and Long-term Responses; Using multi-proxy data to project Sustainability.”

Energy, diverse by nature, is the focus for the Alaska Center for Energy and Power (ACEP). Solving Alaska’s energy challenges has resulted in teams of experts from across the disciplines. Dr. Marc Mueller-Stoffels, a physicist by training, runs ACEP’s Power Integration Lab. Geophysicist Dr. Jerry Johnson leads projects concentrated on power generation from rivers with his group of researchers, and Dr. Jeremy Kasper, an oceanographer, is director of ACEP’s Alaska Hydrokinetic Energy Research Center. As Alaska’s energy projects revolve around the economics of new technologies, ACEP’s Antony Scott, a senior economist, rounds out the teams. Dr. Scott’s project, “AlaskaMicro LNG Market Assessment,” is one of a suite of projects that are helping Alaskans understand the economics of our energy assets.

Another area critical to Alaska’s economy is mining. Dr. Rajive Ganguli, Director of the Mineral Industry Research Laboratory, is the principal investigator on projects that span from basic research to workforce training. Dr. Ganguli’s project to investigate the recovery of rare earth minerals from Alaska’s Bokan Mountain is experimental chemistry, studying the basic alchemy of mineral separation. At the applied end of the spectrum, Dr. Ganguli recently received an $8.1M project for workforce development in the mining industry. Included in this will be the development of the first-ever mill simulator.

Every day brings a new challenge to solve some of Alaska’s most intractable problems. Researchers in INE bring diversity to their teams as they come from backgrounds of engineering, physics, chemistry, oceanography, biology, economics, computer science, anthropology, hydrology, geology, and business. It is a great pleasure to serve as director of this interdisciplinary institute. When you engage with INE as a client, alumni, employer, or resource, you will find it a broad-thinking and entrepreneurial environment. Thank you for your interest in INE.

Daniel M. White
Director, INE

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New Tenure-Track Faculty
- Il Sang Ahn
  Civil and Environmental Engineering
- Daisy Huang
  Mechanical Engineering
- Yin Zhang
  Petroleum Engineering

New Research Faculty
- Guven Akdogan
  MIRL
- Erin Whitney
  ACEP
- Claire Treat
  WERC Post Doc

New Staff Appointments
- Rauchelle King
  Office Manager, Electrical and Computer Engineering
- Judy Johnson
  Office Manager, Electrical and Computer Engineering
- Peter Prokein
  IT Manager, INE
- Nomie Torres
  Academic & Grant Fiscal Officer, INE
Mechanical Engineering

Mechanical Engineering welcomes Dr. Daisy Huang as the newest member of the department. Dr. Huang has a joint appointment with the Alaska Center for Energy and Power, and is researching novel ways to integrate renewable energy into rural Alaska’s power system.

In Spring 2014, Professor Cheng-fu Chen shared his expertise in microfluidic sampling while on sabbatical at the Materials Science and Engineering Institute of Nanotechnology at the National Chiao Tung University in Taiwan.

Graduating senior students demonstrated their newly-honed design skills at several venues this past year. Eight students participated in the inaugural DOE Collegiate Wind Challenge by designing a portable wind turbine for remote researchers and backcountry enthusiasts. Other notable products designed and built as capstone projects were a reverse osmosis birch sap concentrator, a downhill ski press, a UAV IR lens assembly, and a ski bike. Graduate student research continues to span a broad spectrum. Recent thesis projects include investigating diesel-generator heat recovery systems, novel heat exchanger surfaces for inorganic condensation, and characterizing metallic nanofluid coolants for improved heat exchanger efficiency.

Mining & Geological Engineering

Many faculty of the Department of Mining and Geological Engineering welcomed the completion of the $187 million Tanana River Railroad bridge in July 2014. The initial engineering economic analysis and site selection work was led by Professor Paul Metz under contract with U.S. Army Alaska to provide the most cost effective method to access the Tanana Flats and Donnelley Military Training Areas.

Ms. Uyanga Mendbayar, an undergraduate senior in the geological engineering program, received an award from the Center for Global Change and Arctic System Research to conduct research on “Investigation and Quantification of Water Track Networks in Boreal Regions Using Remote Sensing and Geophysical Data” under the mentorship of Dr. Debasmita Misra.

Various members of the department, led by Dr. Rajive Ganguli, continue to be involved in the design of the School of Engineering for the American University of Mongolia. Drs. Guven Akdogan and Tathagata Ghosh received a contract from the U.S. Department of Energy to study and identify rare earth minerals present in Alaskan coal and ash samples.

Petroleum Engineering

From all aspects, AY2013-2014 was a very successful academic year for PETE. Student enrollment continues to grow at both undergraduate and graduate levels, with a combined student population of over 225. Placement rates are near 100%.

In terms of student success, J. Kyle Raese’s team won 2nd place in the Education Week Competition held in Doha, Qatar in January 2014; Tom Polasek won 2nd place in the poster contest in February 2014, held in conjunction with the AADE National Technical Conference in Houston, TX; and Behnam Zanganeh won the 3rd place in the MS division SPE western region student paper contest at Stanford in April 2014. The PETE student team qualified as one of the top 36 teams for the PetroBowl competition held in Amsterdam in October 2014.

In April 2014, ConocoPhillips donated $300,000 to PDL for subsidence research. Also, the Alaska State Legislature approved $500,000 in funding to PDL for hydrocarbon optimization research. In February 2014, Dr. Shirish Patil, PETE professor and PDL director, received the SPE Regional Distinguished Achievement Award for petroleum engineering faculty. In May 2014, PETE chair Abhijit Dandekar returned from a successful two week long Fulbright specialist visit to the University of Witwatersrand in South Africa. He is also the 2014 recipient of the SPE distinguished membership award, accepted in person at the SPE ATCE in Amsterdam on October 29th, 2014.
UAF is an affirmative action/equal opportunity employer and educational institution.

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Workers poured around 400 yards of concrete for the construction of the strong floor in the New Engineering Facility. The strong floor is one of the unique features of the building and the first in the State of Alaska. Photo by Todd Paris/UAF.