SOUTH DAKOTA SCHOOL OF MINES & TECHNOLOGY

Department of Geology and Geological Engineering 2015 Alumni Newsletter

Department of Geology and Geological Engineering – Fall 2015: Left to right: (back row) – Foster Sawyer, Kurt Katzenstein, Cleo Heenan (Department Secretary), Maribeth Price, Larry Stetler, Darrin Pagnac, Ed Duke, Tim Masterlark, (front row) - Zeynep Oner Baran, Christina Belanger, Laurie Anderson (Head), Nuri Uzunlar and Chris Pellowski. Absent: Liangping Li**,** Arden Davis, Colin Paterson. Alvis Lisenbee, Perry Rahn, Sally Shelton, Clint Boyd, Bill Roggenthen, Jim Fox and Jack Redden.

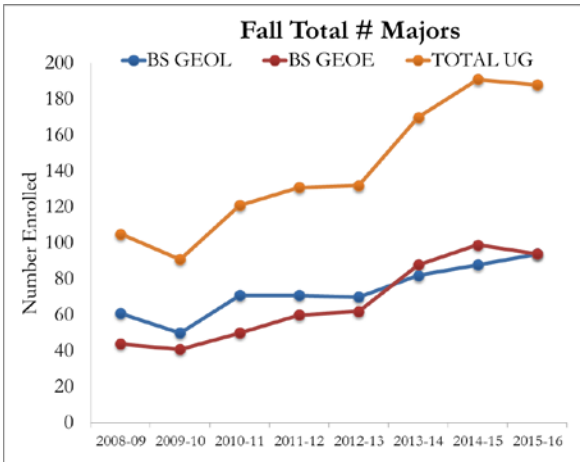
From the Editor – Nuri Uzunlar

Greetings Alumni and friends!
I wish each and every one of you good health and happiness in 2016. The 2015 newsletter is being produced as PDF and DOC and posted on the department's website http://geology.sdsmt.edu. Alumni with emails will be notified that it is on the web page. Please pass this newsletter to other alums you may know without emails. Have a blessed holiday season and a fantastic new year!

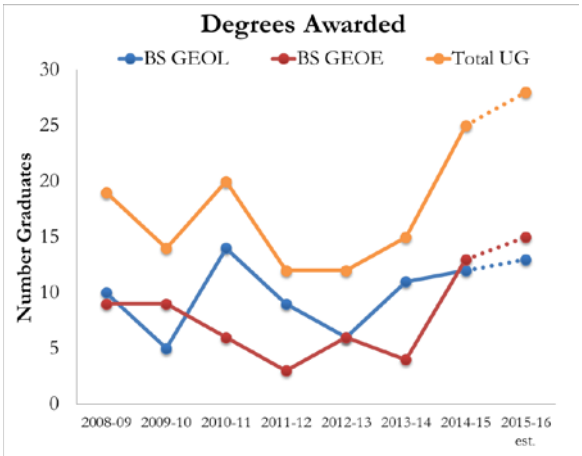
From the Head – Laurie Anderson

Status of the Department

Happy Holidays to all! The Department of Geology and Geological Engineering (GGE) has had another productive year. **After five years of rapidly increasing enrollments, the number of undergraduate majors has leveled off, while graduation rates have increased. We currently have 189 GEOL and GEOE majors.** Not too bad considering the current state of commodity prices. In our graduate programs, although enrollments have declined to 39 from a high of 56 in Fall 2011, we are seeing more students successfully finishing their degrees (we anticipate 8 MS GGE, 8 MS PALE, and 2 PhD students finishing in 2015-16).

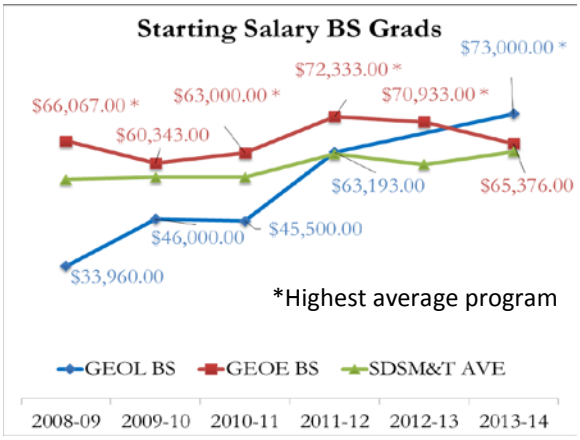


The department's graduate programs underwent a program review in 2014-15. Our external reviewer was Dr. Herb Wang from the University of Wisconsin-Madison. The overall finding of the review is that the **"degree programs are of high quality and worthy of staunch support by the institution. The faculty, staff, and graduate students are energetic and productive**." As a result of the review process the department has identified areas for further improvement and growth, which include a renewed focus on retention and graduation rates for all of our degree programs. Our ABET review of the GEOE B.S. program is just around the corner in 2016.



Career placement of our undergraduates has seen some effects of the downturn in the mining and petroleum industries. In 2013-14, both GEOE and GEOL graduates had 100% placement. The average **starting salary for GEOL graduates was the highest on campus ($73,000)**. The preliminary placement numbers for 2014-15 are 54% for GEOLs and 75% for GEOEs. This fall we had **15 companies and agencies** recruiting our students at the Fall Career Fair (there

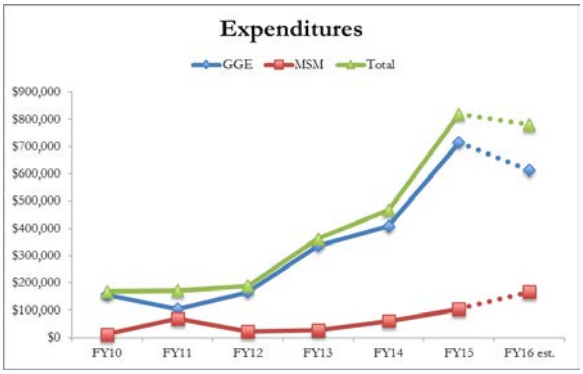
were 30 in 2014). The department also participates in the Rocky Mountain Rendezvous, a regional student career expo for the energy sector (sponsored by AAPG and SEG). We still have much to do to increase the visibility of our excellent programs and students with industry at a national and international level. **We welcome any assistance that alumni and industry partners can provide in promoting SD Mines, GGE, and our students!**



This fall we launched a **graduate certificate program in Petroleum Systems**. This certificate is a 12-credit program chosen from a menu of seven courses (21 credits). The certificate is available to both campus graduate students and outside professionals interested in expanding their portfolio of coursework to include additional content relevant to the energy sector. More information is available here: http://ecatalog.sdsmt.edu/preview_program.php?catoid=14&poid=1234&returnto=2585.

The Petroleum Systems certificate is part of the department's efforts to establish interdisciplinary research and teaching efforts in energy resources on campus through the ***Energy Research Initiative (ERI).*** *This initiative remains a top fundraising priority for President Wilson and the SD Mines Foundation, with alumnus Steve O'Rourke (GEOE 1983) serving as chair of a committee to coordinate these efforts. This year we have received continued support and pledges of support from a number of alumni and industry, whose generosity will help both the department and ERI. We conducted a search for a director of ERI in 2015 but did not find the right match for our vision of the program and we will relaunch the search in early 2016. We also have received much attention from the media for the continued support from Schlumberger; the company donated software to the department valued at over $172 million this fall. Neuralog also donated a software license this year. These software tools are critical to our education and research efforts. At present we are looking for avenues to fund upgrades to our computer labs to use this software to its fullest capacity.*

We have been working with Mining Engineering and Materials and Metallurgical Engineering to raise funds to refurbish the MI building. We have preliminary architectural renderings in hand and an estimate of $17 million to fund the renovation. To date we have received support or pledges from a corporation wishing to remain anonymous, Royal Gold, Pete Lien, and Coeur Mining.



Our research efforts continue to be strong. For the department as a whole, and the department and museum combined (museum grants can be administered through either unit), **awards increased by an order of magnitude** between fiscal years 2010 and 2014. New awards are down for 2015, but expenditures continue to be strong as faculty and students work on the research funded over the last few years. These awards help support both undergraduate and graduate students and provide them opportunities for research experiences in the field and laboratory.

We welcomed a new faculty member to the department this fall. **Dr. Liangping Li**, who joins the geological engineering faculty and has an expertise in groundwater modeling. He comes to us from a postdoctoral position in the Department of Petroleum Engineering at the University of Texas, Austin. In addition to the ERI directorship, we currently have a faculty search underway for an assistant professor with a specialization in petrology.

I would like to acknowledge some of the gifts we received for the Department or the Museum of Geology (apologies for any omissions). In Fiscal Year 2015, we received $1,376,038 in unendowed giving to the department and $41,660 to the Museum of Geology, $125,350 for newly established or additions to existing endowments, $3,250 in support to our student clubs, and $336,000 in in-kind gifts (data donation of Gulf of Mexico seismic and well-log data from TGS). Barr Engineering has been a long-time supporter of our programs and again generously provided unrestricted funds in support of students. Whiting Petroleum also continued their support of students. Sherwin Artus (1960 GEOE) generously continued his support of the programs in GGE. Lorin (1975 MET) and Mary Brass (1977 CE), Jeff (1978 GEOE) and Johanna Hohle, Larry Pearson (1972 ME), Willie Chiang (1981 ME), Frank Richardson (1955 GEOE), and Scott Richardson provided support for the ERI Director position. Thomas Alexander (1981 MINE) provided support for the ERI Lab. Jeff and Johanna Hohle and Larry Pearson provided scholarship support for students enrolled in the Petroleum Systems minor and Joseph (1961 GEOE) and Josephine Kulik funded two endowed fellowships for graduate students. In addition Roy Roadifer (1954 GEOE), Rose Marie Abbott, and Paula Bauer contributed to these respective endowments: Roy Roadifer Geology Engineer Fund, Abbott Vertebrate Paleontology Fund, and Jeff L. Bauer Memorial Scholarship.

Other gifts were received from Hilary Brook (1981 GEOE, with match from Shell), Dianne (1969 MATH) and Dave (1969 GEOE) Hammond, David Kyllonen (1984 GEOE), John Hovanec (1978 GEOE), Grove Rathbun (1952 MINE), Thomas Wilker (1992 GEOL, with match from the Carlyle Group), Exxon-Mobil, Lawrence Anna (1974 GEOL), Paul Nelson (1984 GEOE), Newmont Mining, William Siok (1973 GEOL), Mark Fahrenbach (GEOL 1995), Carl Welch (1971 GEOL), Kenneth Nelson (1971 GEOE), Maribeth Price (using payroll deduction), and Laurie Anderson (using payroll deduction). The SPE, TGA, SEG and AAPG student chapters also received gifts to support their activities. Leroy (1971 GEOE) and Charlene Foster continued their support of the Martin Paleontology Research Lab. Andrew Farke (2003 GEOL), Sally Shelton (using payroll deduction), and Laurie Anderson (using payroll deduction) supported the Museum with their gifts, and Aaron Wood (former Haslem postdoc), Sam Begeman (1964 ME, with match from the ExxonMobil Foundation), and the Fort Pierre Cub Scout Pack contributed to the William Schurmann (GEOE 1965) memorial fund.

Finally, I would like to list scholarship and other award recipients for 2015-16. Thank you to our alumni, friends and corporate partners who are providing the funds to allow us to support and recognize our students.

Scholarship/Fellowship	Recipient(s)
D. Sherwin Artus GEOE	Shelby Allen (GEOE), Jonathan Emmer (GEOE), Zachary Lampert (GEOE), Fleford Redoloza (GEOE), Baylor Wagehoft (GEOE)
D. Sherwin Artus Petroleum Systems	Benjamin Douvier (GEOE), Jonathan Emmer (GEOE), Alik Hindbjorg (CBE), Vincent Hunter (CEE), Sunghee Lee (MEM), Fleford Redoloza (GEOE), Andrew Tillman (GEOE)
Macy Baresch	Greydon Shangreaux (GEOE)
Barrick Gold	Morgan Ekmark (GEOL), Tyler Rust (GEOL)
Barrick Gold Field Camp	Taran Bradley (GEOL), Tait Earney (GEOL), Zachary Lampert (GEOE), David LaPorte (GEOE)
Jeff L. Bauer Memorial	Ethan Courter (GEOE), Tait Earney (GEOL)
Lynn & Nancy Owen Bell	Kayleigh Muilenburg (BS GEOL)
Bittner-Campbell Memorial	Harrison Costello (GEOE)
Carver Cornelissen	Nishanthi Perera (GEOE)
Homer Davis Memorial	Harrison Costello (GEOE)
Gregory French	Tony Gesualdo (MS GEOL)
Paul and Virginia Gries	Michael Baranowski (PhD GEOL), Scyller Borglum (PhD GEOE), Hallie Bower (GEOL), Ryan Bozer (GEOL), Hannah Duncan (GEOL), Benjamin Elliot (MS PALE), Charles Field (GEOE), Tony Gesualdo (MS GEOL), Ethan Jennings (GEOL), Young Jae Kim (GEOE), Dominic Krause (GEOE), Stephanie Loose (MS GEOL), Jason Marvin (GEOE), Colton Medler (GEOL), Patrick Mulligan (GEOE), Nicholas Reid (GEOL), Caleb Ubl (MS GEOE), Patrick Verbryke (GEOL), Tristan Walker (GEOL), Desiray Wilson (GEOL)
Halliburton (Petroleum Field Camp)	Jonathan Emmer (GEOE), Vincent Hunter (CEE)
James O. Harder Memorial	Greydon Shangeaux (GEOE)
Ben Holmes Memorial	Rachel Brunstad (GEOE)

Dr. Ray Lemley Memorial	Bryce Kampa (GEOE)
John Mickelson Fellowship	Kyle Hazelwood (PhD GEOL)
Jack Redden (outstanding GEOL senior)	Christopher Schiller (GEOL)
Roy E. Roadifer	Victoria Karnes (GEOL), Justine Langas (GEOE), Ian Rice (GEOL), Donovan Schoenefeld (GEOE), Maxwell Southbloom (GEOE), Aidan Sweeney (GEOL), Seth Vandenberg (GEOL)
Bill & Jean Roberts	Brittany Coupe (GEOE)
Bill & Jean Roberts (Western Gem & Mineral Society)	Zachary Lampert (GEOE)
Roberts Fellowship	Umit Yildiz (PhD GEOL)
Seth Schaefer	Todd Anderson (GEOE), Taran Bradley (GEOL), Lana Jewell (GEOL), Sterling Richard, (GEOE)
Shawn Stickler	Audra Basel (GEOL)
Surbeck-Connolly	Kayleigh Muilenburg (BS GEOL)
Tullis (outstanding GEOE senior)	William Eldridge (GEOE), David LaPorte (GEOE)
Whiting Fellowships	Michael Baranowski (PhD GEOL), Scyller Borglum (PhD GEOE), Joshua Laird (MS PALE)
Whiting Petroleum Corp. Travel Awards	Bethany Costello (PhD GEOL): Geological Society of America; Tony Gesualdo (MS GEOL): Society of Economic Geologists; Brooke Long (MS PALE): International Paleontological Congress; Ethan Melville (MS GEOL): AAPG Student Expo; Paul Woods (MS GEOL): Society of Economic Geologists; Rocky Mountain Rendezvous; Hart Energy Developing Unconventionals

Finally, all of the best to you for the New Year. **I hope you will think of us as part of your charitable giving plan now and in future years.** SD Mines is experiencing some budget shortfalls and we could really use the support of alumni and friends, especially at this time. **I would be happy to chat with you about the department's needs and goals at any time.**

Laurie Anderson News

Administrative duties didn't keep me from working on some research and collections grants this year. Work on a project funded by the NSF Dimensions of Biodiversity program with Annette Engel from the University of Tennessee - Knoxville and Barbara Campbell from Clemson University continues. This project is a field and lab investigation of the genetic, taxonomic, and functional diversity of modern lucinid bivalve chemosymbiosis from coastal marine biomes. At SD Mines, we are investigating how the morphology of the living bivalve hosts might reveal the presence of endosymbionts, degree of symbiotic dependence, or the type of symbiotic dependence.

Field work in 2015 focused on San Salvador, the Bahamas, where Annette, her lab manager Audrey Paterson, and I conducted reconnaissance work for a field course we hope to offer in 2016. Brooke Long (MS PALE) also is continuing her working on this project. She presented her work at the Geological Society of America Meeting this November and won a student poster award from the Geobiology and Geomicrobiology Division!

The PRL is busy with many undergraduate and graduate students involved in several collections projects as well as other research. Funding from the Institute of Museum and Library Services is supporting the curation and digitization of collections from the Cretaceous Western Interior Seaway (WIS). In addition, funding from the NSF Collections in Support of Biological Research program is allowing us to curate and digitize three newly acquired collections of modern and Neogene-age (last 23 million years) invertebrates and protists. The targeted collections represent ancient and recent shallow-marine environments and are a foundation for conservation paleobiology and contemporary ecological research. Materials include collections I brought will me when coming to SD Mines (representing 1989-2011 field seasons), the dissertation collections of Christina Belanger, and an orphaned collection from the former University of South Dakota-Springfield. A small grant from the BLM allowed us to curate specimens in the SDSM collections from the decommissioned Fossil Cycad National Monument. Maribeth Price and I also submitted a proposal to the NSF Advancing Digitization of Biological Collections program to digitize Cretaceous collections that USD transferred to us in 2011.

All these projects have allowed us to curate and digitize nearly 200,000 specimens to date. In addition to collections work, Darrin Pagnac has developed a collections blog for the museum (https://mogcollections.wordpress.com/) and an online virtual field trip to the Cretaceous of South Dakota (http://arcg.is/1LIqGuy). Further, to support the outreach components of a number of projects, our exhibits design class built exhibits on conservation paleobiology, on marine symbioses, and on the WIS this fall.

2014-2015 GGE Department news:

December:

Climate change researcher Dr. Christina Belanger studies the fossil record for clues to future in the Capital Journal – December 29, 2014.
http://www.capjournal.com/news/climate-change-researcher-studies-the-fossil-record-for-clues-to/article_091ab59e-8f22-11e4-b194-0b1521af40b4.html

January:

Museum mogul: 'Sue' leads Shelton to Mines in The Hardrock – Winter, page 6.
Mines: An educational leader for energy industry in The Hardrock – Winter, page 10.
An explosive find fuels research for Dr. Masterlark in The Hardrock – Winter, page 11.
www.sdsmt.edu/Campus-Services/University-Relations-and-Media/Publications/Docs/Hardrock-Winter-2015/

February:

Dr. Arden Davis receives the Society for Mining, Metallurgy & Exploration Environmental Division Distinguished Service Award for 2014 at the 2015 SME Annual Conference & Expo in Denver, CO
http://www.smenet.org/membership/awards/division-awards/environmental/the-environmental-distinguished-service-award

SD Mines Announces $1.4M Raised for Energy Resources Initiative
Search to Begin for Director
http://www.sdsmt.edu/News/SD-Mines-Announces-$1-4M-Raised-for-Energy-Resources-Initiative,-Search-Begins-for-Director/

March:

Master's candidate Kasey Garrand receives national teaching assistant award in Legacy News – March, page 6.
www.sdsmt.edu/Campus-Services/University-Relations-and-Media/Publications/Docs/Legacy-News-March-2015/

April:

Unearth History's Mysteries at Mines' Dinosaur Extravaganza Saturday
http://www.sdsmt.edu/News/Unearth-History-s-Mysteries-at-Mines--Dinosaur-Extravaganza-Saturday/

SD Mines, Arizona State University Pave Way for Cooperative Research
http://www.sdsmt.edu/News/SD-Mines,-Arizona-State-University-Pave-Way-for-Cooperative-Research/

May:

Geology undergraduate Tyler Rust named Udall Scholar, plans to pursue tribal land sustainability in Legacy News – May, page 6.
4.0 GPA SD Mines geological engineering student David LaPorte award $10K Tau Beta Pi Fellowship in Legacy News – May, page 10.
www.sdsmt.edu/Campus-Services/University-Relations-and-Media/Publications/Docs/Legacy-News-May-2015/

Dr. Arden Davis, Professor of Geological Engineering, receives the 2015 Presidential Award for Outstanding Professor at the Employee Service and Recognition Awards Ceremony on May 6th.

June:

U.S. Forest Service helps SD Mines master's student Reid Cummins reach career dream in Legacy News – June, page 5.
www.sdsmt.edu/Campus-Services/University-Relations-and-Media/Publications/Docs/Legacy-News-June-2015/

SD Mines Grads Continue to Enjoy High Job Placements, Starting Salaries
http://www.sdsmt.edu/News/SD-Mines-Grads-Continue-to-Enjoy-High-Job-Placements,-Starting-Salaries/

July:

Four new minors, certificate (Petroleum Systems) will increase job readiness in Legacy News – July, page 3.
www.sdsmt.edu/Campus-Services/University-Relations-and-Media/Publications/Docs/Legacy-News-July-2015/

September:

Royal Gold donates $500K to Minerals and Energy Industries Center in Legacy News – September, page 3.
www.sdsmt.edu/Campus-Services/University-Relations-and-Media/Publications/Docs/Legacy-News-September-2015/

SD Mines students, including geology major Cori Christensen, intern at 232 employers in 37 states in Legacy News – September, pages 2 and 6.
www.sdsmt.edu/Campus-Services/University-Relations-and-Media/Publications/Docs/Legacy-News-September-2015/

SDSM&T scientist studies Chile's 8.3 magnitude earthquake at NewsCenter 1 – September 19th.
http://www.newscenter1.tv/news/local/SDSMT-scientist-studies-Chiles-83-magnitude-earthquake-328348761.html

October:

Research reveals new findings on one of the earliest Iguanodont dinosaurs of North America in Legacy News – October, page 4.
www.sdsmt.edu/Campus-Services/University-Relations-and-Media/Publications/Docs/Legacy-News-October-2015/

Plesiosaur stomach stone found during Mines student's field project in the Rapid City Journal – October 8th.
http://rapidcityjournal.com/news/local/plesiosaur-stomach-stone-found-during-mines-student-s-field-project/article_d65bafdc-552a-5e5e-93b0-1cfa2278b6d1.html

Dakota Midday: Dakotadon like rhino sized horse with a beak at South Dakota Public Radio – October 15th.
http://listen.sdpb.org/post/dakota-midday-dakotadon-rhino-sized-horse-beak#stream/0

Public Invited to Bring Rocks, Fossils to Museum for Identification
http://www.sdsmt.edu/News/Public-Invited-to-Bring-Rocks,-Fossils-to-Museum-for-Identification(1)/

Mineral Industries Day to be Held at SD Mines on Friday
http://www.sdsmt.edu/News/Mineral-Industries-Day-to-be-Held-at-SD-Mines-Oct--16/

'Night at the Museum' Hosted at SD Mines Oct. 31
http://www.sdsmt.edu/News/-Night-at-the-Museum--Hosted-at-SD-Mines-Oct--31/

November:

Coeur Mining donates $125K to Minerals and Energy Industries Center of Excellence in Legacy News – November, page 4.
www.sdsmt.edu/Campus-Services/University-Relations-and-Media/Publications/Docs/Legacy-News-November-2015/

December:

Schlumberger Oil and Gas Software Gift to Mines Valued at $172 Million
http://www.sdsmt.edu/News/Schlumberger-Oil-and-Gas-Software-Gift-to-Mines-Valued-at-$172-Million/

Cleo Heenan

This past year I have been blessed with spending quality and rewarding time with family, friends, work associates and students. Hiking has been my new experience and I enjoyed many hours with grandkids and family. Wishing everyone the best for another great year and good health.

Christopher Pellowski

It was a busy year at Ranch A with three five-week sessions being offered this past summer. During the three five-week sessions, we had 28 students from 14 universities in session one, 27 students from 13 universities in session two and 24 students from 17 universities in session three. The weather started out snowy and cold this year and made field geology very challenging and we even had a snow day during week two of session one!

Session 1 students and instructors were greeted with fresh snow at Ranch A on Monday, May 11th, the first day of field camp. Photo by Dr. Greg Baker

Group photo of the SD Mines students enrolled in session 1 this summer.

Recruitment efforts for our department include visits to local high schools. The counselors from Admissions have once again invited our department to join them for visits to Douglas, Saint Thomas More and Stevens High Schools to promote our programs. We loaded up the sediment flume and packed up some mineral and fossil specimens to display and handed out our undergraduate degree brochures to interested students.

Saint Thomas More students learning about the formation of stream channels and sediment transport. Photo by Ms. Molly Moore, Admissions

This year I am serving on two department committees and assisting with the upcoming ABET review in 2016 and I will be teaching GEOE 451 Economic Geology during the Spring 2016 Semester with sixteen students already signed up.

Be sure to visit and like us on Facebook.

LIKE US ON facebook

https://www.facebook.com/SDSMTGeologyGeologicalEngineering

From Our Emeritus Professors:

Perry Rahn

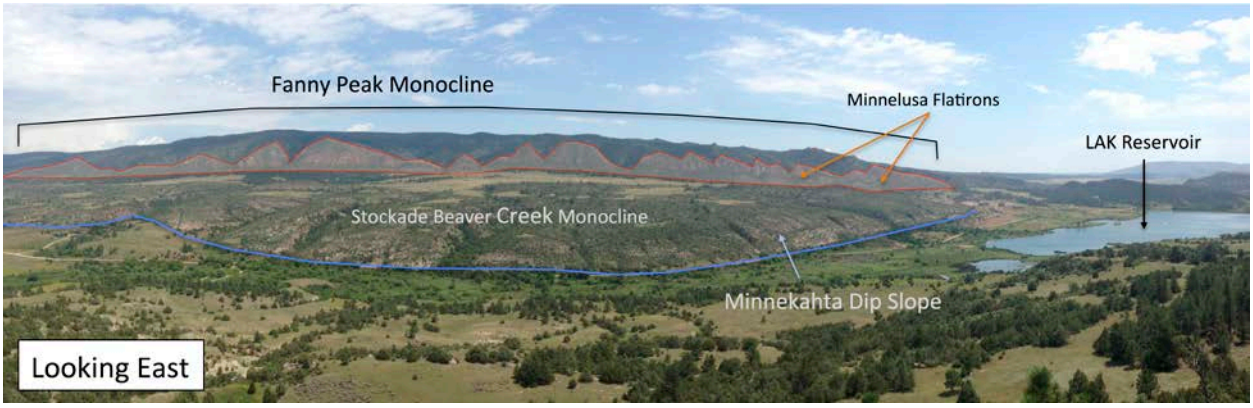
Perry Rahn sends his greeting to alums and friends: “I still work in my office in the MI building and have coffee with my colleagues about two to three times per week. And I stop to see Jack Redden about every week. He is weathering out the winter at his house on West Boulevard. He has his dog Molly II and takes her for a walk every day. Up at Slate Creek I am burning hand-stacked brush piles, the result of cutting down all these darn “bug” trees.“

Alvis Lisenbee

Yet another enjoyable year of travel and geology.

Participating with students and other faculty members continues to be an enjoyable aspect of my “retirement”. This includes working with Dr. Davis and Dr. Price in what may be the last phase of our study of water quality in home wells in the crystalline rocks of the central Black Hills – look out for the arsenic in some areas seems a pertinent part of the findings there. This year, eight graduate and undergraduate students participated in the door-to-door sampling, the compilation of the data base, and the analytical stage, which continues. Members of this group, such as Mackenzie Kester, Max Kange, Umit Yildiz, Andrew Clift, and Kyle Hazelwood, tend to be amazingly adept in the electronic world by which geology is currently furthered.

Due to the current guidelines of the Graduate School, Kasey Garrand, who graduated last spring, will be the last of my graduate advisees, which I believe now number 49. Kasey did an excellent study of the partitioning of strain across the Fanny Peak and Black Hills monoclines near Newcastle, Wyoming. I enjoyed returning to the area in which Joyce Fry did her thesis work in the 1970’s. The hills may be a bit shorter now, due to erosion over the years, but the majesty of those well exposed structures has not lessened in the least. One of Kasey’s views of his project is shown in the photo below.



On the east flank of the Black Hills uplift I have continued with mapping of 1:24,000-scale quadrangles. This involves my own work (including mapping into the Cretaceous shales which I have previously avoided for 40 years) and an enjoyable combined effort with alums Mark

Fahrenbach and Brian Fagnan of the South Dakota Geological Survey on areas of Tertiary intrusions in the northern Hills.

Teaching for me now is in the form of wandering across the hills, hither and yon, in various field camps of the Black Hills Natural Sciences Field Station. Nuri Uzunlar has not grown tired of me yet, apparently, and so I have both taught in the geology camps and participated in scouting trips for new ones in Spain and western Arizona.

The Turkish field camp completed its twelfth successful year due to the efforts of Nuri, Colin Paterson, myself, and Umit Yildiz, the teaching assistant who had to carry a heavy load as translator for the students, grader of field notebooks, and general donkey for Nuri. It will be interesting to see how many students actually show up for this next year, given the texture of Middle Eastern strife. They are signing up, however.

Following the Turkish adventure, field camp participation continued as a hitch-hiker in the Petroleum Field camp. This was in its inaugural voyage under the direction of Foster Sawyer and Larry Stetler and the students were mostly from coastal U.S. universities. They had little experience with rural America and even less with the altitude and dry climate of the west, and the appearance of an oil field. They left with a better appreciation of each of these and gave strong approval for what Foster and Larry had brought to them.

Geology in September involved a scouting trip to the northeastern part of Spain (Catalonia) where Nuri and I joined Joe Hill, a professor from Sam Houston University in Texas, for a look into the logistical and geological possibilities of opening a field camp there. Both proved to be remarkable for the needs of teaching. The geology includes the metamorphic core of the Pyrenees Mountains as well as the adjacent, southern foothills where large deltaic sequences are folded into major anticlines and synclines.

Nuri placed the camp onto the BHNSFS web site on the way back to the U.S. and enrollment was full within a few weeks. Numerous pictures, such as the fold shown below, undoubtedly helped to encourage participation.

A similar exploration trip was taken to western Arizona in October to examine the Black Range for its qualifications for a three-week winter camp. This too was considered a go situation and Nuri, Umit Yildiz, and I will meet Harry Filkorn, Jim Sears and 14 students there at the end of the year to begin this experience as a three week long field camp. As shown in the photo of Nuri at Sitgreaves Pass, there is no lack of outcrop here. The challenge is that most of it is volcanic rock.

Life is good……..be well all

Bill Roggenthen

Progress continues to be made at the Sanford Underground Research Facility (SURF) in Lead, SD. For example, refurbishment of the Ross Shaft has made it to a depth of 3,350 ft (final depth is 5,000 ft) in preparation for large excavations for future physics experiments. New geological experiments have also been funded including kISMET [permeability (k) and Induced Seismicity Management for Energy Technologies] which involves hydraulic fracturing of crystalline rocks at SURF. The project will be located on the 4850 Level and will consist of drilling five 100 m long boreholes with one being the injection hole and the other four hosting monitoring instrument for ultrasonic seismic tomography and electrical resistivity tomography. The experiment will perform real-time imaging of the mechanics of the fracturing process and the distribution of fluids near the injection borehole. SDSMT's involvement will center on any induced seismic activity during the fracturing and injection. The results of the experiment will provide insights into the hydraulic fracturing process and will have direct application to enhanced geothermal systems developed in crystalline rocks.

Colin Paterson

Turquoise Ridge Au mine

The freedom of retirement has allowed me to travel in 2015, twice to New Zealand, once to Australia, and once to Turkey. In the latter case, I spent 5 weeks teaching geology field camp with Alvis Lisenbee and Umit Yildiz in Turkey.

Paul Woods completed his M.S. thesis on characterization of breccias at the Rare Element Resources project area in the Bear Lodge Mountains, Wyoming.

The Society of Economic Geologists student chapter continues to be very active in the department with about 25 members involved in monthly meetings, field trips, outreach activities, and sponsoring of refreshments for the department seminars. Five students (sophomore to graduate) participated in the trip to Utah and northern Nevada in August 2015. We visited the Bingham Canyon porphyry Cu mine (viewed from overlook in Oquirrh Mts), Turquoise Ridge Au mine, Marigold Au mine, and Robinson Cu mine. We appreciate the time and efforts of our contacts and guides including alumni Ken Krahulec, Andy Armstrong, Melissa Jetson, and Justine Miller.

The search for my replacement is on again, in the area of petrology and mineral resources, at the level of Assistant Professor. If you know of potential applicants, please direct them to the department. If any of you are in New Zealand or intending to travel there, email me – Becci and I will be based in Te Anau, gateway to Fiordland National Park in the southwest of the South Island, during January-April 2016.



Marigold mine, with Andy Armstrong Robinson mine with Melissa Jetson and Justine Miller

Arden Davis

In June of 2015 I retired from teaching but was awarded emeritus professor status, so I'm usually at school two or three days each week, except during the summer. Perry Rahn and I now share an office in MI 327B.

During the past year I've worked on two research projects, both involving water sampling from wells in Precambrian aquifers in the Black Hills. Our project with the West Dakota Water Development District showed that about 30% of Precambrian wells in the Hill City and Keystone areas had arsenic above the maximum contaminant level of 0.010 µg/L. About 20% of the samples showed bacterial contamination. Statistically, there appeared to be an association of elevated nitrate levels with bacterial contamination.

A second project involved sampling of wells in the Custer area. We had roughly similar results in that work – about 20% of samples had arsenic concentrations above the maximum contaminant level, and we detected bacterial contamination in some wells, along with elevated nitrate levels.

Consulting work also has kept me busy part of the time, with a water supply project and a site suitability report.

My wife and I plan to continue to live in Rapid City during most of the year, so I look forward to seeing alumni as well as current students. Please stop by to say hello if you're in the area. It's enjoyable to stay in touch with our graduates.

From the Faculty:

Larry Stetler

In 2015 I taught 3 courses in the spring term, 1 course in the summer, and 3 courses in the fall semester. I also advised 1 geology student on their research project each semester. Currently I am advisor for 2 MS GeoE students, 1 PhD GeoE student, and 1 PhD Geol student. One paper has been published in 2015 and another is ready for submission. I have 5 other papers in various stages of preparation and am looking for time to complete these and get them out.

Research in 2015 has slowed except for that being conducted by my students. A large proposal to the Department of Energy was made in fall 2015 and another NSF proposal is scheduled for submission in late December 2015.

Liangping Li

Hello, I am the new Assistant Professor of Geological Engineering in the department. It's great to be joining such an accomplished group of earth scientists. I am looking forward to fruitful collaborations in the coming years.

I earned my PhD from Technical University of Valencia in Spain. Prior to that, I received my Bachelor and Master degrees in China from Hebei College of Geology and China University of Geosciences, respectively. I then moved to Austin for a post-doc at The University of Texas at Austin. Currently, I am the associate editor for the international journals *Hydrogeology* and *Stochastic Environmental Research and Risk Assessment*.

At Mines, my research will focus on two areas: subsurface flow and transport modeling and inverse modeling for complex formations. I use numerical approaches to study the fluid flow and transport migration, in particular, for the fluids such as groundwater and supercritical CO2. Regarding inverse modeling, I use the advanced geostatistical methods coupling with the flow modeling to inversely calibrate the hydrogeological properties such as hydraulic conductivity in order to have a better prediction in the future. This information is significant to the field because it can be used for: environmental risk assessment, remediation engineering of contaminated groundwater, the design of underground repositories for radioactive material, carbonate sequestration in saline aquifers and hydrocarbon recovery.

Again, I am excited to collaborate with outstanding GGE students and faculty. I hope you have a Merry Christmas and a Happy New Year!

Kurt Katzenstein

Greetings! Another busy year has come and gone! At home, my wife and I are never bored while raising our three daughters. Our oldest, Brianne (6) started kindergarten this year and enjoys playing soccer and basketball. Hannah (4.5) is enjoying pre-school and is looking forward to starting school for real next year. Leslie (2) is growing fast and is learning all kinds of things (for better or worse) from her older sisters. All three girls enjoy spending time outdoors during hikes, etc… now I just have to teach them how to use a Brunton compass!



The Tech Geological Association had another successful year. This year we held our annual camping trip at Wind Cave National Park, hosted the annual fall department kickoff party, hosted the annual ice fishing pot-luck, took a tour at both Wind and Jewel caves, attended recruiting events at Douglass and Sturgis High Schools, hosted a "learn to curl" event, and hosted four bowling nights.

In October I successfully earned my Professional Engineer's license and I recently applied to be trained as an ABET evaluator for Geological Engineering. I am currently involved in two funded research projects. One as a Co-PI on a project investigating complex mine ventilation in block-caving operations and another as a Co-PI on a project investigating volcanic deformation

resulting from magma injection. I am also involved in two proposed projects that we hope are funded in the coming months.

I hope you have enjoyed 2015 as much as I have, enjoy the holidays!

Foster Sawyer

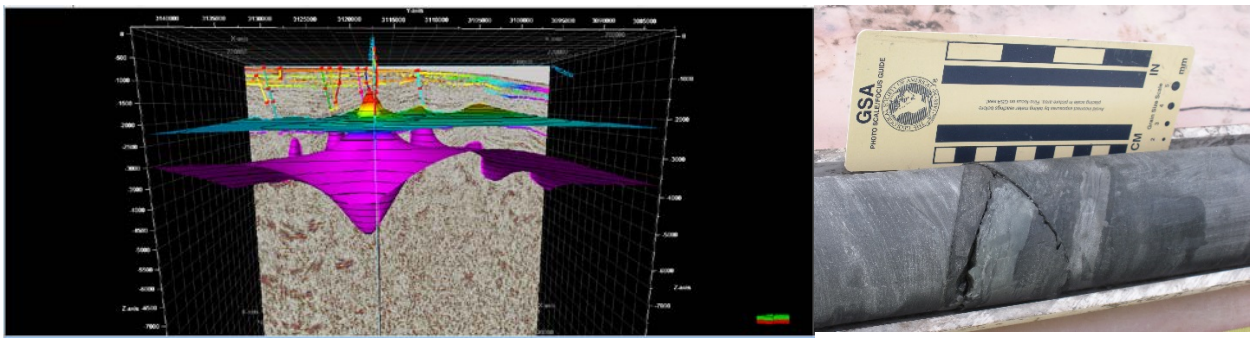
I hope this message finds all of our alumni, students, and friends in good health and spirits! It has been a busy and exciting year as always around the Department and the campus. Highlights for me include the successful launch of our new Petroleum Field Camp, another major software donation from Schlumberger Ltd., receiving an award to continue the PEEC program for another year, completion of coring operations in the Pierre Shale and Niobrara Formation, serving as National President of the American Institute of Professional Geologists, and fun-filled activities with the Tech Geological Association and the Society of Petroleum Engineers Student Chapter. Teaching classes and labs and advising student research are always interesting, challenging, and rewarding components of my work.

The new Petroleum Field Camp was a great success last summer which included short courses in geophysical logging and natural fractures and culminated with a four day field trip to oil and gas geological and industrial points of interest in Wyoming and Colorado. Included in the field trip was a geological pontoon ride on Alcova Reservoir, led by distinguished alumnus Scott Cooper, and a visit to oil and gas infrastructure in the Denver Basin courtesy of Whiting Petroleum Corporation. Another significant achievement related to our petroleum curriculum is the acquisition of a second major software donation from Schlumberger Ltd. The donation includes twenty-five licenses of Petrel, Eclipse, PIPESIM, and nine other software platforms and is valued at $172,000,000.

Left – Students in Petroleum Field Camp at Whiting Petroleum Corporation facilities in northeastern Colorado. **Right** – Petroleum Field Camp students on a geologic field trip via pontoon at Alcova Reservoir, Wyoming.

STEM education and diversity are important issues at SDM&T, and I am happy to report that my collaborative grant programs with Oglala Lakota College and Sinte Gleska University have been extremely active and healthy. The Pre-Engineering Education Collaborative (PEEC) program received another year of funding from NSF, and I am currently working on another proposal to further advance our collaboration with Sinte Gleska University and the U.S. Dept. of Energy.

The focus of the PEEC program this year was sustainability of natural resources, food, and housing on the Pine Ridge Reservation, as well as continued geologic mapping and water resources investigations. Coring of the Pierre Shale and Niobrara Formation in central South Dakota was completed as part of the DOE-Sinte Gleska project, and biostratigraphic and lithologic evaluation of core samples is underway.



Left – Image of Salt Creek Field, Wyoming, generated with Petrel software. **Right** – Core from the lower Pierre Shale, South Dakota.

The Tech Geological Association (TGA) had a busy year with a successful ice fishing tournament (we actually caught some fish!), several geologic field trips, and a number of social events. The Society of Petroleum Engineers (SPE) has been particularly active this past year, with several trips to the Powder River Section in Gillette, WY, and an overnight field trip to view petroleum infrastructure at Flatirons Resources in North Dakota. I would like to recognize Chance Costello and Zack Malone for their dedication and success in leading the SPE Student Chapter over the past two years.

I would also like to thank the American Institute of Professional Geologists (AIPG) for the opportunity to lead that organization as National President in 2015, and for the support that everyone has shown through an extremely busy, challenging, and rewarding year.
I wish everyone Happy Holidays and a successful, healthy year in 2016!
Sincerely,
Foster Sawyer

Tim Masterlark

2015 was a year of great challenges, opportunities, and successes. My Physical Geology course, which confronts students with the dynamic processes of the world beneath our feet, has taken on a life of its own. The course had a record enrollment of 80 students and, as every seat was taken, I am exploring possibilities for a larger classroom. My two graduate courses, Geodynamics and Linear Inverse Methods, provide the theory and numerical tools to quantify the physical processes that underpin a variety of Earth's systems. These challenging courses are slowing catching-on in the graduate student culture. I am introducing a new course for advanced undergraduate scientists, GEOL 450 Fluid and Thermal Diffusion:

> Description: Quantitative techniques to describe the occurrence, flow, and implications of fluids and heat in the crust. Topics include: Characterization of fluid and thermal systems; Derivation of governing equations; Boundary value problems; Poroelastic

theory; Earthquake coupling and induced seismicity; Heat transfer, Hydrothermal systems; and Numerical methods including finite difference, finite element, and matrix methods.

My intent is that students will look back on their academic careers and say "…*GEOL 450 was the one course that truly opened my eyes to the beauty of mathematics and science*".

Summit of Mauna Kea, Hawaii (elevation 4,205 meters above sea level). Mauna Kea is the tallest mountain on Earth because its base is ~6,000 meters below sea level, which gives a net base-summit difference of more than 10,000 meters.

Ted Donovan (Ph.D. Candidate), Dr. Uzunlar, and I taught the Hawaii Field Camp last summer. With the assistance of a team of students, we tested our prototype rover (Project Firewalker) on the lava fields of Kilauea Volcano. Project Firewalker is a remote-controlled tracked vehicle equipped with an array of geophysical instruments intended to gather data in the harsh environment of an active volcano. Thanks to Ted's expertise and leadership, Project Firewalker was a success. We are currently reconfiguring the system based on the lessons learned during these field tests.

My Geodynamics Research Team made great progress on all fronts. Dr. Jay Tung (Post-doc, funded by NASA JPL) led a study of earthquake-triggering that was submitted for publication in *Journal of Geophysical Research*. Jay well-represented the Geodynamics Research Team by giving three presentations at the *International Association of Mathematical Geosciences* (*IAMG*) in Freiberg, Germany. Ted Donovan (funded by NSF), passed his Ph.D. Comprehensive Exam and is the lead author on a manuscript submitted for publication in *Computers & Geosciences*. Mike Baranowski (Ph.D. student) received an award for Best Student Poster at an *AAPG* meeting. I led studies of volcano deformation that were submitted to *Journal of Geophysical Research* and *IAMG* for publication. An international team of colleagues and I published an article in *Journal of Geophysical Research*, which described how impoundment of a reservoir produced a fluid-pressure pulse that triggered the subsequent 2008 M8 Wenchuan earthquake and killed 30,000 people in China. For 2015, my team's productivity includes 2 publications, 3 manuscripts submitted for publication, 6 conference abstracts and presentations, and 1 interview article.

Finally, I am on the science team for the Krafla Magma Drilling Project (KMDP), which was selected for funding by the International Continental Drilling Program (ICDP) and Landsvirkjun (the Icelandic geothermal power company). I traveled to Iceland last Fall to help finalize the drilling plan. KMDP will drill and directly sample rhyolite magma that was erroneously discovered at a depth of 2 kilometers beneath the Krafla volcanic center, Iceland, when Landsvirkjun was prospecting for supercritical steam.

Christina Belanger

Research on how the Gulf of Alaska responded to past changes in global climate is making headway thanks to a Paleo Perspectives on Climate Change National Science Foundation research grant funded this year. This work began in 2013 when I participated in Integrated Ocean Drilling Program Expedition 341. In collaboration with researchers at Oregon State University, an SD Mines graduate student (applications are being accepted now!), two undergraduate research assistants starting next Spring, and I will use assemblages of microfossils and geochemical proxies to reconstruct productivity and bottom water oxygenation in the Gulf of Alaska over the past glacial-interglacial cycle. Our goal is to use changes in the communities of foraminifera living on the seafloor to determine what caused past low-oxygen events in the North Pacific. Masters student Ozlem Orhun (MS GGE ’15) began this work by combining data on changes in foraminiferal assemblages and their body sizes to identify distinct communities that lived in different types of low-oxygen environments. Masters student Rebecka Hastings (MS AES, ongoing) is working on using geochemical proxies to link changes in oceanic productivity to atmospheric changes recorded in ice cores.

Three of my graduate student advisees - Ozlem Orhun (MS GGE ’15), Alysia Korn (MS PALE, ongoing), and Joshua Laird (MS PALE, ongoing)– presented at this year’s Geological Society of America meeting in Baltimore thanks to travel grants made possible by GGE department supporters. They were able to discuss their research topics with other graduate students and researchers to sharpen their interpretations and see how their work fits into the larger framework of paleontological and paleoenvironmental research. Alysia’s work has shown that carbonate concretions form preferentially in different regions of mosasaur (a large marine reptile) fossils, which likely reflects differences in the quality of food available to bacteria from different body parts. Joshua has collected paleontological data from multiple fossilized hydrocarbon seeps in the Pierre Shale (locally known as Teepee Buttes) and been able to characterize how different these Cretaceous assemblages are from modern communities living in similar marine environments.

MS PALE student Alex Gardner (’15) also graduated this semester after completing work on the taxonomy of small deer-like mammals called hypertragulines; Alex was able to show that more species of hypertragulines are present in Badlands National Park than previously recognized. Alex worked closely with former SD Mines Haslem Postdoctoral Scholar Clint Boyd (now North Dakota’s State Paleontologist) during the project.

New to group is MS student Justin Wilkins, who has been taking courses at SD Mines for the last few years while working as the bonebed curator at the Mammoth Site of Hot Springs. He’s decided to now officially pursue an MS degree and is working on small vertebrate assemblages associated with mammoth fossils preserved on the Channel Islands off the coast of California. He completed field work on Santa Rosa Island this semester is now in the sieving and identifying phase of the project.

I’m enjoying the diverse topics and perspectives our graduate students bring to lab and looking forward to other year of new discoveries.
I hope the New Year finds you welcome adventures!

Ed Duke

This year Ed Duke again taught three courses in the department: Mineralogy and Crystallography, Scanning Electron Microscopy, and Igneous and Metamorphic Petrology. He has also enjoyed working with several Geology undergraduate students on senior research and independent research projects that test applications of field-based visible and near infrared spectroscopy. Madigan Cochran-Bjerke has been examining hydrothermal alteration minerals from the Wharf gold mine (Coeur Mining) in the northern Black Hills. Taran Bradley and Michael Day have been using spectroscopy to map regional variation in muscovite composition in low- to medium-grade metamorphic rocks (biotite and garnet zones) in the central and northern Black Hills. The students have acquired thousands of spectra this fall and are in the process of correlating spectral features with metamorphic grade, rock types, and hydrothermal alteration.

Zeynep Oner Baran

Merry Christmas and a happy new year to every one of you. Great changes happened both personally and professionally this year. My husband Kemal and I welcomed our first child, a precious baby boy Altan Poyraz on December, 4th.

AAPG Student Chapter organized a free short course with Exxon Mobil and Mr. Bob Stewart and Ms. Lori Suma visited the department for 2-day intense short course. ~35 undergraduate and graduate students registered and attended this short course in April 2015. Bob Stewart who is Global Geoscience Recruiting Supervisor also gave a talk on recruitment services at Exxon Mobil services and answered questions from students and faculty.

AAPG Student Chapter organized a joint activity with SPE and students visited Flatiron Resources for a rig tour in Williston, ND on October 22-23. As an active chapter, they received $1500 support funds from AAPG and ~1000 from Student Organizations Association of SDSMT. This year, they will be busy with arranging new short courses teaching petroleum software, organizing other field trips throughout the semester.

One of my graduate students, Ethan Melville completed his MS thesis successfully and graduated in December. He will be working at Hess Corporation as a talented and hardworking geologist. Another MS student, Anthony Gesualdo will continue working on our funded research project, detailed structural analysis at Marigold mine, NV. Collected fault, fracture, bedding measurements will be analyzed and investigations will continue with compilation of different maps, structural plots. Stephanie Loose, MS candidate is granted with access to core samples at Keystone- Holly Terror mining area by Mineral Mountain Resources. Her research will be mainly focusing on structural analysis of major brittle faults and ductile shear zones in the mining area in order to understand the timing, nature and style of deformation and its influence on gold mineralization.

I will be also busy with a new medical geology research project that investigates geological factors controlling high and hazardous radon levels around Rapid City and Black Hills area. Preliminary results show that high radon measurements are not only related with shale

formations which may have higher uranium content and associated radioactivity. This new research project will provide a geologic map with measured radon levels and help us educate public about radon hazard and possible solutions.

It has been a busy year and new year seems to be another busy and productive year. I wish you have a great new year.

Darrin Pagnac

Greetings and Happy Holidays! It's been a very busy and exciting year with a great many accomplishments. It is the beginning of my sixth year as faculty at SD Mines, so naturally I've applied for tenure this fall. I should know the results of my application soon. Wish me luck!

It was a wonderful year with regard to field paleontology. I led several field camps this year, once again at Agate Fossil Beds National Monument, one to Wind Cave National Monument, and another August spent along the Missouri River in Chamberlain, SD.

Agate Fossil Beds was a great success! We spent five days prospecting a brand new site not related to those the monument is famous for. We found several fin dozen microfossil specimens and documented a new locality stratigraphically above the Agate Ash. The students gained a great deal of experience both prospecting for fossils and removing larger blocks. The Wind Cave Camp brought us to a locality far removed from the sites featured in the monument. Although we spent five days working this site, no new material was recovered. However, the students had a great time, we saw some wonderful scenery, learned some valuable lessons, and had some great times with our colleagues at Wind Cave.

Students documenting a new *Daemonelix* burrow at Agate Fossil Beds National Monument.

August was spent, as usual, on the Missouri River working with our colleagues in the US Army Corps of Engineers. We had a fantastically productive month with all of my students making significant discoveries and contributions. We pulled two significant finds. The first was a partial hind limb of the large Cretaceous diving bird *Hesperornis*. The second was a fantastic mosasaur specimen discovered by undergraduate Jon Frasier. We worked feverishly for six days to uncover this specimen, but managed to get it back to Rapid City for our volunteer Kenny Brown to prepare.

Students excavating an amazing mosasaur along the Missouri River.

We've made significant progress with our backlog of vertebrate material needing preparation. With the hire of our new collections manager, Kelsey Abrams, we are now able to address the massive amount of material collected in prior seasons. Kelsey is taking off and successfully supervising students and volunteers, making an observable dent in our considerable amount of material needing preparation.

My students are doing very well. Paul Barrett finished his MS degree last spring. He is currently applying to Ph.D. programs but in the meantime is spending a year teaching English in Japan. Two more of my students finished this fall. Mariah Slovaceck finished her MS work on microenamel structure in plesiosaurs, and Sydney Boos completed her work on population dynamics of *Moropus* at Agate Fossil Beds. I foresee great things from all these students.

I've been busy as well, submitting and publishing papers. In October, Clint Boyd and I finished our re-description of *Dakotadon lakotensis*, one of the oldest iguanodonts in North America, discovered in the Black Hills in the late 1960s. Additionally, I've submitted another paper with colleague Bob Feranec from the NY State Museum on stable carbon and oxygen isotope analyses

of horses from the Miocene of southern California. This manuscript will be published in early 2016.

2016 promises to be a great year. The new Paleontology MS curriculum is working well and students are seeing the difference in their adjusted courses. All of our students are getting a much broader base of paleontology knowledge. I am facing many new opportunities in 2016 as well. I've again been invited to participate in field work with colleagues from Oklahoma State University, and I will also lead a youth paleontology camp in June. I look forward to what the new year has in store.

From Black Hill Natural Sciences Field Station and Nuri Uzunlar:

In summer of 2015, 38 instructors and 252 students from 96 institutions across the USA mapped geological environments ranging from volcanoes to fault zones in Hawaii, Turkey, Iceland, Nepal, India, Ecuador, the Galapagos Islands, and the Black Hills of South Dakota. We are adding three new camps, **Geology Field Camp in Arizona, Montana and Spain**. Today, the BHNSFS is the world's largest field school offering summer and winter camps in earth science and related engineering fields including geology, geological engineering, environmental geology and engineering, volcanology, geomorphology and geo-hazards on four continents.

Alvis and I traveled to Arizona twice this past year to scout projects for the Arizona winter field camp, located in Bullhead City. In June, Alvis, Colin and I spent five weeks in Turkey teaching field. Late July, I joined the Hawaii camp lead by Tim Masterlark. We spent three weeks on the big island studying lavas in Kilauea National Park, Mauna Loa and Mauna Kea with 19 students.

Courses offered in 2016 are listed in the table and locations are shown on the map.

Field Camps 2016			
USA			
Session Name	Credit	Course Number and Name	Date
Geology Field Camp, Session One -Ranch A	6	GEOL 410 Field Geology	May 9 - June 10
Geology Field Camp, Session Two - Ranch A	6	GEOL 410 Field Geology	June 13 - July 15
Geology Field Camp, Session Three - Ranch A	6	GEOL 410 Field Geology	July 18- August 19
Engineering Field Camp, Campus	6	GEOE 410 Engineering Field Geology	May 16 – June 17
Environmental Eng. Field Camp, Campus	3	GEOE 412/512 Science and Engineering Field Applications	May 14 – June 1
Death Valley Field Camp, Shoshone, CA	3	GEOL 412/512 Science and Engineering Field Applications	Dec. 27, 2015 – Jan. 13, 2016
Petroleum Field Camp, SD, ND and WY	3	GEOL 412/512 Science and Engineering Field Applications	July 11 - 27
Paleontology Field camp, SD and NE	2	GEOL 471 Undergraduate Field Paleo.	Multiple dates -
Arizona Field Camp, Bullhead City, AZ	3	GEOL 412/512 Science and Engineering Field Applications	Dec. 27, 2015 – Jan. 13, 2016
Geology Field Camp, Dillon, Montana	6	GEOL 410 Field Geology	May 22 - June 25
Spain			
Geology Field Camp, Ainsa, Spain	6	GEOL 410 Field Geology	June 16 - July 19
Hawaii			
Volcanology Field Camp, Hawaii	3	GEOL 412/512 Science and Engineering Field Applications	July 20- August 5
Turkey			
Geology Field Camp, Taskesti, Turkey	6	GEOL 410 Field Geology	June 5 – July 9
Nepal			
Geomorphology Field Camp, Himalayas -Nepal	3	GEOL 412/512 Science and Engineering Field Applications	May 22 - June 10

In addition to traveling from camp to camp I have been very active in departmental committees and the department's graduate recruiting efforts. I attended GSA in Baltimore and to AGU in San Francisco on behalf of the BHNSFS and the department.

I am also leading the efforts on campus to establish interdisciplinary research and teaching efforts in energy resources through the **Energy Research Initiative (ERI)**. The newly established Minor in Petroleum Systems, an 18-credit program including three core courses and 9 credits of approved electives in geology as well as in chemical, civil, electrical, geological, mechanical, and metallurgical engineering is getting great deal attention from students and industry. Electives allow students to focus either on upstream exploration and production or on downstream refining. To support this educational effort, the Black Hills Natural Science Field Station offered petroleum field camp in the summer of 2015.

The BHNSFS is growing every year and lodging is becoming a serious issue. I am looking for a suitable land somewhere close to Nemo or Spearfish to build a field station. Please contact me if you can help or you know someone who can.

For additional information about upcoming field station activities please visit: http://geologyfieldca mp.sdsmt.edu, call me at (605) 394–2494 or write to nuri.uzunlar@sdsmt.edu