

CIVIL ENGINEERING

Engineers Without Borders at MSU one of four finalists for \$20,000 national award

May 13, 2011 -- MSU News Service

The student-led chapter of Engineers Without Borders at Montana State University has won regional recognition for its work in bringing clean water to Kenyan schools and is now one of four finalists nationally vying for a \$20,000 prize.

The Association of Public and Land-grant Universities, APLU, recently announced that EWB at MSU won one of four W.K. Kellogg Outreach Scholarship Awards. It will now compete against community outreach programs at Michigan State University, Pennsylvania State University and the University of Tennessee Knoxville for the C. Peter Magrath University/Community Engagement Award. The Magrath award carries at \$20,000 prize.

EWB at MSU will be presented with the Kellogg award the 12th Annual National Outreach Scholarship Conference, Oct. 24, at the Kellogg Center in East Lansing, Mich. The Kellogg award comes with a \$5,000 prize to be used for the group's efforts.

Established in 2006, the Outreach Scholarship and Magrath University Community Engagement Awards recognize four-year public universities that have redesigned their learning, discovery and engagement functions to become more closely and productively involved with their communities.

Since 2004, EWB at MSU has brought seven clean drinking water wells to schools in western Kenya, helping more than 3,500 students and teachers. The group has raised more than \$375,000 in donations and maintains more than 60 students from across the university as members.

EWB at MSU is committed to bringing clean drinking water to 58 schools in western Kenya, a project that could take decades. Its success depends so heavily on a healthy collaboration with the Kenyan people that students involved frequently describe it as "a social project with an engineering component."

"These students work incredibly hard," said Otto Stein, EWB at MSU's faculty adviser. "Their dedication to this project is awe-inspiring. They are putting in thousands of volunteer hours to improve the lives of the people in Kenya."

EWB at MSU was also one of 15 MSU projects that helped the university earn the Carnegie Foundation's community engagement classification in January. The classification brings national recognition to MSU's commitment to teaching that encourages volunteer service in communities and the spreading of knowledge that benefits the public.

MSU currently enjoys two Carnegie classifications. It is one of only 311 universities with the community engagement classification and is one of only 108 universities with a "very high level of research activity" out of roughly 4,400 colleges and universities nationally.

The winner of the \$20,000 Magrath Award will be announced during the APLU Annual Meeting, Nov. 13-15, at the San Francisco Marriott in San Francisco. EWB at MSU will be competing against Michigan State's 10-year effort to help epilepsy patients in Zambia; the redevelopment projects of Penn State architecture students in Pittsburgh and the efforts of faculty and students at the University of Tennessee to help a Burmendi immigrant community adapt to Knoxville.

The winner of the Magrath Award will be able to use the funds to advance their program.



Dear Alumni and Friends,



Hello from MSU. Reflecting back over the past several years, it seems the news has been dominated by tough times and tough decisions. I would like to change the tone a bit with this newsletter. It is filled with stories about the extraordinary things the students and faculty of the Civil Engineering Department are accomplishing in spite of the seemingly bleak world outlook.

Earlier this summer, I was notified that the Civil Engineering Program at Montana State University has been selected by the Educational Activities Committee of the American Society of Civil Engineers (ASCE) to receive an honorable mention for the 2011 Walter LeFevre Award in the large program category. In selecting our program for the award, the committee particularly noted our program's exemplary promotion of licensure, ethics, and professionalism in engineering education in a large program. The Walter LeFevre Award is named for E. Walter LeFevre, Ph.D., P.E., Dist.M.ASCE who endowed this honor to recognize actions in promoting licensure, ethics, and professionalism.

I am so proud to be a part of a Civil Engineering Program that is receiving this level of national recognition. The faculty, staff and students that comprise the MSU Civil Engineering Program are second to none. In August, I began my 10th year as the Civil Engineering Department Head. I have been asked how I have managed to stay in this position for this period of time. The answer is simple, The Civil Engineering Department is home to the best faculty, staff and students on campus and now I am claiming the nation too! To the faculty, staff and students of the MSU Civil Engineering Department, a sincere thanks for all you do. To the faculty, staff and students of the MSU Civil Engineering Program: CONGRATULATIONS, VERY WELL DONE!

In this newsletter, you'll find other examples of the tremendous accomplishments of the department's students and faculty. You'll read about the national recognition that our Engineers Without Borders student chapter is receiving, the significant work that Katey Plymesser is doing to improve fish ladders, the amazing Subzero Science and Engineering Laboratory and about Avalanche Ed.

The support that the department receives from alumni and friends is essential to the success of our students, faculty and programs. Thank you for all you do to support us.

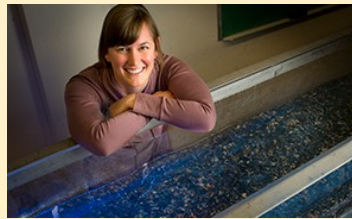
Brett Gunnink, PhD, PE
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MSU student fellowship may improve fish ladders

June 21, 2011— Melynda Harrison, MSU News Service



Montana State University student Katey Plymesser stands next to a hydraulic flume used as a teaching tool and to calibrate simple computer models. Plymesser was awarded a fellowship to study how fish navigate certain fishways, or fish ladders. (Photo by Kelly Gorham)

A Montana State University graduate student has won a \$94,000 fellowship for research that may improve fishways, or fish ladders, that help fish such as salmon and shad navigate dams and other obstacles to reach their spawning grounds.

Katey Plymesser, a doctoral candidate in civil engineering, was one of only 14 students nationally chosen as a Hydro Research Foundation fellow. The foundation's \$94,000 award will fund two years of research for Plymesser.

It's a pretty impressive thing to get one of these," said Joel Cahoon, professor of civil engineering and Plymesser's adviser. "The monetary award is greater than a lot of the well-known scholarships and there are fewer of them given out."

Plymesser's approach to studying Steeppass fishways, a type of fishway designed for use in smaller streams and remote locations, is unique in that she is taking a more detailed look at the hydraulics than studies have in the past. According to Plymesser, many of the previous studies on these fishways only analyzed the velocities in the downstream direction, or the direction of water flow. In reality, there are swirls and eddies in these fishways that result in water moving in many directions. Plymesser will characterize the velocities in three dimensions rather than just one.

Plymesser's work focuses on American shad, a species of herring native to the Atlantic Ocean that spawns in freshwater rivers. They usually grow to about 20 inches, but can be up to 30 inches and weigh up to 12 pounds.

It is easier to collect meaningful data on one species than on several, said Plymesser, so she is focusing on shad. However, she hopes the techniques she uses for analysis will be applicable to the design of fishways for other species.

Plymesser feels that being in a small program has been beneficial to her. Since she is Cahoon's only advisee, she gets to work one-on-one with him. And, she found unique funding options such as the Hydro Research Foundation fellowship and as a Student Career Experience Program intern with the U.S. Fish and Wildlife Service in Hadley, Mass.

"I have made a lot of contacts that will continue to benefit me," Plymesser said. "That wouldn't happen if I walked into a fully funded program."

The Hydro Research Foundation fellowships are made possible by a \$3 million, four-year grant from the Wind and Waterpower Technologies Program of U.S. Department of Energy. The 2011 class represent eleven universities from ten states.

Read the full article from MSU News Service:

<http://www.montana.edu/cpa/news/nwview.php?article=9945>



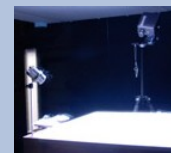
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Popular Science: MSU has one of nation's most amazing college labs

August 18, 2010 -- By Evelyn Boswell, MSU News Service



For the second time in three years, MSU's SubZero Science and Engineering Research Facility is included in a Popular Science feature. In its latest appearance, the lab that allows students and researchers from all over the world and across disciplines to conduct research in extreme cold is described as one of 15 "mind-blowing college labs" in the country. Popular Science said the featured universities -- listed under a heading of "coolest schools" -- offer "amazing, hands-on programs that are almost too fun for credit."

Popular Science noted that MSU's lab allows students to look for life in 250,000-year-old ice cores and prepares them for a career as avalanche forecasters.

MSU's SubZero Science and Engineering Research Facility first appeared in Popular Science in September 2008. MSU, at that time, was one of 10 universities listed under the heading of "Smartest Schools." Readers learned that temperatures in MSU's lab can reach minus 80 F. Those who used the lab studied ancient ice cores from underneath the Antarctic, the best way to keep ice off roads, and the flow of snow to better predict avalanches.

John Priscu, long-time Antarctic researcher and Land Resources/Environmental Sciences professor, co-directs MSU's cold lab with avalanche expert Ed Adams. The studies he conducts involve the oldest ice on the planet and ice from polar ice sheets, which tells us about past climate conditions and potential life in and beneath the ice sheets.

Priscu's National Science Foundation- and NASA-funded programs are currently studying ice cores from West Antarctica that span the last glacial maximum to reveal the microbial record as the Earth went from an ice age to its current interglacial period, Priscu said. They are also examining ice, water and sediments collected in arctic lakes beneath a large ice stream in West Antarctic and in the Arctic in search of novel microorganisms with novel metabolisms, which may provide them with clues about life on other icy worlds such as Mars, Europa and Enceladus.

Adams, a professor in the department of MSU Civil Engineering, said he is currently working on NSF-funded projects in the areas of snow metamorphism and material properties. Other researchers in the lab are studying "green" concrete to see how the cold affects concrete that contains crushed glass and fly ash. They're also studying the performance of glue-laminated beams in the cold. They're researching the rock glacier at Big Sky. John Seifert and Dan Heil in the Department of Health and Human Development are using the lab to conduct a variety of studies, that include the effect of cold on athletic performance, Chronic Obstructive Pulmonary Disease (COPD), and clothing designed for cold weather.

In addition to MSU faculty, the subzero facility serves high school students and MSU undergraduates and graduate students who are interested in pursuing careers in subzero science, Priscu said. Adams said two visiting scientists from Switzerland will conduct snow studies there for the next two years.

MSU avalanche expert in permanent exhibit in Chicago

August 18, 2010 -- By Evelyn Boswell, MSU News Service

A Montana State University snow scientist who is nationally and internationally known for studying avalanches is now part of a permanent exhibit at the Museum of Science and Industry in Chicago.

Ed Adams appears larger than life in a big-screen video that welcomes visitors to the avalanche portion of the *Science Storms* exhibit. Showing that researchers are regular people with fun jobs, he shares what he does, the questions he asks and what excites him about his research.

Elsewhere in the exhibit, a miniature Adams appears in an interactive game that teaches visitors about avalanches. Players see Adams in his parka and wool hat and listen to him introduce the game. Then they trigger a cartoon avalanche behind him, select conditions that might contribute to avalanches and listen to Adams' recorded comments about their choices.

Adams has been featured in the New York Times, various National Geographic publications and People magazine. He has appeared on the national news, Discovery Channel, the History Channel and Discovery Channel Canada. But the Chicago exhibit is definitely a career highlight, Adams said. The Museum of Science and Industry has approximately 1.5 million visitors a year, with 300,000 of them school children on registered tours.

Adams is known for the research he conducted from inside a shed in the Bridger

Ed Adams appears larger than life in a big-screen video that welcomes visitors to the avalanche portion of the Science Storms exhibit. Showing that researchers are regular people with fun jobs, he shares what he does, the questions he asks and what excites him about his research.



Mountains and inside the SubZero Science and Engineering Research Facility on the MSU campus. During the winter and spring, when conditions were right for avalanches, Adams and his team of students headed high into the Bridgers where they set off small explosions and monitored the resulting avalanches from inside a building they bolted to a boulder.

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MSU avalanche expert in permanent exhibit in Chicago (continued)



Ed Adams in the Bridger Mountains where he and his team test avalanche explosives. (MSU photo by Kelly Gorham).

Olivia Castellini, senior exhibit developer at the Museum of Science and Industry, said museum staff first saw Adams when he appeared on the PBS show NOVA several years ago. They started keeping tabs on him, and when they began developing the concept for the *Science Storms* exhibit, he was one of the first researchers they contacted. As they developed pieces for the avalanche exhibit, they ran them by Adams.

"We rely on partnerships with people like Ed to make sure we are choosing interesting science and accurate information," Castellini said. She added that, "He ended up being an incredible resource for us."

The *Science Storms* exhibit opened March 18, taking up two floors and an entire wing of the main museum building. Covering more than 26,000 square feet, the exhibit focuses on the science behind some of nature's most powerful phenomena. Besides "Avalanches and Motion," *Science Storms* features Tornadoes and Vortices, Tsunamis and Waves, Sunlight and Rainbows, Fire and Combustion, Atoms and Matter; and Lightning, Charge and Magnetism.

Visitors have the opportunity to participate in more than 50 experiments and activities, including manipulating a 40-foot tornado, setting off a 30-foot tsunami and creating a soaring rainbow. In the avalanche area, they start to understand how Adams felt when he triggered experimental avalanches in the Bridger Mountains. They turn a 20-foot steel avalanche disk, set a speed and

watch "snow" flow down a virtual mountainside in varying patterns. Besides learning about the flow of granules (in this case, white glass beads and tan sand), they see how snow crystals teach Adams about snow pack. They learn how microstructures are a key component in forecasting avalanches.

"It is a pretty impressive exhibit," Adams said.



Ed Adams examines snow crystals in the Bridger Mountains near Bozeman. (MSU photo by Kelly Gorham).