

## CAMPUS REPORT

**DATE:** September 17-18, 2014  
**TO:** Board of Regents  
**FROM:** Donald M. Blackketter, Chancellor, Montana Tech  
**RE:** Campus Report for the September 17-18, 2014 Board of Regents' Meeting

### STUDENT ACHIEVEMENT

- Nine Montana Tech undergraduate students are working with eight faculty on seven diverse and interdisciplinary faculty-mentored Summer Undergraduate Research Fellowship (SURF) projects this summer, sponsored by Montana Tech. The students will present their research in a poster symposium on August 7<sup>th</sup> from 2:30 to 4:30 pm. Student researchers include Justin Gomez, Meredith Ludford, Cameron Kauffman, Aaron Mack, Hayden Peck, Sarah Queer, Quincy Riordan, Mariah Sheble, and Erin Wiles.
- Petroleum Engineering undergraduates Alicia Kastelitz, Alexander Shull and Tim Denton have been working through the summer on the Survey of Native Proppant (SNaP) project, both on laboratory analysis and sample collection. SNaP is a three year, \$383,000 grant from the Montana Board of Oil and Gas Conservation. John Getty (Geophysical Engineering) is the PI and Katie McDonald (MBMG) is Co-PI.
- Four SAMPE (Society for Advance Material and Process Engineering) club students participated in a composite bridge building contest at the SAMPE Technical Conference held in Seattle, WA June 3-5. Students Taylor Winsor, Cameron Kauffman, Rick Ladouceur and Nick Morales built a bridge beam made of coir fiber and epoxy resin. This was entered in the natural fiber class and placed 6<sup>th</sup>, sustaining a load of 3400 pounds. Advisor Ronda Coguell accompanied the students and also attended the conference.

### FACULTY EFFORTS

- After a national search, Montana Tech hired Ronald J. White, Ph.D. as the Director of the Center for Advanced Mineral and Metallurgical Processing (CAMP) and as a professor of chemistry in the new Materials Science Ph.D. program. CAMP is a designated Montana Tech center of excellence in research and education. Dr. White previously served as Vice President for Research at South Dakota School of Mines & Technology.
- Professor Roger Jensen presented a paper in Krakow, Poland at the 5th International Conference on Applied Human Factors and Ergonomics. The title of the paper—*Hierarchies of hazard control: A proposal to resolve different lists—reflects* Dr. Jensen's advocacy for a modification in international standards for safety management systems.
- The National Institute for Occupational Safety and Health awarded Montana Tech a one-year grant of \$98,824 to support tuition and fees for selected students, and travel for students and faculty. The funds are specifically for students pursuing a B.S. in Occupational Safety and Health or an M.S. in Industrial Hygiene. The grant application was prepared by Drs. Julie Hart and Roger Jensen.
- Dr. Courtney Young, Metallurgical & Materials Engineering Department Head and Lewis S. Prater Professor, organized and hosted an ASM Materials Camp for HS Teachers. The camp was held on the Montana Tech campus July 21-25 and attended by 20 teachers from Montana, 1 from Ohio, and 1 from Minnesota.
- The National Institutes of Health Science Education Partnership Award (NIH-SEPA) announced a grant of \$1.25 Million to Montana Tech for an exciting science education research project titled, "Bringing Research into the Classroom (BRIC): A PARTNERSHIP FOR RESEARCH AND EDUCATION IN THE MONTANA PUBLIC SCHOOLS." Dr. Marisa Pedulla, Professor of Biology, and Rayelynn Connole, director of CFWEP, are co-leading this effort. The BRIC project builds upon eight years of collaborative efforts between the Montana Tech Phagedigging Program and CFWEP – (Clark Fork Watershed Education Program). The project directors have designed a new program of intensive teacher professional development combined with in-class bacteriophage discovery mentored by faculty and undergraduate students. The project goal is to equip Montana's K-12 teachers with the knowledge, skills, and dispositions to provide high-quality health science research opportunities for students.

- NSF awarded Montana Tech a 2014 Major Research Instrumentation grant of \$314,012 to purchase a high-tech shake table for research on seismic stability of Rock Masses. The shake table will have a one-ton capacity and will allow specimens (such as rock blocks or an engineered structure) to be subjected to programmed shaking sequences and magnitudes, such as ones that match the time histories of recent earthquakes, and to study the stability of rock slopes and boulders during earthquakes. Professor Mary MacLaughlin in Geological Engineering is the PI, and Dr. Larry Smith (Geological Engineering) and Debbie Smith (MBMG) are co-PIs. Collaborations with other faculty and students are welcome.
- CDC/NIOSH awarded Montana Tech a \$314,267 contract to demonstrate the ability of distributed fiber optic sensing technologies to enhance mine safety. The 27-month project started in mid-July and involves collaboration with the University of Wisconsin, Madison, testing in Montana Tech's on-campus Underground Mine Education Center, and finally demonstration deployment in a real operating mine. Dr. Mary MacLaughlin (Geological Engineering) is the PI.
- Montana Tech has acquired and installed a four-wavelength Renishaw Raman spectrometer. The research capability will be used in metallurgy, materials science, geology, chemistry, geochemistry, and by the MBMG.
- Mary MacLaughlin was selected as the Council on Undergraduate Research (CUR) Geological Society of America (GSA) Undergraduate Research Mentor of the Year (2014). The award will be granted at the fall GSA meeting.
- Professor John Morrison (Electrical Engineering) received a grant of \$107,766 from the Ford Corporation for battery related research.
- Dr. Suzan Gazioglu, Professor of Statistics, served on the Organizing and Scientific Committees for the 9th International Statistics Days Symposium in Antalya-Turkey (2014).
- Dr. Suzan Gazioglu also presented a talk titled "Applicability of Sensitivity Analysis Methods to Compartmental Models with Steady-State Constraint" at the 9th International Statistics Days Symposium in Antalya-Turkey (May 2014), and chaired the Environmental Statistics session.
- Dr. Suzan Gazioglu authored a peer-reviewed article titled "Visualizing and Inspecting Sensitivities in Large Models Using Dot Charts and Star Plots, with Application to Compartmental Models" in the *Journal of Statistics: Advances in Theory and Applications*, March 2014, Vol. 11, No. 1, pages:1-30.
- Drs. Chris Gammons (Geol. Eng.) and Stephen Parker (Chemistry), along with graduate students Bill Henne and Tyler Johnston and two colleagues from MSU, just published a paper on the geochemistry and microbiology of Georgetown Lake, Montana: "Stable isotopes track biogeochemical processes under seasonal ice cover in a shallow, productive lake: Biogeochemistry (2014) v. 120, p. 359-379". Chris also presented a paper at the May, 2014 meeting of Rocky Mountain Section of Geological Society of America entitled: "Origin of the Black Butte stratiform Cu-Co-Ag massive sulfide deposit, central Montana: Preliminary Sr-isotope evidence".
- Dr. Larry Smith (Geol. Eng.) led a field trip and published an accompanying field trip guidebook paper at the May, 2014 meeting of Rocky Mountain Section of Geological Society of America entitled: "Sedimentary record of Glacial Lake Missoula along the Clark Fork River from deep to shallow positions in the former lakes: St. Regis to near Drummond, Montana". At the same meeting, Larry and graduate student Billy Rhyne presented a poster on "The Pennsylvanian Tensleep Formation – A possible proppant for hydraulic fracturing, Carbon County, Montana".
- Dr. Mary MacLaughlin (Geol. Eng.) was selected the winner of the 2014 "GeoCUR Undergraduate Research Mentoring Award". This is a national award given annually by the Geological Society of America. Mary just received a grant from NIOSH for \$314,000 entitled "Demonstration of the ability of distributed fiber optic sensing technologies to enhance mine safety through distributed monitoring of ground deformation, temperature, and dynamic events". In addition, Mary and colleagues Larry Smith (Geol. Eng.) and Debbie Smith (MBMG) were recently awarded an NSF instrumentation grant, also totaling \$314,000, entitled: MRI: Acquisition of a Shake Table for Research on Seismic Stability of Rock Masses".
- Keith Vertanen, Assistant Professor of Computer Science, co-authored a paper "The Inviscid Text Entry Rate and its Application as a Grand Goal for Mobile Text Entry" to be presented at the ACM International Conference on Human-Computer Interaction with Mobile Devices and Services (MobileHCI).

- Keith Vertanen will present two demo papers "Speech Dasher: A Demonstration of Text Input using Speech and Approximate Pointing" and "Phoneme-based Predictive Text Entry Interface" at the Text Entry Challenge of the International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS).
- John Getty (Geophysical Engineering) attended the ASTM D18 meeting in Toronto Canada in June. He is actively involved in the development of new ASTM standards on water well sampling, data management, particle size analysis and proppant test methods for hydraulic fracture stimulation operations in oil and gas wells.
- John Getty was named a Fellow of the International Centre for Diffraction Data. The award was presented during the plenary session of the Denver X-ray Conference held in Big Sky, Montana and reads in part, the "ICDD Fellow Award, recognizing individuals who have given their time and talents beyond that normally associated with membership."
- The Butte Historical Society has awarded the biennial Ray Calkins Memorial Research Fellowship to two Montana professors. Henrietta Shirk, Ph.D., Professional and Technical Communication Department, and Elaine Hunter, RN, Nursing Department, have been awarded \$1,500 to fund their research project titled "A Half-Century of Nursing Training in Butte, Montana, 1900-1950."
- Dr. Henrietta Shirk, Professional and Technical Communication Department, presented a paper titled "Collaborative Communication Using a Wiki" on July 11, 2014, at the Mountain Moodle Moot Conference, Carroll College, Helena.
- Montana Tech Electrical Engineering department head and professor, Dr. Dan Trudnowski, has had his paper entitled, PDCI Damping Control Analysis for the Western North American Power System, selected as one of four "Best of the Best" Conference Papers submitted to the 2013 Power & Energy Society (PES) General Meeting, on the basis of technical merit and presentation quality.

#### **STAFF AND PROGRAMS**

- The Institute for Educational Opportunities completed a busy summer. Highlights include;
  - Montana Tech hosted a one week residential GEAR UP (Gaining Early Awareness and Readiness for Undergraduate Programs) camp for 23 middle school students. Middle schools sending students were; Hardin, Libby, Eureka, Crow Agency, Lodge Grass, Troy, St. Ignatius, and Arlee. The goal of the camp was to inspire science research interests in these young students. The participants turned Butte into a historical and scientific playground, studying the restoration of the Clark Fork Water Basin under the leadership of Tech staff members Annette Kankelborg, Jeanne Larson, Bernie Phelps, Theresa Rader and Tech faculty; Dr. Arlene Alvarado and Dr. Amy Kuenzi, and a special guest Dr. Wease Bollman from Rhithron Associates out of Missoula.
  - The Institute sponsored a six week college preparation residential camp for 25 Upward Bound participants. Upward Bound students are selected based on high academic ability and low home income status from Anaconda, Butte, Helena and Capital High Schools. Students earned high school credit for their six weeks of academic work, which was instructed by campus faculty as well as Carlton Nelson, Math Teacher from Anaconda High School and Amanda Curtis, Math Teacher from Butte High School. The theme of the summer curriculum was Forensic Science and the camp cumulated with students traveling to Denver, Colorado to tour the Regional Forensic Lab and numerous college campuses along the way.
  - The Institute for Educational Opportunities partnered with Butte Silver Bow County to sponsor a Global Youth Service Day. Talent Search students from Butte, Anaconda, Deer Lodge and Helena assist the county in planting trees and grass on reclaimed soils.
  - Three weeks of Kids College was held on campus, with each day offering a different professional from the scientific community engaging local children ages 5 to 12 in hands-on inquiry activities. Each student was afforded a graduation ceremony for participating.
  - The Clark Fork Watershed Education Program hosted a Blacktail Creek Clean-up Day with 60 students from Whittier Elementary School in Butte. Students spent the morning cleaning a few mile stretch of the creek and the afternoon in educational stations discussing environmental stewardship, bull trout health, storm water run-off, and water quality.
  - The Student Success Services program placed a number of participants in summer undergraduate research opportunities. Pell-eligible students whose mother nor father graduated from college are the least likely to engage in or understand the value of research, so this federally funded program is designed to enhance the number of disadvantaged students who stay in the STEM pipeline. Program

participants were funded to be in laboratories for six to eight weeks of intensive, in-depth research experience with faculty.

- The Montana Natural Resource Damage program awarded Cfwep.Org \$842,068 for programming over the next 2 years. This programming reaches students and teachers within the Clark Fork Watershed. Cfwep.Org served over 4,000 students and 160 teachers in 2103-14.
- NorthWestern Energy has donated a bucket truck to the Lineman Program at Highlands College. The fully operable truck will help train those students who will become future Linemen.
- Montana Tech's new mining camp for high school students teaches about mining and mining engineering to help students determine if it's a career option they'd like to pursue. "We don't produce enough mining engineers to meet the needs of the industry, even with 13 (college) programs," said Paul Conrad, a professor of mining engineering at Tech. "This is an effort to get more students interested in mining engineering." Of the 13 mining engineering programs at colleges across the country, only Montana Tech's program has a real mine in which to train its engineers. This year is the first for the camp, and seven students — six male, one female — attended. They came from as far away as Arizona and British Columbia, and surprisingly, only one of the students is from Butte. The camp activities were diverse in subject matter. The first day the students toured the World Museum of Mining, took a tour of the Gem Mountain sapphire mine in Philipsburg and panned for sapphires, and wrapped up the day with a trolley tour of Butte. (*from the Montana Standard*)
- Over 1,200 high school students enrolled in CodeMontana, an online introduction to computer programming offered to Montana high school students, will now have the opportunity to turn their effort into college credit. To make this possible, CodeMontana has partnered with Montana Tech to allow juniors and seniors in high school the opportunity to apply for the 3-credit course for a \$148.74 tuition fee. The course will be offered in the fall and spring semesters at Montana Tech. The fall semester begins on August 25 and goes through December 17, 2014. The last day to register for the course will be September 8. Payment must be made at the time of registration.
- In June, the Alfred P. Sloan Foundation awarded another set of grants totaling \$2.4 million to increase representation of Indigenous Americans in STEM graduate study and the career paths requiring master's or doctoral degrees in STEM. Montana Tech, the University of Montana, and Montana State are three of the seven participating campuses. The new grants will support three cohorts of entering Sloan Indigenous Graduate Partnership (SIGP) students (fall 2014, 2015, and 2016) through degree completion. Of the 79 students to be supported, 28 are expected to attend Montana campuses. The Montana SIGP program was recognized in June with the Stan Israel Diversity Award from the Northwest Regional American Chemical Society.
- The Materials Science Ph.D. program expects to welcome its first cohort of ten students this August. Four are coming to Montana Tech, one to University of Montana, and five to Montana State. This enrollment is about 40% higher than was expected. Five very distinguished internationally recognized leaders in materials science and engineering have agreed to serve on the inaugural External Advisory Board for the program. They are Bruce Chase (Univ. Delaware & DuPont), Millicent Firestone (Los Alamos National Lab), Laura Greene (Univ. Illinois), Christiaan Pistorius (Carnegie Mellon), and Anil Virkar (Univ. Utah).
- A "Create Math" workshop for middle school girls was held at Montana Tech.

#### **MONTANA BUREAU OF MINES AND GEOLOGY ACTIVITY**

- MBMG Director of Earthquake Studies, Mike Stickney, was quoted in an April 15, 2014 article, *Hundreds of earthquakes strike central Idaho, rattling nerves* published by Reuters regarding an earthquake swarm in central Idaho near Challis, Idaho. At the time of publication there had been several hundred small to medium sized quakes that had culminated in a widely-felt event of magnitude 4.9. Stickney notes that Montana and Idaho are near the center of the intermountain-west seismic belt where earthquakes are common.
- MBMG hydrogeologist Tom Michalek spoke about the Ground Water Investigation Program's *Hydrogeologic Investigation of the Four Corners Study Area* to the 18<sup>th</sup> District Court's Spring Water Meeting in Bozeman, Montana.
- On April 10 and April 22, 2014 MBMG Hydrogeologist and licensed monitoring well constructor, James Rose, constructed shallow monitoring wells at the Grant-Kohrs Ranch National Historic Site for Dr. Glenn Shaw and Dr. Hugo Bertete-Aguirre of the Montana Tech Geological and Geophysical Engineering departments. Dr. Shaw used the wells for groundwater-level monitoring and water-quality

sampling; Dr. Bertete-Aguirre used core samples for geophysical method calibrations. Montana Tech graduate student Mike Shirley is also using data from the wells for his groundwater modeling thesis.

- The MBMG released its on-line “*Seismic Activity Mapper*” (<http://data.mbm.mtech.edu/mapper/mapper.asp>) that portrays historic earthquake activity within and near Montana on April 15, 2014. Mapper layers include historic quakes, seismic hazard zones, locations of Quaternary faults suspected of slipping in recent geologic time, surficial geology, and locations of historic large earthquakes. Internet users can easily zoom to locations of interest and learn about historic seismic activity near their homes and businesses.
- Ground Water Assessment Program manager, John LaFave, presented *Survey of nitrate in Montana groundwater* to the Nitrate in Montana Hydrologic Systems Conference in Helena, Montana, on April, 23, 2014.
- MBMG Ground Water Investigations Program manager Ginette Abdo and students Mike Shirley and Amber McGivern demonstrated groundwater/surface-water flow to people attending the Jefferson River Rally in Whitehall, Montana on April 24, 2014. The presenters used a Plexiglas groundwater flow model to illustrate how water moves through porous media under a variety of conditions.
- On April 25, 2014 MBMG released Information Pamphlet 8, *Water levels in the Upper West Bench alluvial aquifer, Red Lodge, Montana* by MBMG Hydrologist Camela Carstarphen, Research Division Chief Thomas Patton, and Ground Water Assessment Program Leader John LaFave. On May 15, 2014 MBMG released Open File Report 649, *Preliminary geologic map of the Dearborn River 30' x 60' quadrangle, west-central Montana* by MBMG geologist Susan Vuke. On June 24, 2014 MBMG released Report of Investigation 22, *Streamside characterization of Blacktail and Silver Bow Creeks: A continuous tracer injection investigation conducted during baseflow conditions in an urban area impacted by mining: Butte, Montana* by MBMG geoscientist, Nick Tucci. On June 26, 2014, MBMG released Information Pamphlet 9, *Tracking Montana's groundwater* by MBMG Ground Water Assessment Program leader John LaFave. Information Pamphlet 9 summarizes the intent and purpose of Montana's statewide, long-term, 900-well, groundwater monitoring network.
- On April 29, 2014, MBMG scientist Matt Berzel led a group of policy makers from India on a tour of the Berkeley Pit in Butte, Montana. The visitors were on a U.S. Department of State sponsored tour under its International Visitor Leadership Program.
- A group of students from the Deerfield Hutterite Colony's Deerfield School near Lewistown, Montana, toured the Berkeley Pit and other mining-related sites in Butte, Montana on May 21, 2014. MBMG Professional Scientist Matt Berzel led the Berkeley pit segment.
- MBMG scientist Andrew Bobst presented a preliminary report on the *Boulder River and Upper Jefferson Groundwater Investigations* at a meeting of the Missouri Headwaters Partnership in Whitehall, Montana on May 6, 2014.
- Mike Stickney, Director of Earthquake Studies, presented a short talk on *Montana Seismicity* to the Yellowstone Volcano Observatory advisory committee meeting on May 8, 2014 in Mammoth, Wyoming.
- MBMG geoscientist, Nick Tucci, demonstrated water-quality issues at the Parrot Tailings area in Butte, Montana, to a Montana Department of Justice, Upper Clark Fork River Advisory Council tour on May 21, 2014.
- The MBMG was well represented at the joint Rocky Mountain/Cordilleran Section meeting of the Geological Society of America in Bozeman, Montana May 19-21, 2014. The MBMG staff presented six papers from the Ground Water Investigations Program, one paper from the Ground Water Assessment Program, and eight papers from the Geologic Mapping Program. Mike Stickney, Director of Earthquake Studies, co-led a field trip on the neotectonics and geomorphic evolution of the Madison Range and Hebgen Lake area.
- Dr. John Metesh, MBMG Director and State Geologist, attended the Western States Seismic Policy Council (WSSPC) annual meeting held May 19-23, 2014 in Sacramento, California. The WSSPC develops seismic policies and shares information to promote programs intended to reduce earthquake-related losses.
- MBMG scientists James Rose and Kirk Waren presented a project update to the Big Sky Water and Sewer District board of Directors on May 27, 2014. During the presentation, Montana Tech graduate student Connie Thomson presented introductory information about her plans for stable isotope analyses of surface- and groundwater in the West Fork Gallatin River watershed. Ms. Thomson will use the isotope data gathered as part of the Investigations Program project for her Master's program thesis.

- MBMG Director and State Geologist Dr. John Metesh is chairing, and Senior Research Scientist Kirk Waren is participating in a Technical Working Group established by the Montana Legislature's Water Policy Interim Committee. The group includes representatives from the Montana Departments of Natural Resources and Conservation and Fish, Wildlife, and Parks. The group is reviewing hydrologic data and models that provide the basis for defining water-rights within the proposed Confederated Salish Kootenai Tribes Compact. The Technical Working Group has met nine times since May 2014, and expects to report its findings to the Water Policy Interim Committee in September 2014.
- On June 3, 2014 Montana Tech graduate student Martin Lorenzo defended his thesis, *Effects of sedimentation and sediment pore water chemistry on water quality in a small beaver pond*. The work was sponsored by MBMG's ongoing research in the Mill Creek drainage to evaluate water-quality issues related to atmospheric deposition from the historic Anaconda Smelter.
- Dr. Gary Icopini, MBMG geochemist, presented *Differentiating Anthropogenic and Geologic Sources of Arsenic Near Anaconda, Montana* to the Goldschmidt 2014 conference held June 8-13, 2014 in Sacramento, California.
- MBMG Director Dr. John Metesh served as the American Association of State Geologists' representative to the U.S. Geological Survey's national review panel for the National Geologic and Geophysical Data Preservation Program. The panel met June 16-20, 2014.
- On June 23, 2014, the US Geological Survey's National Geologic and Geophysical Data Preservation Program notified the MBMG that it had awarded the agency a grant to inventory, organize, and transfer geologic and mineral resource data for the *New World Mine* to its Mining Archives. The *New World Mine* was planned for development in the 1990's at a location only four miles from the border of Yellowstone National Park but the federal government intervened to prevent development by purchasing the land and mineral rights. The US Forest Service has held the data since the 1990s and will transfer the collection to the MBMG.