



WINTER 2005

THE EXPERIMENTAL PROGRAM TO STIMULATE COMPETITIVE RESEARCH

MSU UNVEILS DESIGN FOR RESEARCH BUILDING

Montana State University unveiled the design for a \$23 million chemistry and biochemistry building that will house researchers working on such cutting-edge advances as anti-cancer therapies, drugs that combat bacteria and fungi and ways to protect eyes from laser damage.

Ground is expected to be broken this summer for the 73,000 sq. ft. MSU Chemistry and Biochemistry Research Building. When the project is completed in the summer of 2007, the building will house laboratories and offices for about 20 MSU researchers and 180 graduate assistants, research assistants and support staff. Many of those researchers are creating high-tech jobs in Montana as well as working on advances that will provide a better quality of life for all, not to mention improving MSU's quality of education.

"We are excited about the opportunities this new facility will allow the newly developed Center for BioInspired Nanomaterials faculty members, all NSF EPSCoR hires, to enhance nanotechnology research and open doors for continuing collaborations with institutions such as The Scripps Research Institute," said Mark Young, Montana NSF EPSCoR Co-Director. "This group represents leadership in multi-disciplinary scientific research, and has become world leaders in the use of protein cages for bioinspired nanomaterials fabrication."

"This building reflects the growing level of national and international prominence of the research and education program in chemistry and biochemistry at Montana State University," said David Dooley, MSU Provost who first came to

MSU as chairman of the MSU Chemistry and Biochemistry Department. Dooley added that the success of the faculty in the competitive national research-funding arena is the primary source of the building's funding. "(The building) reflects well on the talent, energy and creative excellence of the faculty and the graduate and undergraduate students who work with them," Dooley said.

"The increase in both the quantity and the quality of research space for the department will result in a significant increase in the competitive grants and contracts awarded to the faculty," said Tom McCoy, MSU's Vice President for Research, Creativity and Technology Transfer.

"The new research building will allow research groups to have enhanced scientific interactions and permit continued excellence and growth of the department's research programs into the foreseeable future," Paul Grieco, chairman of the Department of Chemistry and Biochemistry said. "This is an exciting moment in time for chemistry and biochemistry at Montana State University."



Members of the committee are: (left to right) David Dooley, MSU Provost; David Signel, MSU chemistry professor; Mary Cloninger, MSU chemistry professor; Edward Dartz, MSU chemistry and biochemistry professor; the architect, Stephen L'Heureux; Sara Jayne Steen, Dean, MSU College of Letters and Science; Cecilia Vaniman, MSU planner; Becky Mahurin, MSU intellectual properties manager; Joel Morgan, MSU chemistry graduate student; and Trevor Douglas, MSU chemistry professor. MSU photo by Erin Raley.

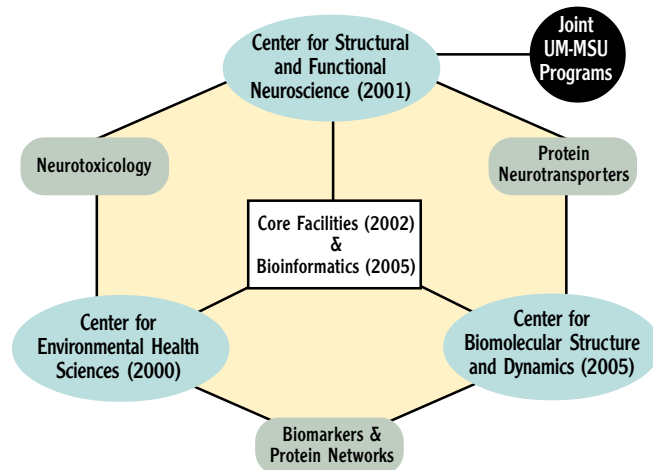


ABCs ON BSD: NEW FOCUS AREA—MISSOULA

Biomolecular Structure and Dynamics is a ‘triangulated’ partnership for center and program development. It is the essential second stage to The University of Montana’s Strategic Research Vision Committee that initiated the creation of a Biomolecular Structure and Function (BmSF) focus area for development in 1999. Now in its first stage—faculty hiring—this new Center for Biomolecular Structure and Dynamics is being constructed to continue the growth of BmSF focus area. Twelve faculty, including interim CBSD director, Professor Sandy Ross (Chemistry), will be blended with seven new faculty (across five departments) to develop and grow a focal group of CBSD collaborative investigators. Initially, CBSD investigators will study the rates, motions and dynamics of peptides proteins, membranes, nucleic acids and coupled interactions using

time-resolved fluorescence, NMR, computational methods and EPR/ESR. Programmatically, the new CBSD will triangulate with the two existing research centers, CEHS (2000) and the CSFN (2001) to build thematic research bridges in ‘protein neurotransmitters’ (proteins that regulate the uptake of neurotransmitters) and ‘protein networks’ (protein architectures that are linked biochemically through structural or functional means). The three centers will share equipment and facilities in a centralized scheme and integrated with a key support platform in bioinformatics. The advantage of co-developing the new CBSD with the existing centers is that the CSFN and CEHS both have NIH Center of Biomedical Excellence awards (COBRE) that can assist CBSD investigators with joint personnel, research seed money, equipment, resources and notably, collaborations. The CBSD builds upon existing research strengths and the partnership of four departments (Chemistry, Biological Sciences, Pharmaceutical Sciences and Computer Sciences) and complementary interests of investigators at Montana State University, whose faculty and students will benefit from the sharing of mutual core facilities, innovative interdisciplinary curricula, administrative support, space and environment resources, and information and technology infrastructure. The Center plans to hire and provide startup for seven tenure-track faculty, a senior investigator/center director, two bioinformaticians and administrative staff support. Support for up to six graduate students and up to twenty undergraduates will also be provided. It is expected that the CBSD will achieve financial independence by January 2008 through multi-investigator program project grants and graduate-training applications.

Triangulation of the new Center for Biomolecular Structure and Dynamics with the existing two Centers



Legend: = Centers = Thematic Research Bridge = Common Resources
Core Facilities: proteomics/mass spectrometry, histology/cell culture, microscopy, and molecular modeling



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.

MONTANA NSF EPSCoR PARTNERS

Montana University System
 The University of Montana-Missoula
 Montana State University-Bozeman
 Montana Tech of The University of Montana
 The University of Montana-Western
 Montana State University-Billings
 Montana State University-Havre

TRIBAL COLLEGES

Blackfeet Community College
 Chief Dull Knife College
 Fort Belknap College
 Fort Peck Community College
 Little Big Horn College
 Salish Kootenai College
 Stone Child College

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NEW FACULTY AT MSU

Dr. William Halford

Dr. William Halford is a recent hire supported by NSF EPSCoR, working as an Assistant Professor in the Department of Veterinary Molecular Biology. Dr. Halford came to Montana State University after serving as an Assistant Professor at Tulane University in New Orleans.



Why MSU Bozeman? Dr Halford said, "It is difficult to find an academic position that challenges you and still allows you to maintain a great quality of life for yourself and your family. While Boston or San Francisco offer excellent academic environments, long commutes and/or million dollar mortgages make it difficult to achieve a balance between work and family. MSU Bozeman offers the best of both worlds with a great group of scientists and students that challenge you professionally, and an incredible mountain environment that allows you to use your playtime to its fullest. A little bit of skiing, hiking, or camping goes a long way towards keeping me happy and sustaining my desire to produce and create."

Dr. Halford was attracted to the Veterinary Molecular Biology (VMB) department because of their successful approach to the study of infectious disease. Halford states, "I believe that the success of the VMB department is rooted in the fact that they have diversified their efforts into the study of both immunology (host responses to infection) and microbiology (study of infectious agents) at the molecular, cellular, and organismal levels." His research interests focus primarily on the study of herpes simplex viruses (the causative agents of cold sores and genital herpes). The goal is to develop an improved understanding of the strategies that viruses use to manipulate and play off of the weaknesses of the host immune system, such that persistent, life-long infections can be established in the human body. Halford notes, "Although researchers and doctors universally acknowledge the clinical importance of persistent infections, there is no consensus about how best to rationally proceed with the development of therapeutic interventions. The enormity of the problem is difficult to comprehend."

"The way I see it," continues Halford, "until the scientific community is willing to take a step backwards and admit that we lack fundamental pieces of knowledge that describe the behavior of persistent infectious agents in humans, we are going to continue to propose intervention strategies based on faulty biological paradigms (garbage in) and reap the corresponding results of more failed clinical trials (garbage out). I certainly think there is hope for improved treatment, but I think that the rational pathway to reach this desired outcome is to first invest the necessary time and effort into understanding the basic biology of persistent infections."

Dr. Lilian Calderón-Garcidueñas

When UM's Center for Structural and Functional Neuroscience and Center for Environmental Health Sciences join forces under the School of Pharmacy and Allied Health Sciences to recruit and hire new faculty, their hand is far reaching indeed. Lilian Calderón-Garcidueñas hails from Mexico City, Mexico, with an extensive education



and research background, which she completed in the Toronto, Canada, and Boston and Chapel Hill areas. Lilian explains how she chose UM: "The University of Montana was looking for someone just like me, with my background, skills and research interest. It was a perfect match for me, since I was looking for a research position that would allow me to work on my particular line of research fully, in a supportive environment." Lilian noted that she is one of the 55 women faculty in the sciences and one of even fewer minority women faculty at UM.

Lilian is warm, conversational and to the point about the importance her work plays in her life. She has unbridled passion for her research, and enthusiastically shares her knowledge with students and peers. She has had a keen interest in medicine since the time she was a child, as both her parents were physicians. Clinical diagnosis was a part of dinner table conversation at home and by age ten she was in her parents' office, helping diagnose patients. At fifteen, Lilian entered medical school and graduated at age 20. She became intrigued with scientific research during her final year in medical school. From those experiences, Lilian decided to pursue pathology.

Lilian's past research focused on the effects of air pollution on respiratory health in populations of Mexico. Her first paper on the topic was accepted by the *American Journal of Pathology* in 1992. She presented a new concept, one that expanded the work formerly done on air pollution and the effects on human lungs and nasal tissue of rats and mice. Her study was the first to use human nasal tissue to analyze

the effects from air pollution. Because human subjects were used and Calderón-Garcidueñas' results matched what had been found in rats and mice, the credibility of the research results was very positive. This opened the door for additional research on the topic of the effects of pollution on humans.

Lilian's energy levels are off the charts as her other research interests are numerous. Currently she is focusing on the effects of air pollution to the brain—the relationship of health effects from pollution on minorities and the comparative health effects noted in smokers. She is also leading a breakthrough research study vital to answering the question of how children living in different environments compare in the effects of pollution on target organs such as the heart.

Lilian explains, "The research uses Holter monitoring results to compare the effects of pollution on the hearts of children from polluted environments to children from non-polluted environments." The children representing the extreme polluted environment are from Mexico City, Mexico and the children representing the cyclic seasonal polluted environment are from Missoula, Montana.

Following a fire in the Missoula area, Lilian plans to make additional comparisons on how the pollution from fires and the smoke that lingers in our valleys affects children's hearts compared to the same children when there are no fires. We can look forward to the results from her research in the next few years, and hopefully see some changes for human health conditions for people living in polluted areas.

Finally, she describes one more research topic that she is studying, "How early in human development can we see the effects of air pollutants?"

The University of Montana is an exciting place for Dr. Calderón-Garcidueñas to pursue her research and continue bringing to light timely health concerns about our environment. "Although I love seeing the snow blow across my window and the mountains in the distance, I enjoy most of all my work, and take great pride in developing my questions, creating the research parameters, and completing research, which sheds light on critical topics within neuroscience and toxins."

Dr. Darrell Jackson

Dr. Darrell Jackson returns at last to the northwest, after several years on the east coast and five years in Georgia. He is glad to now call Missoula home. Darrell grew up in Seattle but left to pursue undergraduate studies in Philadelphia. He went east to follow his dreams, and this decision meant leaving the northwest behind for many years. He was invited back again to Washington, where he pursued his PhD in Pharmacology and Toxicology at Washington State University (WSU), Pullman. Following postdoctoral positions at Massachusetts Institute of Technology, Boston University and Morehouse School of Medicine in Atlanta, he is now an Associate Professor in the Department of Biomedical and Pharmaceutical Sciences at The University of Montana.

Early on in his career, with deep interest in pharmacology, Dr. Jackson had the choice between the path of industry or the path of academia. He chose academia in which he felt offered such wonderful opportunities to pursue his research questions. Jackson's research is focused broadly on the effects of stroke and how cells respond after the lack of oxygen after stroke. As Darrell describes it,

"Immediately following an ischemic (stroke) brain injury, some nerve cells within the affected ischemic core will undergo immediate cell death, while other nerve cells within the core may experience a delayed cell death. There are numerous events that follow ischemic brain injury that contribute to the delayed cell death. One of these events that is a focus in my laboratory is the structural change to affected nerve cells that occurs as a result of ischemic injury. These structural changes can predispose affected nerve cells to further injury that culminate in cell death. I am interested in identifying the critical structural changes in affected nerve cells that predisposes these cells to delayed cell death."

Research is just part of Dr. Jackson's work at UM. He also enjoys the teaching aspects of his new position. As a neuropharmacologist and a neuroscientist, his style of instruction is highly interactive with the graduate students taking his courses. After assigned readings, the students design experiments that try to test the concept detailed in the



readings. These experimental designs are then critiqued by the other students to test the accuracy and purpose of the original experiment.

As a new faculty hire, Darrell Jackson is one of only two black faculty at The University of Montana. Being one of the first is not new to Darrell. In 1990, he was the first minority post-doc in the brain and cognitive science department of MIT. When he pursued his PhD, there were just two black people in the WSU Department of Pharmacy, and he was the first black postdoctoral researcher at University of Washington's pharmacology department. He is part of the science faculty through cooperative funding of the following at UM: National Science Foundation EPSCoR Program, NIH Center for Structural and Functional Neuroscience, Center for Environmental Health Sciences, Office of the VP for Research and Development, Department of Biomedical and Pharmaceutical Sciences, and the School of Pharmacy and Allied Health Sciences.

When he is not in the lab or teaching, Darrell looks forward to spending his leisure time outdoors and has fishing, hiking and rafting on his list for this spring. His family is out enjoying the snow and loving the Montana winter.

Meanwhile, Darrell is bundling up and waiting for the right ski conditions—those involving snow and sun. Watch for him out on the slopes in March and April.

Butte to Host 2005 Montana NSF EPSCoR Conference

The 2005 State of Montana NSF EPSCoR Conference will be mining for economic development gold in Butte, Montana this year. Starting Friday, April 22 and running through Sunday, April 24, Montana NSF EPSCoR will be hosting this conference at Butte's Copper King Hotel. Our conference will assemble science research faculty, community business leaders, and state legislators from across Montana for educational and roundtable discussions exploring economic development, commercialization, and SBIR opportunities within our state. Please watch for announcements and visit our website <http://www.mtnsepsc.org/> in the coming months for specific details on discussion topics, agendas, and registration materials.

Calendar of Events

FEBRUARY

1		MBRCT Semi-Annual Report Due
4	Montana Tech	URP call for proposals
14		Valentine's Day
21		President's Day (MUS Holiday)

MARCH

14-18	Montana Tech	Spring Break
14-18	MSU	Spring Break
17		St. Patrick's Day
21-25	UM	Spring Break

APRIL

21-23	Lexington, VA	National Conference for Undergraduate Research
22-24	Butte, MT	2005 State of Montana NSF EPSCoR State Conference
29-30	Montana Tech	Undergraduate Research Fair
30		NSF Annual Report Due

MAY

2-6	MSU	Finals Week
7	MSU	Commencement
9-13	Montana Tech	Finals Week
9-13	UM	Finals Week
14	Montana Tech	Commencement
14	UM	Commencement
30		Memorial Day (MUS Holiday)

Internal Advisory Committee–December 13, 2004

Present: Chuck Thompson, Director; Gay Allison, Assistant Director; Rhonda Stoddard, Financial/Programs; Deb Fassnacht, Diversity/Outreach; Dan Dwyer, Vice President for Research; Claire Carlson, AVP for Research; Mark Cracolice, Chair, Chemistry; Dan Pletscher, Director, Wildlife Biology; Todd Cochran, Acting Chair, Biomedical and Pharmaceutical Sciences; Steve Lodmell, Associate Professor, Division of Biological Sciences (for Erick Greene, Acting Associate Dean); and Joe Figueira, Vice Chancellor, Montana Tech (by conference phone).

Absent: Steve Sheriff, Chair, Geology

The Montana NSF EPSCoR program management is shared at two office sites, Missoula (UM) and Bozeman (MSU), where each is staffed with a project director, project administrator, funds manager/accountant and diversity/outreach coordinator. UM is currently the host institution. Quarterly meetings are held between institutions to coordinate specific project finances, expenditures and projections.

Each program director is responsible for project progress and fiscal management including subcontracts to partner institutions. Institutional management at UM and MSU is the responsibility of each project director and its Internal Advisory Committee (IAC), which, at UM, meets quarterly to evaluate program progress, define milestones and enact policy. The UM IAC is also to be responsible for overall program assessment, individual assessment (Project Director and Project Administrator) and coordinating AAAS reports for individual departments, centers and institutes.

The NSF EPSCoR IAC was developed in February 2001. UM's first Internal Advisory Committee convened to discuss the new grant (2004-2007). It was held December 13, 2004; the following items were reviewed and discussed: historical review of NSF EPSCoR and UM's participation (1980-2004), overview of where the NSF EPSCoR award is focused (2004-2007), programmatic reporting and informational requirements, fiscal reporting and budgetary spending, assessment of the UM NSF EPSCoR program, program office space, governance committee and/or lines of communication, new faculty assessment, graduate stipend issues, job description for UM NSF EPSCoR Director, and setting up a 2005 Science Vision Committee meeting.

The next UM IAC will be held March 10, 2005.

Internal Advisory Board–December 3, 2004

Present: Mark Young, Co-Director; Angie Solvie, Program Coordinator; Susie Couch, Fiscal Manager; Gary Strobel, Assistant to the Co-Director; Sara Jane Steen, Dean, College of Letters and Science (Invited Guest); Paul Greico, Chair, Chemistry (Invited Guest); John Sherwood, Chair and Head, Plant Sciences and Plant Pathology; Robert Marley, Dean, College of Engineering; Robert Rydell, Chair, History, Philosophy and Religious Studies; William Hiscock, Chair, Department of Physics; Allen Harmsen, Chair, Veterinary Molecular Biology; Susan Capalbo, Special Projects Outreach, Office of the Vice President for Research; and Anne Camper, Associate Dean, College of Engineering.

Absent: Tim Ford, Chair, Microbiology

The MSU NSF EPSCoR Internal Advisory Committee held their first meeting on December 3, 2004. The committee members were appointed to represent a variety of disciplines at Montana State University. This committee was established to oversee the Montana State University NSF EPSCoR program, to make recommendations, and to oversee the future programmatic growth. This meeting offered insight into the history of EPSCoR's funding distribution, the new programs that will be available, and how and where funding will be distributed in the current 2004-2007 grant. Each committee member received a copy of the new 2004-2007 Montana State University-NSF EPSCoR Implementation and Procedures Manual. The committee will meet again in May 2005 and continue semi-yearly after that.



MSU Advisory Committee



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MONTANA NSF EPSCoR
DAVIDSON HONORS COLLEGE
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INSIDE: MSU UNVEILS DESIGN FOR RESEARCH BUILDING



*Computer rendering provided by architectural firm—
L'Heureux, Page, Werner of Great Falls*

