



## From the Department Chair...

The department has made rapid progress toward our 5-year goals in 2011 and it is my pleasure to introduce this newsletter and share some of the exciting news and stories.

One of the main goals in our plan was to double the amount of outside research grant dollars per full time faculty. Our team of junior and senior faculty responded with major increases in research productivity and we are already nearly 75 percent of the way to our goal. Additionally, we are also moving forward on the other metrics we defined, and anticipate together these will significantly enhance our reputation as a department.

Through a university initiative focused on attracting brilliant young faculty we have hired Dr. Masako Tominaga from Woods Hole. She will be starting as an assistant professor of oceanography in August and we have included a profile of her on page 4. We are also actively recruiting two other early career faculty with strong established records and hope to have them join the department next year.

The department received several major gifts from alumni of the university this year. These gifts are creating endowed funds that will make an incredible difference to the future success of our program. The endowed funds will remain in perpetuity and the interest will allow us to recruit the best faculty and graduate students. Among the endowments established are three new professorships and several graduate fellowships. A gift has also completed funding to establish the Vogel Endowed Chair on Solid Earth.

Like many programs at Michigan State, we are hopeful that we have moved beyond



*MSU geology students measure structural bedding and take field notes on deformed Precambrian quartzite exposed along the shoreline of Lake Superior during a weekend field trip last fall.*

the drastic budget cuts we endured over the last decade. The department has become lean and efficient, yet together with our increased research productivity, philanthropic support from alumni and a tough work ethic from our faculty and staff, we have started on an upward trajectory of strengthening of the department.

We are all excited for the many new faces we will be seeing among the department faculty in the coming years, and I encourage all alumni to help welcome each of them into the MSU family as our program grows. I also invite all alumni to consider helping us grow our funds to provide fellowships, scholarships and research support. Every gift makes a difference and I sincerely hope our alumni will join us as we partner to grow the department.

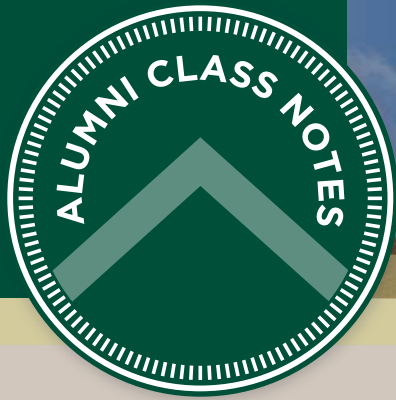
Finally, we encourage alumni to join us at any of the upcoming field trips and events we have planned. The first is a 7-night cruise around Iceland on July 20-28. The MSU Alumni Association is organizing the event and has invited me to serve as

a host. The second is an alumni field trip to the Keweenaw Peninsula in August. Professor Emeritus Bill Cambray will lead the weekend event, and I encourage you to register soon as the first bus is filled and we are determining if there is enough interest to add a second bus. We also have an alumni reception at the annual Geological Science of America Meeting. This year the conference is in Charlotte, North Carolina, during the first full week of November, and we invite all alumni at the conference or in the area to join us.

I hope you enjoy our annual newsletter and extend an open invitation to stop by the department offices when you are in the East Lansing area. 📍



David Hyndman, Ph.D.  
Chair,  
Department of  
Geological Sciences



Bill Small, B.S. '61, has continued to develop a campground in central Virginia and now has 200 sites, 6 rentals and a 25-acre lake.

Jim LeAnderson, B.S. '67, M.A.T. '69, has moved to Maple City, Michigan, where he is involved in a study of the geology of the Good Harbor Bay watershed. He had spent 19 of the past 23 years overseas employed in geology and teaching.

Mike Mottl, B.S. '70, a professor of oceanography at the University of Hawaii, recently served as Co-Chief Scientist on Expedition 331 of the Integrated Ocean Drilling Program onboard the Japanese drillship Chikyu, which drilled five sites in an active hydrothermal system on the floor of the Okinawa Trough. This was his ninth drilling leg on four different vessels. Mike is also a principal investigator in the University of Hawaii's NASA-funded Astrobiology Institute.

Nancy Hepworth, B.S. '77, was appointed the Child Safety Officer for ABWE, an international faith-based agency with headquarters in Harrisburg, PA.

Michael Schock, M.S. '78, recently received the American Water Works Association's A.P. Black Award - the most prestigious research award given to recognize outstanding research contributions to water science and water supply. Schock has been a leader at the EPA and in the drinking water community at-large on corrosion issues for many years.

Mark Petrie, B.S. '79, M.S. '84, is a geologist with the Michigan Department of Natural Resources and inching closer to retirement.

Tom Taylor, M.S. '79, Ph.D. '82, retired from Shell as Senior Research Geologist in December, 2011.

S. Frank Rabbio, B.S. '85, M.S. '88, is currently Exploration Manager for Catamount Exploration in Denver where he explores for oil and gas primarily in the deepwater Gulf of Mexico.

Ron Hill, B.S. '86, joined Noble Energy in September, 2011, as the Senior Geochemistry Advisor.

Joseph Allen, B.S. '88, is a professor of geology and chairman of the Division of Natural Sciences at Concord University where he founded the undergraduate geology degree program in 2004.

Astrid Makowitz, B.S. '97, M.S. '99, recently joined an oil and gas start-up named Tracker Resource Development as a project geologist.

Stephen Kaczmarek, B.S. '00, Ph.D. '05, is an assistant professor in the Department of Geological Sciences at Bridgewater State University.

Troy Scalfani, B.S. '01, received his professional geologist license in Illinois. He is currently a project manager, senior geologist and supervisor at ARCADIS, managing environmental investigation and remediation projects for federal, automotive and petroleum clients.

Jennifer Wade, M.S. '02, is a Program Director in the Earth Sciences Division at the National Science Foundation.

Missy (McLean) Leone, M.S. '09, is currently a geologist at Otto Rosenau and Associates, Inc. in Seattle.

Troy Stevens, B.S. '09, recently accepted a position with ARCADIS-US in Novi as a geologist working on the BP portfolio. Prior to that he was a field geologist at the Hanford Nuclear Reservation.

Brett Tomlinson, B.S. '10, joined Baker Hughes in Surface Logging (Mudlogging) and moved to Houston. 📍

*Help us share your career news, awards, promotions and accomplishments with students and alumni — [ns.msu.edu/StayConnected](http://ns.msu.edu/StayConnected)*

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Send correspondence to CNS Advancement, 103 Natural Science Bldg., East Lansing, MI 48824. Phone (517) 432-4561. E-mail: [natsci4u@msu.edu](mailto:natsci4u@msu.edu).

Contributing writers: David Hyndman & Mike Steger. Photos: Brian Hampton, William C. Koeppen, Tyrone Rooney, Michael Steger and MSU University Relations.

## Brandt Elected to SEPM

Danita Brandt, associate professor of invertebrate paleontology, has been elected by members of the Society for Sedimentary Geology (SEPM) to serve on its 2011-2012 council. SEPM is an international organization dedicated to the dissemination of scientific information on sedimentology, stratigraphy, paleontology, environmental sciences, marine geology, hydrogeology, and many additional related specialties. 📍

## Student Recognized for Understanding How People Learn from Visualizations

The Geological Society of America recognized MSU doctoral student Sheldon Turner with an Outstanding Mention Award for his research in understanding how to best communicate complex science issues through images and visualizations.

Turner's research covers a broad area of disciplines as it is a mixture of geology, environmental science, cognitive science, social science and policy. He conducts his research as part of Associate Professor Julie Libarkin's Geocognition Research Lab.

As part of Turner's research, he examines how non-scientists work through environmental scenarios where they must make a decision on a problem. Participants get the same information provided to them in different types of formats including plain text, maps, diagrams and charts. Participants make a decision and explain it using an interactive system of electronic white boards, eyetracking software and voice analysis so Turner can understand how they work through the problem and the effectiveness of the visualizations.

Turner is nearing completion of his PhD. Originally from Rockford, Illinois, he received a B.S. in Geology from Beloit College before entering MSU's graduate program in 2008. 📍

## Alumni Field Trip in the Keweenaw August 24 - 26, 2012

Dust off your hiking boots and join Professor Emeritus Bill Cambray as he leads a weekend field trip in the Keweenaw Peninsula. Alumni and faculty will meet in Houghton and a bus will provide transportation to the field sites. Space is limited. Contact CNS Alumni Coordinator Elizabeth Wheeler for details at (517) 884-0290 or visit [ns.msu.edu](http://ns.msu.edu) for registration information. 📍

## Harold "Stoney" Stonehouse 1922 -2011

Professor Emeritus Harold Bertram "Stoney" Stonehouse died December 2, 2011, at his home in Yucaipa, California. He was 89.

Stoney taught Mineralogy as well as other geology courses and served as field trip director for the Department of Geological Sciences for many years. He was the departmental advisor for undergraduate majors and Earth Science teachers before retiring in 1989.

Originally from Walton-on-the-Hill, a small village near Stafford, England, Stoney received his Ph.D. in Geochemistry, Economic Geology, and Mineralogy from the University of Toronto in 1952. He worked for American Smelting and Refining in New Jersey, and then the Illinois Geological Survey before coming to Michigan State University (MSU) in September, 1955.

Following his Fulbright Fellowship in Earth Science Education (K-16) in 1973, Stoney served on various state education committees to improve the teaching and learning of science in Michigan. He was named the Outstanding Education Specialist in Michigan in 1981.

Shortly after the founding of the Michigan Earth Science Teachers Association (MESTA) in 1967, Stoney started the long-standing association between MESTA and MSU; he served

on its board and as journal editor, and worked tirelessly to promote the excellent teaching of Earth Science. He was a MESTA Honorary Life Member and the Stoney Award, a mini-grant program to support innovative K-12 classroom ideas, was established in his honor.

In 1983, Stoney helped transfer the MESTA experience to the national level as he helped establish the National Earth Science Teachers Association (NESTA). He served as the Executive Advisor to NESTA from 1983 until 1991. He was named a Fellow of the association in 1994 and NESTA's Jan and Stoney Award for Significant Achievement is named in his honor.

Stoney was actively involved in the Michigan Science Olympiad and National Science Olympiad. He served on the national board from 1984 to 2002. He coordinated the first two National Science Olympiad tournaments at Michigan State University and three of the Michigan Science Olympiad Tournaments.

He is survived by his wife, Janet Woerner, four children and two grandchildren. Memorial contributions may be made in Stoney's name to the National Earth Science Teachers Association, the Michigan Earth Science Teachers Association, the National Science Olympiad, or the Michigan Science Olympiad. 📍

# Oceanographer to Join Geology Faculty in Fall 2012

**M**asako Tominaga has spent more than a year of her life on the ocean conducting research. More specifically, she has logged 450 days – and counting – on eleven different research expeditions since 2002.

Tominaga is a marine geophysicist currently finishing her postdoctoral research at Woods Hole Oceanographic Institution - the largest private non-profit oceanographic institution in the world. She will be moving inland this summer to join the faculty of MSU's Department of Geological Sciences as an assistant professor.

"Joining the faculty at Michigan State allows me to expand my expertise and skills to inland water, specifically

build her leadership skills in both science and education while engaging in public service. She began her marine science career as a graduate student on an expedition in 2002 to the Jurassic Quiet Zone in the Pacific Ocean. The zone is a region of low amplitude, difficult-to-correlate magnetic anomalies located over the oldest ocean crust. Her research utilized underwater vehicles and seafloor drilling to investigate magmatic and volcanic processes and large scale tectonics.

Since her initial expedition, she has been involved in five Integrated Ocean Drilling Program expeditions. Currently she is the chief scientist on the 2011 Jurassic Ocean Crust Magnetic Survey which is measuring the magnetism, bathymetry,

University where she received an M.S. and Ph.D. in Geological Oceanography. She is an expert in applied geophysics and engineering development, including seismics, potential field data analyses, high-resolution bathymetry and chirp sonar data analyses, numerical modeling, and physical properties of the Earth.

Tominaga's research interests cover a wide area of geodynamic processes of the Earth, including magmatism, volcanism, and lithosphere evolution. Her research also covers CO<sub>2</sub> sequestration, plate tectonics, geomagnetic field of the Earth, and the Jurassic-Early Cretaceous Geological Time Scale.

"Having Tominaga at MSU opens up new areas of research regarding the Great Lakes," says David Hyndman, chair of the Department of Geological Sciences. "Her experience in the analysis of reservoirs and modern seismic methods makes her a strong addition as both an educator and a researcher."

Another project she is involved with is building MAPLES - a Multiscale magnetic and Physical properties Lab for Earth Science. "MAPLES encompasses a full spectrum of geophysical collaborative research with scientists across MSU and around the globe," says Tominaga. "We will conduct cutting-edge research on Earth's geodynamics and environmental problems while training both undergraduate and graduate students."

Tominaga is a rising star among early career geologists. She has been Principal Investigator and Co-PI on NSF research grants that are dedicated to field programs with utilizing University-National Oceanographic Laboratory System ships and National Deep Submergence Facility underwater vehicles as well as Scripps Institution of Oceanography seismic system. She has published 13 peer reviewed papers and received several awards, including an American Geophysical Union Editor's Highlight for the paper "Origin of the smooth zone in early Cretaceous North Atlantic magnetic anomalies." 🌱



*Masako Tominaga is currently the chief scientist on the Jurassic Ocean Crust Magnetic Survey and will begin her teaching and research at MSU in August. Photo by William C. Koeppen.*

the Great Lakes," Tominaga says. "My research will complement the hydrogeological and environmental research in the department. The collaborations with top researchers across the university on fresh water resource studies attracted my interests and I am excited about the opportunities for establishing geophysical contributions to both local and global societal issues."

Tominaga says that being a professor at a public university will allow her to

gravity, and structure of the Jurassic seafloor to investigate the history and nature of the Earth's magnetic field. Scientific outcomes from this cruise will advance our knowledge on how Earth's magnetic field has operated, how Cretaceous supervolcanism interfered with Jurassic basement, and the extension of Jurassic geological time scale.

Tominaga received a B.S. in Petroleum Engineering from Waseda University in Tokyo Japan. She attended Texas A&M

# Building Water Flow Models to Help the Environment and Michigan's Jordan River Watershed

For alumnus Anthony Kendall, what started out as a career leaning toward physics and mechanical engineering has evolved into several years of environmental research spanning everything from water resources in the High Plains to Brook trout in Northern Michigan's Jordan River.

As an undergraduate honors student, Kendall majored in mechanical engineering and astrophysics. He became involved in geology as a Professorial Assistant for David Hyndman. The Kalamazoo native was quickly immersed in the research in the hydrogeology lab and was soon hooked.

"I found myself doing a lot of the same things in geology that I was doing in astrophysics and engineering," says Kendall. "It is all fundamental physical behavior, application and analysis."

In the twelve years Kendall and Hyndman have worked together, Kendall has seen the research grow as the team works on several different grants. In addition to the High Plains aquifer research started in 2010, the group is also working on grants from NASA, NOAA and the EPA.

The group recently completed a 5-year study of Northern Michigan's Jordan River Watershed to determine why the river was choked with sand and how this was affecting the Brook trout and other species. Kendall presented their findings in November during a public presentation to the Friends of the Jordan River Watershed.

The research found three primary factors influenced the sand load in the Jordan River. The findings showed that when the water level of the Great Lakes goes down, more sand flows into the harbor. An unmanaged beaver population in the state forest also plays a role as fallen trees disrupt the sand movement down river. Another factor is persisting long-term effects of logging in the region.



*Anthony Kendall (Ph.D. Environmental Geosciences '09) presented the findings of the sedimentation study to the Friends of the Jordan Watershed in November. A 4-part video series of his presentation can be viewed at <http://www.friendsofthejordan.org>.*

"The region continues to feel the echoes of logging done by past generations," says Kendall. "The logging disturbed the armored bed in the river, which simply takes a long time to heal."

Some of the methods used in the Jordan River research are also being applied in a NASA grant involving the hydrogeology lab as well as researchers at the University of Michigan and Michigan Tech. Together, they are examining how watersheds influence coastal wetlands in the Lower Peninsula. The research shows how nitrogen and phosphorus help spread invasive species. The findings will provide a model of how the nutrients move across the landscape.

As part of the 4-year grant, Kendall and postdoctoral researcher Sherry Martin have been leading a group of students across Michigan to sample stream flow, collect samples and install monitors.

"We are sampling more than 80% of the water flowing out of the Lower Peninsula as well as parts of Northern Ohio and Indiana," says Kendall.

The team of post-docs and students conducted synoptic sampling - collecting data from many sites over a short period of time - on three different occasions last year. They spent nine days in the field during a base flow period in the fall, during the snow melt period in Spring and during the early growing season in the Summer.

Along with MSU collaborators in geography and zoology, they are working to develop a complete model of water flow to help determine policy and decisions to control the nutrient levels. Kendall finds the work exciting, yet is even more excited by the trajectory of growth seen in the hydrogeology lab and the department.

"The research continues to build and each semester we have more capacity for students. The lab has grown and we are continuing to recruit more people to help with this important research" says Kendall. 🌱

# Field Research in the Alaska Range

Assistant Professor Brian Hampton was awarded a grant from the National Science Foundation to examine the origin and tectonic history of the Farewell terrane in Alaska. As part of the grant, Hampton is training geology seniors Cody MacDonald and Kraig Koroleski in field and laboratory research. The two undergraduate students traveled with Hampton to Alaska last summer where they helped conduct research in the remote backcountry.

The research project “Tracking the Siberian-Laurentian Detrital Transition in the Farewell Terrane, Southwestern Alaska” is conducting one of the first detailed field studies on sedimentary basin deposits that make up the middle and upper Paleozoic parts of the Farewell terrane. The origin and tectonic history of many of the crustal fragments that make up the deepest parts of the Cordillera in the Alaska Range are largely unknown.

The project is contributing to a better understanding on the tectonic history of crustal blocks that make up the basement to the northernmost extent of the North American Cordillera in southwest Alaska. Hampton’s research will also contribute to an ever-expanding U-Pb detrital zircon database that is emerging from Alaska as well as the western parts of the continental US, Canada, and eastern Siberia.

Hampton launched a blog to share stories, photographs and videos of their Alaska field research: [msugeology.tumblr.com](http://msugeology.tumblr.com). In addition to the tales of adventure and scenic photographs, Hampton



*Geology seniors Cody MacDonald and Kraig Koroleski joined Hampton in the Alaska Range as part of the NSF grant to train scientists on field research techniques.*

continues to share MSU geology stories on the blog, including images from the student field trip to the Marquette area in the fall.

Hampton joined MSU in 2007. His research focuses on the tectonic evolution of mountain belts as preserved in sedimentary basins with a specific focus on the North American Cordillera and the tectonics of southern Alaska. His Basin Research Lab has conducted research in the central Andes of Bolivia and Argentina and also has active projects in the Michigan basin and the North American Midcontinent. 📍

## Climate Literacy Research Presented on Capitol Hill



Associate Professor Julie Libarkin (2nd from left) was invited to participate in the Coalition for National Science Funding’s annual exhibition on Capitol Hill. Libarkin was joined by geology doctoral students Sheldon Turner (2nd from right) and Robert Drost (right) as well as MSU mathematics Professor Keith Promislow (left). The three geologists and mathematician were invited to Washington in May where they presented their research on climate literacy to lawmakers.



*The view from Associate Professor Brian Hampton’s tent is a popular image on the blog and has been shared, reblogged and liked more than 500 times.*

## From the East African Rift to Mars and Venus



*Children in Ethiopia greeted Tyrone Rooney as he arrived in their village to conduct research of the East African Rift. Photo by Tyrone Rooney.*

Assistant Professor Tyrone Rooney is leading a research project examining a portion of the East African Rift to better understand the interaction between mechanical extension and magmatic intrusion in the initial stages of strain migration.

Rooney is examining how the manifestation of extension transitions from stretching and thinning of the lithosphere to dilating by intrusion of new magma. The research is funded by a grant from the National Aeronautics and Space Administration and will provide insight into the tectonic evolution of planetary lithospheres, including those on Mars and Venus.

Rooney is using detailed geochronological, geochemical, and remote sensing study of dike-associated small-volume eruptions within the archetypical modern example of continental rifting in East Africa.

“By clarifying when and where dike-related volcanism occurs during the process of rift formation and evolution in the East African Rift we can enhance our understanding of the processes associated with the evolution of rift structures not only here on earth, but on other planetary bodies that display

similar magmatic-tectonic features,” says Rooney.

The research has focused specifically on the Pliocene-Quaternary Galema and Akaki dike/cinder cone chains in Ethiopia. The linear dike swarms represented by these chains are distinct from the individual volcanic edifices focused on in previous studies examining rift flank volcanism.

“Our goal is to identify the interaction between volcanism and tectonism during this key stage of rift evolution,” says Rooney. “We aim to determine when volcanism occurred relative to faulting and to see if the focus of magmatism varies in an observable way within the rift.”

The researchers are mid-way through the first year of the project and hope to improve the understanding of planetary geological and geophysical processes that can lead to significant changes in planetary surfaces and interiors on the bodies of the solar system. Rooney is being assisted on this project by three undergraduate students currently involved with research in his lab and a new graduate student will join the team this summer. 📖

## Harley Hotchkiss 1927 - 2011

Harley Hotchkiss (B.S. Geology '51) died on June 22, 2011. He was a prominent community and business leader in Calgary, Alberta.

Hotchkiss began his career as a geologist at Canadian Superior Energy and then the Canadian Imperial Bank of Commerce in the Petroleum and Natural Gas Department. In 1959 he became president of Alcon Petroleum and then started his own company Sabre Petroleum in the 1960's.

Hotchkiss was one of the original owners that brought the NHL's Atlanta Flames to Calgary in 1980, and remained a team owner until shortly before his death. He served as chairman of the board of the NHL between 1995 and 2007, and was inducted into the Hockey Hall of Fame in 2006.

Hotchkiss' philanthropy and involvement will continue to have tremendous impact. He was a driving force behind health-related initiatives and the Hotchkiss Brain Institute is named in recognition of his contributions. He helped fund construction of MSU's Biomedical and Physical Sciences Building and provided financial support to the Department of Geological Sciences.

His awards were numerous, including being named a Companion of the Order of Canada — Canada's highest civilian honor — and the Alberta Order of Excellence. He was a recipient of the CNS Outstanding Alumni Award and member of MSU's Kedzie Society. He is survived by his wife of almost 60 years Rebecca, and his children, grandchildren and great grandchildren. 📖



College of Natural Science  
103 Natural Science Building  
East Lansing, MI 48824-1115

## \$7 Million Gift Establishes Endowed Professorships, Fellows and Chair

A \$7 million gift will help expand the Department of Geological Sciences as it primarily funds new professorships and graduate research fellowships.

The gift, from an MSU graduate who wishes to remain anonymous, will help build a program focused on excellence and leadership and was specifically to the Department of Geological Sciences in the College of Natural Science.

The search for three early career faculty members for the new endowed professorships will start soon.

Along with the \$3 million used to endow the three professorships, another \$3 million will establish endowed graduate fellowships. The fellowship fund receives the additional \$1 million match thereby establishing a \$4 million endowed fund to support numerous graduate students.

The gift leverages a scholarship matching fund provided by a previous anonymous donor to MSU. The endowed graduate fellowship support will help the department in attracting the best and brightest graduate students.

“Endowed professorships and endowed graduate fellowships are critical building blocks for excellence in every academic area,” MSU President Lou Anna K. Simon said. “Comprehending the forces that shape our world, specifically water and energy resources, requires research leaders who also can carry that knowledge into the classroom. This gift enables us to attract rising stars in geological sciences who can make an immediate impact on our research and education.”

“Graduate fellowships are a cornerstone of strong research programs and this funding allows us to recruit the most

capable,” said R. James Kirkpatrick, dean of the College of Natural Science. “Together, these professorships and fellowships will significantly enhance MSU’s Department of Geological Sciences.”

Another portion of the gift completes funding for the Thomas Vogel Endowed Chair in Solid Earth. The chair was established in 2006 in honor of the retirement of longtime geology professor Thomas Vogel. Endowed chairs are the highest honor awarded to faculty and the Vogel Chair is the first endowed chair in the department.

For information on giving opportunities and how you can support the department, contact Suzette Hittner in the CNS Advancement Office at (517) 353-9855. 