Construction is well underway for the new UAF College of Engineering and Mines Engineering Facility located between the Duckering and Bunnell Buildings on the UAF campus. Groundbreaking took place in March 2013 and two stories of steel have now emerged from the basement of the structure. Plans are underway to continue construction in the spring to raise the building to its design of four stories. This state-of-the-art facility will provide over 110,000 square feet of very needed laboratory, classroom and office space, including a three-story high-bay structural testing lab.

This has been a multi-year collaborative advocacy effort to secure funding for this facility as well as a similar project on the UAA campus. The legislature and the governor have been very supportive, providing over $130 million in state funds. The UA Board of Regents has asked for the final phase of funding in the FY15 capital budget request.

In the meantime, enrollment continues to increase in UAF engineering programs, and we are approaching the goal of graduating 200 engineers statewide each year. The number of baccalaureate degrees awarded each year has grown from 72 degrees in 2007 to 156 degrees awarded in spring 2013 – a 116.7 percent increase. Enrollment has increased from 806 in fall 2007 to 1,038 in fall 2013 – a 28.8 percent increase.

For more information and to view the construction in progress, visit: cem.uaf.edu
Welcome to the first anniversary edition of the CEM newsletter, and the start of a new chapter for CEM. New facilities and increasing student enrollments are reenergizing the college and will position us well for the years ahead. This past fall, CEM passed a series of milestones, each one offering a unique perspective into the overall growth and vitality of the college.

In Fall 2013, we welcomed 291 new undergraduate students, representing the largest incoming class on record and an enrollment increase of over 150% since 2006. We have also increased our Bachelor of Science graduation rate by almost 25% in the same time period. Our graduate programs continue to flourish as well, with enrollment having nearly doubled since this time last year. These data trends simply serve to confirm my belief that students are cognizant of the value of an engineering education in today's world, and that CEM is well poised to help meet that need.

In direct response to this increasing demand, we broke ground on the new Engineering Learning and Innovation Building on March 30th, 2013. Work on the building was conducted through October, thanks in part to this year's warm fall. With steel support beams and equipment now lying dormant under the snow until spring, crews continue to work in the enclosed basement space below ground. This will allow us to progress towards completing the building's shell by the end of the 2014 construction session, and move us closer to providing the facilities necessary for CEM's increasing number of faculty, staff, and students.

Throughout this newsletter, I hope you find evidence of CEM's increasing role in the education of the next generation of Alaskan engineers, as well as the research contributions brought forth by our faculty and staff. I invite you to contact my office or visit our website for the college's most up-to-date information, and I thank you for your continued and ongoing support.

Douglas J. Goering
Dean

Word has come that one of our own alums, Patrick H. O’Neill, UAF BS'41, MS’53, ScD (Hon) '76, has been inducted into the National Mining Hall of Fame. This almost-lifetime miner followed in the footsteps of his grandfather who had been a part of the famous great Alaska Klondike gold rush.

Patrick O’Neill began his career at the Alaska Agricultural College and School of Mines (now UAF), thanks to strong encouragement and a job opportunity from university president Charles Bunnell. It took nine years for him to achieve his first two of three degrees in mining engineering — a decision that ultimately took him all over the world, starting in Colombia, South America, where he revitalized a failing mining operation, eventually becoming president of the International Mining Corporation. He credits the School of Mines Dean Earl Beistline for critiquing his master’s thesis on the analysis of mining operation life-spans, and for leading him south to Colombia to pursue the challenge of turning around a failing mining operation.

His mining career took off when he worked for the US Smelting, Refining and Mining Company out of Fairbanks, rising up through the ranks, and working along side many prominent Alaska pioneers. Dr. O’Neill would go onto serve as president or chairman of eight affiliated mining companies, and director of several others including The Fresnillo Company, Zemex Corporation, Placer Development, Moly Corp, Rosario Resources and others. These companies developed and operated some of the western world’s great metal resources.

National Mining Hall of Fame Board Chairman Paul C. Jones praises O’Neill, stating: “Patrick has set a classic example of the leadership and work ethic that has made America’s mining industry the world leader in technically sound, environmentally and socially correct, and economical mineral production that sets the standards for mining worldwide.”

This small town boy brings honor to UAF and the College of Engineering and Mines. Along with his three degrees obtained from UAF in 1941 and 1953, UAF awarded Patrick with the Distinguished Alumnus Award in 1971, and an honorary Doctorate of Science degree in 1976 in recognition of his professional achievements and service to his university.

The author of ‘From Snowshoes to Wingtips’ (UA Press 2007) reflects, at age 98, on his secret to longevity, crediting his wonderful wife Sandra for her encouragement to achieve his dreams. When you ask him what his greatest achievement in life has been, he responds without hesitation, “It’s the education I received at the Alaska Agricultural College and School of Mines. Absolutely the best thing I could have done in life!”
Civil and Environmental Engineering

“America’s Strongest Civil Engineering Department” says the logo on our new T-shirts commemorating our achievements in recent technical competitions - we even finished first in a tug-of-war international championship! This semester, students are designing a concrete canoe for a competition this spring. We have over 130 undergraduate students enrolled this Fall. Our upper division students are prominent in national honor societies such as Chi Epsilon and Tau Beta Pi. Our faculty continues our tradition of heavy participation in teaching, bringing their industry and research experience into the classroom. We recently added a sediment transport flume in the fluids lab, where students can observe changes in movement and scouring of fine materials caused by structures. New faculty this year include an expert in transportation planning, including roundabouts, and an environmental specialist in water treatment. Our faculty and graduate students continue to work with research especially relevant to Alaska: dust control in rural villages; asphalt pavement design, construction, and repair; bridge structures and foundations in permafrost and seismic regions; analysis of rivers, river structures, and floods; as well as novel treatment of wastewater and contaminants in cold and remote regions.

Computer Science

This spring five computer science and engineering students successfully built a 100 pound, four wheel drive, teleoperated moon dust mining robot for the NASA Robotic Mining Competition world finals in May. Coached by Orion Lawlor, the team is now working on building a fully autonomous robot for the 2014 finals. Brian Hay and Kara Nance were awarded $500,000 by the National Science Foundation to develop specialized cybersecurity scenarios and operations for use in a national cybersecurity infrastructure. They were also awarded $100,000 by NSF for specialized administration of the Remotely Accessible Virtualized Environments (RAVE) Project which is a platform developed at UAF and used by institutions around the US for cybersecurity research and education.

Electrical and Computer Engineering

Electrical and Computer Engineering welcomes Dr. Michael Hatfield as its newest member of the ECE department. Dr. Hatfield recently received a joint appointment as assistant professor of Electrical Engineering with the Geophysical Institute in the Remote Sensing Group, where he will provide additional focus on integrating existing academic and research efforts with UAF’s Alaska Center for Unmanned Aircraft Systems Integration (ACUASI). Potential areas of study identified or already under examination include characterization of volcanic plumes, monitoring of glacial and sea ice, permafrost conditions, chemical sensors, forest biomass measurements, and arctic wildlife surveys. Academic emphasis for the position includes study and development of UAV sensors and vehicles, and the application of these platforms in accomplishing remote sensing missions. Dr. Hatfield joins the UAF team with 28 years of experience in the USAF as a developmental engineer, including 2 assignments as assistant professor of aeronautics at the US Air Force Academy where he helped develop their student rocketry and satellite programs. Dr. Hatfield is a USAF alumnus, earning an interdisciplinary PhD in Electrical and Aerospace Engineering in 1999.

Mechanical Engineering

Mechanical Engineering welcomes two new faculty this fall. Dr. Yujian Xiang's research interests include human dynamics, human motion synthesis, and computational dynamics of multibody systems. Dr. Lei Zhang’s research interests include design and investigation of the properties of porous materials and nanostructure-based films for energy and environmental applications. Assistant Professor Jifeng Peng continues to lead a research group studying fluid dynamic as applied to propulsion and energy systems, and recently helped install a novel vertical axis turbine in the village of Igiugig, Alaska. Undergraduate students from both Mechanical and Electrical Engineering are one of only 10 teams selected by NREL to participate in the inaugural Collegiate Wind Competition, which involves designing, building, and marketing a personal wind turbine to power portable electronic devices. The department also bid farewell to Professor Jonah Lee, who retired after nearly 30 years of dedicated service, and continues research in snow mechanics as Professor Emeritus.

Mining & Geological Engineering

The department welcomed two new faculty in the past year. Dr. Thathagata Ghosh joined the department as Assistant Professor of Mining Engineering, while Dr. Gunvan Akdogan joined the Mineral Industry Research Laboratory as Associate Research Professor of Mineral Processing. The department had other reasons to celebrate as well. A student team, led by mining engineering junior Simon Ortega, reached the finals of the SME/NSSGA international mine design contest. The 2013 senior mine design project (MIN 490) by Justin White, Colin Webb, Darell Tweet and Alex Legrismith, was awarded the third place by SME/PCMIA. Students Mindy Krzykowski (MIN), Alyson McPhetres (GE), and Bekah Tisgonis (GE) were initiated into Tau Beta Pi, the engineering honor society. The department also continues to enjoy the support of its partners such as Kinross and Sumitomo and their full support of the mining engineering research endowment. Both renewed their million dollar commitments in 2013. The Alaska Division of Geological and Geophysical Surveys also renewed their partnership by supporting two graduate students in geological engineering. There are also some major additions to our laboratories, including a LiDAR unit, an atomic absorption spectrometer and a zeta potential meter.

Petroleum Engineering

The Department of Petroleum Engineering (PETE) has witnessed unprecedented growth in student enrollment at both the undergraduate and graduate level in the last few years. PETE has currently over 125 undergraduate students, 28 graduate students, including one PhD student. Another 18 students have been admitted to the MS program starting Spring 2014. J. Kyle Raese (current UAF SPE student chapter Treasurer and PETE senior) was selected by the Education Week Committee, following a tough competition from all around the world, to participate in the Education Week Competition to be held in conjunction with the 2014 International Petroleum Technology Conference in Doha, Qatar. This is an all expenses paid trip to Doha, Qatar. We wish Kyle the very best in representing PETE in this competitive event. PETE chair Abhijit Dandekar is now a Fulbright Specialist Award roster candidate for 5 years beginning May 2013 and thus eligible to receive up to two grants for short visits of academic nature/exchange to overseas petroleum engineering institutions.
The Institute of Northern Engineering (INE) continues its robust trajectory with research expenditures in FY13 being the 3rd highest in INE’s history. INE remains a world leader in cold climate science and engineering and continues competitive growth in a number of research areas, including energy production, modeling and testing of mechanical systems, environmental engineering and hydrology, mining, and petroleum development. We will continue to strategically invest in these areas and other areas that advance INE’s mission to engineer solutions for the world’s cold regions and beyond. By investing strategically, we have continued the successful recruitment of world leading researchers in these areas.

Research faculty are the backbone of this institute and because our faculty undertake the rigorous challenges of conducting research, now is the time to consider our role in mentoring. To ensure the institute’s continued success, we want those both inside and outside the institute to be involved in its future through mentoring. Whether mentoring new generations of eager students, our staff members, or faculty, it is our responsibility to ask, “Who am I mentoring?” and “Who is mentoring me?” This goes for mentors and protégés alike.

The Institute’s center directors have developed the following thoughts on mentoring.

1. Your “mentor” is not one person. You should have a suite of mentors to advise you on different career aspects. As a mentor, be open to mentoring people in all areas, including faculty, staff and students.

2. Your mentors should be vertically integrated. It is helpful to have a mentor above or below your current status. A staff or junior faculty, for example, could serve as a research mentor to a full professor.

3. Mentorship is dynamic and the mentors you need in the first year of being a faculty member may be different than the second. As a mentor, focus on “graduating” protégés from your mentorship.

4. Your mentors should change with your mentoring needs and career advancement.

5. Be active in choosing your own mentors that you feel add value to your career.

6. Mentorship requires homework and follow-up on behalf of both the mentor and the protégé.

7. The mentor and the protégé need to be committed to the mentoring relationship.

8. Mentoring is a wide range of advice derived from a wide range of venues. An open forum, lunch, cookout, or picnic could all serve as venues for mentoring or mentoring in and of themselves.

The message here is to be active in the shaping of your future and the future of someone else. If you believe as I do, that a rising tide floats all ships, your mentoring contributions will benefit us all.

Thank you for your interest, support and dedication to INE.

If you have questions or would like more information on the goals for INE in the upcoming year, please contact my office.

Daniel M. White
Director, INE
A Message from Pete Stokes, PE, MBA, Chair, College of Engineering and Mines Advisory and Development Council

We have been entrusted as members of the CEM Advisory and Development Council to advise the CEM Dean on issues, challenges and needs of strategic importance to industries hiring engineers in Alaska and beyond. We are actively participating in advocacy efforts to support the UAF and UAA engineering facilities in a collaborative partnership with the UAA School of Engineering Advisory Board.

The members of our Council have also been actively involved in creating and providing funding to support the new Student Enhancement Fund to provide support to engineering students in the way of mentoring, tutoring and other support needed to encourage them to continue their educational goals and career aspirations. We are very aware of the need for qualified engineers trained in arctic conditions, and the industry leaders on our council are working with CEM to provide internships and employment opportunities to CEM students and graduates.

We all have an interest in seeing our engineering students succeed. The UAF College of Engineering and Mines is training high quality engineers. Most of them are from Alaska and will soon serve our state and communities. Our various industries need them now more than ever. I agreed to be a part of this Council because I value my educational experiences and the quality education I received from UAF and want to give back to my alma mater. I also want to pass on a legacy to my grandsons who represent the future of our State, and who will need to pick a college a decade from now. If they chose engineering, I want to be proud to tell them that they can’t beat the programs at the College of Engineering and Mines!

We encourage you to participate by contributing to the new CEM Student Enhancement Fund.

Visit cem.uaf.edu/giving to make a contribution today!

The CEM Dean’s Office Fall BBQ marks the beginning of a new school year.

Photo top right: INE Director Dan White tosses a burger to Mechanical Engineering Office Manager Frances Bedel at the annual CEM Welcome Back BBQ.

Photo bottom right: Students enjoying a feast of burgers prepared by CEM faculty and staff.
In this Issue

UA Undergraduate Engineering Expansion Initiative ....................... 1
Letter from the Dean ....................... 2
Hometown Miner Brings Honor to UAF ....................... 2
CEM Department News ....................... 3
Research News ........................... 4
A Message from Pete Stokes ............... 5

Photo above: CMI partners with UAF to provide support for UAF's Silver Fox Mine and student scholarships. Deryl Box, Sales Manager, Construction Machinery Industrial (CMI) presents a check to Rajive Ganguli, Professor and Department Chair, Mining and Geological Engineering, CEM on December 13, 2013 at the Alaska Miner's Association breakfast. Photo courtesy of CMI.