MONTANA NSF EPSCoR




experimental program to stimulate competitive research

Saturday Radio = Science is Cool

Children can start their weekend with Montana Public Radio. The *Children's Corner* is two hours of music, stories and imaginative activities for kids from two to ninety-two offered through The University of Montana's public radio station, KUFM.

Annie Garde hosts the program and every other week Assistant Research Professor, Dr. Katie George, more fondly known as, Dr. Katie, invites the early morning listeners to join her ***Science is Cool*** radio program. George's show is an interactive program that introduces new scientific experiments to listeners when they tune in on Saturday mornings. The best part of the program is that Dr. George asks the listeners to perform the experiments right along with her while she's performing them live on the air.

A show for children of all ages, Dr. Katie got her inspiration from a television program that many of us remember from our youth, *Watch Mr. Wizard.* One of commercial television's early educational efforts (1951), this program was highly successful in making science exciting and understandable for children. Presenting scientific laboratory demonstrations and information in an interesting, uncomplicated and entertaining format. Katie watched his program in the 1970s when Don Herbert (aka Mr. Wizard) revived his show for the next generation.

Dustin Derrough and Tyler Shaughnessy participating in the Science is Cool Radio Program

Dr. Katie has followed Mr. Wizard's design, by introducing kids in grade school (K-6) to science in a fun, interactive format. Her novel approach through public radio has garnered her a devoted following.

With the call to "get ready" approximately 15 minutes prior to the experiment, Dr. Katie asks the listeners to gather everything from rubber bands, cornstarch, diet soda, coins, cardboard, lotion, potatoes and even the bathroom scale. Each program has invited students from local elementary schools to perform these experiments right along with her in the KUFM radio studios.

Dr. Katie George, host of the science is cool radio program

Her young research guests follow simple instructions along with the radio listeners. They go through all of the scientific steps to produce air pressure, sound waves, static electricity, inertia, viscosity, and capillary action, just to list a few of the 63 (and counting), shows produced so far.

The goal of this program is to encourage kids to explore their world and ask questions. ***Science is Cool*** is being broadcast on Saturday mornings so it will reach children at a time when many parents are home and can assist their children with the experiments and discuss the science with them.

As with *Watch Mr. Wizard*, the National Science Foundation, specifically through a Montana NSF EPSCoR award, supports ***Science is Cool***. Currently 43 shows with materials listings are available on CD (a 4-CD set) through the UM NSF EPSCoR Office.

Dr. Katie feels her purpose is not to just teach but to have fun and share her entheusiasium for science with her radio audience. So, set your alarm clock for 6:45 AM this next Saturday morning and tune into the *Children's Corner*. Listen for that "15-minute ***Science is Cool*** call" and be ready to join Dr. Katie and her young researchers in discovering what fun there is to be had with science.

Series of EPSCoR Films for PBS

EPSCoR is funding the production of two one-half hour presentations to be aired on PBS. The production, directed by Media and Theatre Arts' Science and Natural History Filmmaking (SNHF) program director, Ronald Tobias, is being produced entirely by graduate students in the SNHF program working to earn their Master of Fine Arts degrees.

Hannah Smith Walker, whose undergraduate degree in film studies from New Zealand's University of Otago, is examining the work of MSU's veterinary entomologist, Dr. Greg Johnson. Dr. Johnson's mission is to examine why so many sage grouse, an endangered species, are dying from West Nile Virus. With camera in hand, Hannah follows Dr. Johnson through thickets of mosquitoes and through laboratory corridors to capture Dr. Johnson as he unravels the mystery of the threatened sage grouse and the menacing mosquitoes.

Associate Producer, Editor and MFA student. John Little, working on film clips.

Maria Tucker, a graduate of the University of Virginia, with Bachelor of Arts degrees in both Biology and English, is producing a film segment on Dr. Toni Ruth of the Wildlife Conservation Society. The reintroduction of wolves into Montana concern not only cattle ranchers, but affect other indigenous predators such as cougars. Maria is filming Dr. Ruth and her team of 'hardcore ridge grinders' as they spend long days tracking, collaring and analyzing the impact of wolves on the habitat of the big cats of Montana and Wyoming.

Anne Devereux received her Bachelor's degree from Vanderbilt University in 1994 and has extensive experience in media and film production. Prior to joining the MFA program at MSU, she left the film production path behind to become a first-year graduate film student at Columbia University in New York City. Anne's film for EPSCoR closely examines the work of April Craighead, an MSU graduate with a Master's degree in biology, as she tries to unravel the challenges of creating safe passage for Montana's wildlife as it crosses man's deadly highways.

Jenn Shoemaker holds a degree in Mass Communications from UCLA. Before becoming a graduate film student, she worked as a park ranger in national parks across the Western United States. For five years, she led ranger programs at Yellowstone National Park. Her footage of Yellowstone's wildlife and scenery has been used by National Geographic Explorer and the National Park Service. Her film looks closely at the work of Dr. Doug Smith and the challenge that he and many biologists must now tackle – managing both the wild animals, wolves in particular, and the people who might be inadvertently loving them to death.

This publication promotes the development of Montana science and technology resources through partnerships involving Montana universities, industry and state research and development enterprises. EPSCoR operates on the principle that aiding researchers and institutions in securing federal funding will develop Montana's research infrastructure and advance economic growth. EPSCoR's goal is to maximize the potential inherent in Montana's science and technology resources and use those resources as a foundation for economic growth.

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Montana NSF EPSCoR is supported by:
NSF Grant EPS-0346458 *and*
MBRCT Agreement #04-06

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Montana High School Students Compete with UM Support

Independent research classes across western Montana finished the 2004-2005 academic year with great success. This was due, in large part, to the funds provided through the UM NSF EPSCoR program. A total of fifty-five students from six high schools benefited from transportation and registration fees supported by the EPSCoR funds. Based on this support, students were able to participate in the following three major science symposiums/fairs:

Intermountain Junior Science and Humanities Symposium, Salt Lake City, UT, March 9-12, 2005

Montana SW District Science and Engineering Fair, Butte, MT, March 24, 2005

Montana Junior Academy of Science Annual Meeting, 2005, Butte, MT, April 9, 2005

Hellgate High School participant

At these symposiums/fairs a total of twenty-seven students received recognition of their exemplary work in the form of awards and scholarships. This resulted in seventy-four individual awards and two team awards. In addition, all of the students benefited from the experience of presenting their independent research in a formal research setting. They received feedback from university level researchers as well as gained new ideas and enthusiasm for what can be accomplished at the high school level.

Big Sky High School participants

Without the funds provided through the EPSCoR program many of the schools would not have been able to send students to these meetings.

Attending schools: Big Sky, Sentinel, Hellgate and Loyola Sacred Heart high schools, Missoula; Stevensville High School, Stevensville, Corvallis High School, Corvallis; and Dillon High School, Dillon, Montana.

If you Build it...They will Come

Historically, The University of Montana has been highly successful in recruiting new tenure-track faculty in the sciences. Over the past two award periods (1998-2000 and 2001-2004), we've added 25 new science faculty hires. These new hires have built productive research programs, which in turn have greatly expanded the offerings in UM science research. But these new faculty far exceed the existing graduate student population, and not surprisingly, larger classes of incoming graduate students are necessary to fill and keep these laboratories growing. However, nearly every lab is in need of additional graduate students. Therefore, NSF EPSCoR's Graduate Stipend Program was created and has evolved to try and keep pace with new faculty growth.

Originally, during the 1998-2000 grant period, the program financed both Masters and PhD candidates with small $3,000 awards. Now the program supports only PhD students and, at present, offers competitive awards between $17,500 and $20,000 per year. During the past two grants, 47 new Masters and PhD students began their graduate careers with the help of NSF EPSCoR funding on the UM campus. As the program has grown, it has become highly competitive. As a result, the selection committee now consists of six science departments (Biomedical and Pharmaceutical Sciences, Chemistry, Division of Biological Sciences, Geology, Mathematical Sciences and Wildlife Biology), with the Director of the Center for Environmental Health Sciences serving as chair. This committee evaluates and selects applicants based upon pre-established criteria.

PhD Student Katie Morrison

In order to receive an NSF EPSCoR award a candidate must have the following: a GPA of 3.25 or higher, GRE scores of 60 percent or higher, prior research experience, and excellent letters of recommendation. Although once a student accepts the committee's offer, performance expectations are still high. Students are required to participate in outreach activities, which may consist of sharing their research with K-12 students in a public school setting, judging at a local, regional or state science fair or mentoring middle or high school science students; submit a yearly report complete with photos of research being performed; and, provide evidence they have made acceptable progress toward achieving their PhD. These obligations must be met if students wish to keep their funding and become eligible for a second-year award. Furthermore, during the time they are paid by NSF EPSCoR, no student teaching is

PhD Student Cox Bolin

PhD Student Tammy Mildenstein

PhD Student Emily Geraghty

allowed. This gives these graduates an opportunity to delve into their research interests right away.

As candidates complete their requirements, some move to other funding, others receive a second year of EPSCoR support. Sometime during that second year, students must make arrangements for any continued support to either come through their department or other grant awards. This transferring to other funding gives our program the ability to assist more students and increase the grad student population.

NSF EPSCoR continues to provide start-up money to assist in building a stronger foundation for high quality faculty and scientific research at The University of Montana. As a result, top-notch graduate students have come, and more continue to apply to UM graduate programs. As this ever-increasing relationship between faculty, graduate students and program growth continues, our university science structure becomes stronger. This in turn steadily increases Montana's ability to compete in the national and international arenas. Truly, "if you build it . . . they will come."

Women in Science Bridging

The committee for the NSF EPSCoR Women in Science Bridging Program met on Tuesday May 17th, with committee Chair Dr. Cathy Cripps (Plant Sciences and Plant Pathology) and committee members Gretchen Rupp (Engineer, Directory of the Montana Water Center) and Dr. Valerie Copie (Chemistry and Biochemistry). The qualifications of the applications were discussed, and two students were selected to receive awards: **Kimberly A. Slack** and **Lisa Sun Rhodes**. The committee felt both applicants met the criteria of this program, and that the awards will be strong encouragement for them to continue in the field of Science and Engineering. In addition to a final report on the research that they will accomplish in their respective selected laboratories, those of Dr. Susan King (Chemical and Biological Engineering) and Dr. Christa Merzdorf (Cell Biology and Neuroscience), the committee will also request that the applicants inform NSF EPSCoR of their future plans as they pertain to this program in a letter at the conclusion of the award period. This will enable the committee to track success of the program and to adjust requirements as needed to ensure that the goals of the program are met.

Lisa Sun Rhodes and Kimberly Slack

Sunburst Students Shine at ISEF Competition

When cattle started aborting on her family's ranch, 16-year-old Lacy Gillespie, of Sunburst, was determined to find out why. The answer — a copper deficiency — earned her $2,200 in cash awards at the prestigious International Science and Engineering Fair in 2003.

But her project didn't end there. When Lacy left for college, her little sister, Kari, picked up where she left off.

Lisa Sun Rhodes and Kimberly Slack

The problem stemmed from the high sulfur content in oilfield wastewater that the cows sometimes drank from collecting ponds. "The goal was to see what the effect of the oilfield water was and how we could clean it up," Kari said. After elaborate lab experiments using California Blackworms, Kari, now a junior, determined that activated charcoal filters are the most effective method of treating the water and improving animal health. Her work earned her a fourth-place, $500 award at the 2005International Science and Engineering Fair, held in Phoenix in May. Next year Kari hopes to develop a cost-effective, practical filter for oil wells on her family's ranch.

But this is not just a sister act.

The Gillespie girls are part of a long tradition of science excellence at North Toole County High School. Seniors Chris McFadden and Ben Dubbe earned a $1,000 third-place award this year for their team project: "The effects of Allelochemicals Produced by Lepidium Latifolium on Selected Crops Grown in North Toole County, Montana." In other words, they studied how chemicals released by the perennial pepper weed plant damage crops.

Lisa Sun Rhodes and Kimberly Slack

Teams from North Toole County High School earned first-place botany awards at the international competition in 1997 and 2001 and the school has racked up numerous second-, third- and fourth-place awards since teacher Larry Fauque and his students started attending the event in the early '70s.

Just qualifying for the competition, which Fauque calls "the World Series of science fairs" is an accomplishment. Teams must win a regional or state fair to qualify. Many of the competitors, who come from around the world, attend specialized science high schools and are mentored by Ph.D.s, Fauque said. Their projects are often patented. "For us in little Sunburst, Montana, to compete with that is quite a challenge, but the kids do it very, very well," said Fauque, who has taught science for 36 years at North Toole County High School, where he graduated in 1960.

In another coup this year, Sunburst senior Cherry Tomsheck won the Stockholm Junior Water Prize for Montana for her study on the effects of an herbicide on microtubial formation of aquatic organisms. She will compete in the national competition in Portland, Ore., June 16 through 18. The winner there will travel to the international competition in Stockholm, Sweden.

Fauque said the secret to his students' success is making time for research and letting the kids do the rest. With the help of The University of Montana National Science Foundation EPSCoR undergraduate research funding among other sources, "We do everything we can here to give them the opportunity to demonstrate their potential," he said.

Portions of this article taken from the Great Falls Tribune, published May 31, 2005

Statewide Networking Symposium

On May 22-24, 2005, MSU's Women in Science and Engineering (WISE!) group hosted a statewide Networking Symposium for Undergraduate Researchers and Mentors. Approximately 75 attendees – undergraduate students involved in research and their faculty mentors – descended on the campus from all over Montana. Represented campuses included MSU Northern, UM-Western, Montana Tech, the Montana Tribal Colleges, and private institutions such as University of Great Falls. The symposium offered a number of activities to provide positive role models and support to students considering research careers.

Lisa Sun Rhodes and Kimberly Slack

WISE! organizers Mary Lukin, Anne Rusoff and Anneke Metz worked especially hard to reach out to women and minority students, who often have few role models, struggle with confidence, and face societal stereotypes when pursuing science and engineering careers. Symposium attendees participated in breakout sessions on balancing career and family, success in graduate school, and positive mentoring. The event also featured undergraduates sharing their research experiences with other students and faculty. Experienced student researchers presented award-winning posters at the poster session, which also featured a poster-making workshop for students new to research.

Lisa Sun Rhodes and Kimberly Slack

A highlight of the symposium was the keynote address by US Geological Survey field geologist Dr. Margaret Hiza Redsteer. Dr. Redsteer used her own personal experiences as a young mother in graduate school, and her role as a female scientist studying climate change on the Navajo nation, to provide students and faculty alike with inspiring words of wisdom and encouragement for a rewarding life and career. MSU President Dr. Geoffrey Gamble was in attendance, viewing student posters and reaffirming his strong support for equity in school and in the workplace. Communal meals held in the MSU ballrooms during the event allowed everyone to get to know each other, make lasting friendships and forge new research connections.

Television coverage of the event was provided by local NBC affiliate KTVM Channel 6 & 42. This symposium was sponsored by WISE!, Montana EPSCoR, and NCRR Lariat.

Lisa Sun Rhodes and Kimberly Slack

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