MRI’s newest scientist, Associate Professor Teresa Gunn, is enthusiastic about exploring the effect of two genes on susceptibility to Parkinson’s disease. She is funding this new research project with a two-year $250,000 grant from the National Institutes of Health’s Institute of Neurological Disorders and Stroke.

“This is the hardest of times for research funding,” said Irving Weissman, Chair of MRI’s Scientific Advisory Committee and Director of Stanford University’s Institute for Stem Cell Biology and Regenerative Medicine. “Dr. Gunn has been at the Institute for less than a year and already has brought in her own funding. For Teresa to get a grant in these super hard times just says what a high quality scientist she is.”

The project adds a new dimension to Parkinson’s research at McLaughlin. Assistant Professor Deborah Cabin studies the role of a different gene in the disease.

“I’ve wanted to do this for a long time,” Dr. Gunn said, adding that her move to McLaughlin last year from Cornell made the intensive mouse study affordable because of MRI’s lower mouse costs.

“MRI Adds Jobs with $2 Million Montana Dept. of Commerce Grant

“The economic impact of the State’s investment in McLaughlin will be felt across the state for years to come,” Montana Dept. of Commerce Director Anthony Preite said about the $2 million grant MRI received last fall to boost the expansion of its research faculty and its facility. “The outcome of the important research done at McLaughlin has the potential to change the world,” he said. “This facility is an outstanding asset to Montana.”

The grant, which must be matched with another $2 million by MRI, will help fund new positions as well as lab renovations to accommodate the new scientists, and specialized equipment to keep the Institute at the leading edge of neurodegenerative disease research.
Gunn Receives NIH Grant  
From the Cover

She also appreciates the prospects for collaboration with the Institute’s faculty, which she is beginning to develop.

Dr. Gunn’s research focuses on the process – at the molecular level - of how brain cells die in neurodegenerative disorders. In the new study, she is investigating a possible connection between two genes that could reveal insights into that process, particularly in Parkinson’s disease.

Dr. Gunn works with a strain of mice with a mutation in a gene called *Mahogunin*. The new project involves crossbreeding these mice with another strain with a mutation in the *parkin* gene. Both genes are associated with degenerative brain diseases, and both have been shown to have an effect on mitochondria. Mitochondria are the cell’s energy factories that fuel cellular activities. Damaged mitochondria can cause a cell to die.

According to Dr. Gunn, “Mitochondrial dysfunction is associated with most or all neurodegenerative disorders: Parkinson’s, Alzheimer’s, Huntington’s, you name it.” She hopes to learn more about the role of mitochondria in these diseases. “This could turn out to be a really important aspect of neurodegeneration,” she said.

Despite the similarities between the *Mahogunin* and *parkin* genes, the effects of their mutations on the mice are distinctly different. Crossing the two will show how they may work together to cause the degeneration in Parkinson’s.

As a sideline, Dr. Gunn is breeding her mice with one of Dr. Cabin’s strains to see if there’s an interaction between *Mahogunin* and *alpha-synuclein*, which is the gene Dr. Cabin studies. This is the first of many possible areas of collaboration for Dr. Gunn and her new colleagues as they explore the complexities of degenerative brain disease.

MRI Adds Jobs with $2 Million Commerce Grant  
From the Cover

The Department of Commerce also provided $2 million in seed money for the expansion in 2008. McLaughlin quickly raised the required match for that grant. Since that time, the Institute has nearly completed its building expansion, which has employed more than 100 people in the construction industry. MRI has also hired a new scientist and advertised and received applications for an additional faculty member.

The new grant will help fund the new faculty position, as well as six postdoctoral positions. Like most, MRI has had to make some budget cuts in recent times, but McLaughlin continues to add good jobs and to bring outside funds to the state.

This recent grant maintains the momentum of the expansion project. “We need to keep building on the wonderful success we had with matching the first grant.” said Leslie Oakland, chair of the fund drive for the project. “This is an opportunity for people to invest in the future. Sadly, most of us are affected in some way by these diseases, and without research, we will continue to watch our family members suffer from them.”

According to MRI Director George Carlson, “This state grant makes us more competitive for federal research grants by helping us bring in good new scientists and specialty equipment that attracts good scientists.” He added, “Research is one of the biggest drivers of economic growth in the world. That’s why Governor Schweitzer and Mitch Tropila and Mike Milburn saw it was important to invest in research. It was really forward-looking of the state of Montana. But it’s important to remember that we don’t get the money if we don’t raise the matching funds.”

“ Wouldn’t it be wonderful if a cure for Alzheimer’s, Parkinson’s, MS or mad cow disease came out of Great Falls?”

–Mitch Tropila, District 12, Montana State Senate
MRI Scientists Bring in Over $2.5 Million in Grants

MRI’s scientists continue to receive grants in a very competitive funding environment. In addition to Dr. Teresa Gunn’s grant (see cover story), the Institute’s investigators have brought in a number of recent grants from federal and private sources. Some of these grants are funded over multiple years. These funds advance our research and education missions while supporting our staff and creating new jobs.

Dr. George A. Carlson, MRI’s Director and Professor
$1.5 million to use stem cells to better understand the susceptibility to mad cow disease and Alzheimer’s.
$15,000 to look at changes happening inside the cell that are involved in prion infection.
$57,000 to advance the understanding of the physiological changes brought about by Alzheimer’s disease.
$160,000 to develop blood tests to distinguish prion diseases from Alzheimer’s disease.

Dr. Deborah E. Cabin, Assistant Professor
$335,000 towards creating a better model for Parkinson’s disease that would aid in developing drugs to treat this disease.

Dr. John R. Bermingham, Jr, Associate Professor
$350,000 to advance understanding of a protein function that may lead to new treatments for myelin disorders and a better understanding of epilepsy.
$150,000 to help replace an imager with one that is more capable of advancing research relevant to neurodegenerative diseases and myelin diseases.

Dr. John A. Mercer, Professor
$15,000 to study the transfer of RNA from cell to cell following a nerve injury. This could lead to treatment that would stimulate regeneration of damaged nerves.
Tom Siebel Presents Meth Project Results at MRI

Tech mogul and part-time Montana resident Thomas Siebel was recently ranked 5th among the world’s philanthropists for his highly effective meth prevention project, which began in Montana. The Global Philanthropy Group and Barron’s ranked those whose giving produced the best results. You might have seen the Montana Meth Project’s latest television ads, directed by the renowned cinematographer of The Dark Knight, Wally Pfister.

The Meth Project is one of several large innovative projects developed by the Siebel Foundation under the guidance of a group of top scholars. The Siebel Scholars search for solutions to some of the world’s greatest challenges. Among the organization’s primary interests are biomedical research and methamphetamine abuse prevention.

Tom Siebel presented the conception, implementation, and assessment of his Montana Meth Project to an enthusiastic audience at McLaughlin during the National Development Council’s 2009 annual meeting. Nobel Prize-winning scientist David Baltimore spoke about his exciting new cancer research at the same meeting (see article at right).

According to MRI Director and Professor George Carlson, the similarity between the two presentations was striking. “Both Tom Siebel’s and David Baltimore’s talks were outstanding examples of critical thinking. Each one carefully evaluated a complex problem, identified a crucial aspect of the problem and developed an approach to address it. I was very impressed with Siebel’s analytical approach to meth abuse prevention and with the compelling evidence that showed the project was successful. There is no question in my mind that the Meth Project has made a tremendous difference.”

The Meth Project has been credited with dramatically reducing meth use in Montana since 2005. During the first two years of the project’s public messaging campaign, which graphically depicts the dangers of meth use, Montana dropped from being 5th in the country for meth abuse to 39th. The model has been adopted nationally and expanded to six other states so far.

“Only a tiny number of people could possibly marshal the resources and intelligence to tackle this problem, and Tom’s the one who did it,” said Irving Weissman, Chair of MRI’s Scientific Advisory Committee.

Dr. Weissman met Tom Siebel in 2002 when Siebel invited him to address the Siebel Scholars at a conference at Stanford University. Dr. Weissman is Director of Stanford’s Institute for Stem Cell Biology and Regenerative Medicine. One result of that meeting was the Siebel Stem Cell Institute, which has given a major boost to stem cell research at Stanford and its collaborator UC Berkeley.

“I wondered why someone would give so much of his time and money to preventing meth abuse in Montana,” Dr. Weissman said. “Over time, I learned that he is simply committed to helping people. He is willing to share the money he made in his companies to really move issues, with no political or financial self-interest. It’s the same kind of basic motivation that the McLaughlin has or that we have in our labs at Stanford – helping people with incurable diseases or with an addiction from which they can’t escape.”

David Baltimore Hopeful of New Cancer Cure

Nobel laureate David Baltimore wowed the audience at MRI with the promising results of his radical new approach to fighting cancer. Now in clinical trials with a small number of patients, the therapy is “melting tumors,” he said.

“Forty years into the war on cancer, the disease remains the toughest opponent modern medicine faces,” according to Dr. Baltimore, President Emeritus and Millikan Professor of Biology at Caltech. After outlining the limitations of other approaches to curing cancer, he described a revolutionary treatment for late-stage melanoma, in which the body’s killer immune cells are genetically programmed to recognize and destroy tumor cells.

“We’re harnessing the immune system to do the same thing for cancer as for a cold virus,” he said.

Because it’s the nature of cancer to grow indefinitely, Dr. Baltimore said, “a successful therapy must drive cancer tumors to total elimination. Immunotherapy can do this. We have cured a little bit of cancer with it, and I’m hopeful we’ll cure it all.”

Dr. Baltimore cautioned that it will take quite some time before the new treatment could be applied more widely.
An MRI student intern from the 1950s and another from the 1990s are co-authors of a new paper on stem cells and aging published in the *Proceedings of the National Academy of Sciences*.

Irving Weissman, MRI’s first student intern, is known—among other things—for discovering the blood forming stem cell and for his research on the use of these cells in regenerative medicine. His work at Stanford University has led to new treatments for leukemia and other diseases. Dr. Weissman collaborated with Isabel Beerman, who was also a high school intern at McLaughlin, on her study of how blood forming stem cells function during aging.

Dr. Beerman is now a postdoctoral fellow at Harvard Medical School’s Immune Disease Institute. Her work is linked to Dr. Weissman’s through his former postdoc, Derrick Rossi, in whose lab Dr. Beerman now works. Dr. Beerman is the lead author of the new paper, and Dr. Rossi is the senior author.

The Rossi lab works with the hypothesis that blood forming stem cells don’t function properly as people age, leading to a loss of immune function and a higher incidence of myeloid leukemia.

Blood-forming stem cells have the potential to give rise to all cells in the blood, including the myeloid cells and lymphoid cells of the immune system. With aging, these stem cells with a greater potential to create myeloid cells become dominant in number, at the expense of those more likely to create lymphoid cells.

The new study showed that the myeloid-biased stem cells develop an elevated ability to self renew as they age, leading to a dramatic replication of these cells. This could help explain the diminished immune response and predisposition to myeloid leukemia in the elderly, making it possible to find a way to therapeutically address these pitfalls of aging.
Generosity

From time to time, MRI’s Development Director, Dave Crum, receives calls from attorneys asking for the Institute’s legal name or other identifying information. While an attorney cannot disclose the purpose of the call, it indicates that someone is making a bequest in their will to benefit McLaughlin. According to Dave Crum, “This type of gift is very important for the long-term success of the Institute.”

MRI is fortunate to have many loyal supporters who believe it is of critical importance to improve healthcare by supporting McLaughlin's research and education programs.

McLaughlin invites our supporters to consider this long-term approach to their partnership with us. Bequests are often not easy for people to think about, but the value of these gifts is tremendous. By making such a gift, you leave a legacy that will make a difference for many people by advancing research for deadly diseases.

Bequests are particularly important to plan, so it’s a good idea to discuss options with an attorney, which makes the process easier.

Your bequest can be used for a specific type of research that’s important to you. For instance, you can designate the gift for Alzheimer’s research or for an education project. Donors can also direct their bequest to the Institute’s greatest need and McLaughlin’s Board will oversee the use of these funds. Please feel free to contact Dave Crum at 406-454-6009 to discuss the specific purpose of a charitable contribution you may be considering and to learn more about your options.

Below are a few examples of bequest language.

Bequest of cash
“I bequeath the sum of $5,000 to McLaughlin Research Institute for Biomedical Sciences, Inc. of Great Falls, Montana.”

Bequest of a percentage of the estate
“I devise and bequeath 15% of the remainder and residue of property owned at my death, whether real or personal, and wherever located to McLaughlin Research Institute for Biomedical Sciences, Inc. of Great Falls, MT.”

Contingent Bequest
“If my brother John Doe survives me, I devise and bequeath 20% of the remainder and residue of property owned at my death, whether real or personal, and wherever located to John Doe. If John Doe does not survive me, then I devise and bequeath 20% of my residuary estate, whether real or personal property and wherever located to McLaughlin Research Institute for Biomedical Sciences, Inc. of Great Falls, MT.”

You may have heard the buzz about Tom Dean, or you may have yet to be introduced to his startlingly beautiful sculpture. In his short time on the art scene, he is quickly ascending to the top with his lifelike fish carved from exotic woods. In 2009, Cowboys & Indians named him one of the country’s best woodworkers.

The Great Falls artist has taken his work in an exciting new direction and is sharing the wealth with MRI. Maybe you saw his life-size sculpture of a bison skull, Big Medicine, on exhibit at this year’s C. M. Russell Art Auction. “It turned out to be a stunning piece and I wanted to do more with it,” he said. “This iconic symbol of the American West is so exciting to work with.”

The result is 25 signed and numbered limited edition bronzes of Big Medicine. Dean is donating a percentage of each sale to McLaughlin and three of his other favorite organizations: the Lewis and Clark Interpretive Center, the C. M. Russell Museum, and the National Museum of Wildlife Art in Jackson Hole. Each organization will receive $500 with the sale of each $10,500 sculpture.

“I want to give back to the community,” he said. “McLaughlin is a phenomenal research facility, and I want to be able to support research that takes place here in Great Falls.”

MRI Board member Leslie Oakland has admired Dean’s work since he began sculpting. “Tom’s work is already in the collections of interesting people far and wide,” she said. “His art will touch people all over the world, like McLaughlin’s work will. This is a great opportunity for art lovers to support biomedical research and enjoy beautiful sculpture at the same time.”

Bill Healey, of Jackson, Wyoming—a leading collector of western art—had this to say about Dean’s work: “Tom’s art will stand the test of time and become, in my opinion, true Legacy Art to be respected and handed down for the enjoyment of future generations.”

See a photo of the original wood sculpture and more of Tom Dean’s work, and order a Big Medicine Bronze at milocreekcarvings.com.
McLaughlin Wins First Lady’s Science Education Award

In February, McLaughlin Research Institute received a Math & Science Award from Montana’s First Lady for its outstanding commitment to science education. “We want to highlight those who are really making a difference,” First Lady Nancy Schweitzer said, “and McLaughlin is preparing the next generation to be leaders in our global economy.”

“McLaughlin actually shows kids how to perform research and teaches them the skills they need to be scientists, inventors or otherwise really cutting-edge players in the new economy,” she said.

The award is part of the Governor and First Lady’s Math & Science Initiative. According to Governor Brian Schweitzer, “It is absolutely essential that students have a solid foundation in math and science to compete in a global world.” Montana is unique in having two scientists for its First Couple. The Governor is a soil scientist and the First Lady is a botanist. She credits good teachers with stimulating her own interest in science.

“High quality teachers are essential,” she said. According to the First Lady, nurturing good science teachers, providing opportunities for young people to experience hands-on learning, and exposing them to career role models are key elements in encouraging students to pursue science, and McLaughlin Research Institute excels at each of these.

“We want to highlight those who are really making a difference, and McLaughlin is preparing the next generation to be leaders in our global economy.”

–Montana First Lady Nancy Schweitzer

She praised the Institute’s interaction with the community, bringing in teachers as well as high school students to work alongside the scientists. “This is a great opportunity for the students, and it makes better teachers, too.”

MRI has been training young scientists for more than a half century, beginning with Dr. Irving Weissman, now an eminent Stanford University stem cell biologist. An expansion of the education program with a five-year grant from the Howard Hughes Medical Institute features a partnership with the Great Falls Public Schools in developing an inquiry-based science curriculum.

McLaughlin Director George Carlson explained that education, in addition to research, has always been a critical part of the Institute’s mission. He pointed out the importance of the education program in a community without a research university. “We’re committed to providing opportunities for science students to do research,” he said.

“McLaughlin is grateful to the First Lady and the Governor for recognizing the importance of science education,” Dr. Carlson said. “It makes such a difference, having support from the government for both science and education.”

MRI/GFPS Partnership Motivates Students

A partnership between MRI and the Great Falls Public Schools is making science come alive for students. Local high school teachers are using engaging new lessons in their biology classes that were developed at McLaughlin as part of a new inquiry-based curriculum.

Inspired by working in the Institute’s labs and learning how real science works, teachers from C. M. Russell High and Great Falls High School are translating that experience into stimulating lessons for their classrooms. While individual teachers have been doing that for years, a small group of teachers is now working to apply their lab experience to the entire high school science curriculum. This means that all students in Great Falls will benefit.

The program is funded by a grant from the Howard Hughes Medical Institute, which aims to attract more students to science careers in order to meet the increasing demand and to keep the U.S. competitive in science fields.

Chris Provance, Assessment Specialist for GFPS, is enthusiastic about the project. “McLaughlin’s role in this move to inquiry-based science education is really key because it shows schools how professional science uses inquiry and critical thinking rather than a lockstep approach to the scientific method. We’re trying to get away from the old textbook view of science and show kids that science involves curiosity and creative thinking.”

The school district is using lab experiments developed at MRI to evaluate biology students’ science inquiry skills. According to GFPS Superintendent Cheryl Crawley, the tie between actual scientific research and the new curriculum is motivating students to learn.
Annette Kittleson followed her passion for working with animals to Montana, where she first worked with a sled dog trainer. “After 25 years of training and working with dogs, that was the one thing I wanted to do and hadn’t done,” she said. She later moved into another realm of animal work when she became a laboratory animal technician at McLaughlin. “I went from wrangling dogs to wrangling mice,” she said.

After a decade of caring for MRI’s mice, Annette Kittleson was named the 2009 Technician of the Year by the Northern Rocky Mountain Branch of the American Association for Laboratory Animal Science (AALAS). The AALAS is dedicated to “the humane care and treatment of laboratory animals and the quality research that leads to scientific gains that benefit people and animals.”

“An animal person is an animal person, whether you work with dogs or large exotic animals in a zoo or with mice that are used for medical research,” Annette said. Another way she has worked with animals who are used to help humans is by training dogs to track in search and rescue efforts. She still judges tracking events for the American Kennel Club.

At McLaughlin, she says, “We’re guardians of the animals. A lot of people don’t realize there are specific people looking after the mice to make them as comfortable as possible. I brought an ‘animal’ friend in to see the mice, and her comment was, ‘They seem pretty happy to me.’ That’s our goal – to make them happy.”

According to Julie Amato, Manager of MRI’s Animal Resource Center, the Institute recognizes that good animal care benefits the research. For example, she said, “Annette’s meticulous attention to detail and protocols makes sure that a research project goes forward in the proper manner.”

Because of the key role played by the technicians, MRI supports the development of its animal staff. This could help explain why its animal technicians are winning awards. Another technician, Anita Pecukonis, won an animal technician award in 2008 for a 10-state district of the AALAS.

Julie Amato explained that at MRI, “animal technicians are an integral part of the research that goes on.” Rather than merely cleaning cages, as animal caretakers do at most facilities, they work closely with the research staff. “The majority of the hands-on work that is done with animals is done by the technicians,” she said. “They bridge the gap between animal caretakers and research assistants.”