



Neurogenetics Laboratory Opens

NGL Holds Open House

MRN held an open house on May 16 to introduce its new Neurogenetics Laboratory (NGL). The NGL, a state-of-the-art facility capable of whole genome genotyping, whole genome methylation and whole genome gene expression analyses, adds a vital research tool to MRN's arsenal of neurodiagnostic equipment.

Held at MRN's headquarters in Albuquerque, the event was attended by representatives from a variety of research and educational institutions. The program, which featured presentations by Dr. Kent Hutchison, Director of the Neurogenetics Core at MRN, and Kyle O'Connor from Illumina, Inc., makers of the Bead Station, was followed by a tour of the NGL and a demonstration of its capabilities.

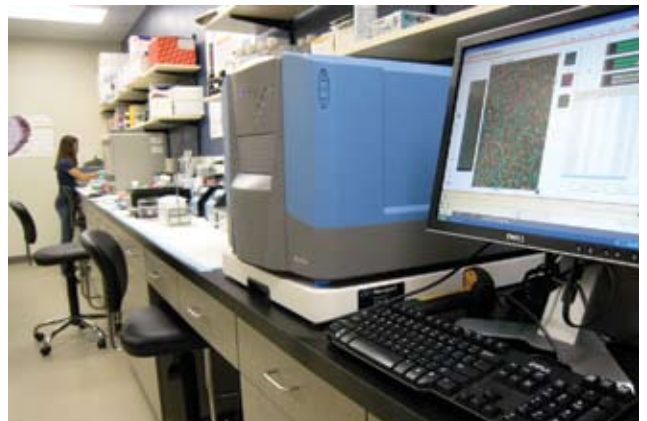
Significant advances in the treatment of all diseases, including mental illness, will require a greater understanding of individual genetic differences and their interaction with the environment. The hope is to someday use the human genome to match individuals with the treatment most likely to benefit them. "In

fact, the much touted promise of research on the human genome is personalized medicine," begins Dr. Hutchison. "This new facility allows us to leverage our existing capabilities and maximize the clinical potential of our research in ways that we would not have imagined even a year ago." With the installation of the Illumina Bead Station, which supports the profiling of a focused set of genes and whole genomes, MRN now has the capability to conduct a

wide-range of genetic analysis. The NGL will allow scientists to integrate genetic and imaging data through innovative neuroinformatic techniques such as ICA (Independent Component Analysis), to potentially develop new diagnostic and treatment solutions. ICA is a statistical and computational technique for revealing

hidden factors that underlie sets of random variables or signals.

Translational medicine, also referred to as "bench to bedside", is the practice of taking scientific research and translating it in to effective, practical treatments. Basic scientists provide clinicians with new tools for



use in patient treatment and also diagnostics. "At MRN we have a unique and effective circumstance in

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NGL Manager Marilee Morgan demonstrates the Illumina Bead Station

NM Economic Forum Honors Senator Domenici

Mind Discovery Fund Established as Tribute

More than 450 people attended the Economic Forum's tribute to Senator Domenici on May 29. The Forum, an organization comprised of business leaders devoted to improving the economic welfare of Albuquerque and New Mexico, paid tribute to Senator Pete Domenici at the sold-out event. Proceeds from the luncheon were donated to the Mind Research Network to establish the Mind Discovery Fund.

John Rasure, MRN CEO was on hand to accept kick-off donations from the Economic Forum and AztraZeneca Pharmaceuticals for the Fund. The Fund will provide

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Letter from the President



During the past few weeks, MRN has launched a campaign to raise funds to specifically support our early career researchers and honor Senator Domenici's commitment to understanding and treating mental illness. We have set a goal to raise \$1 million in the next twelve months for The Mind Discovery Fund. This Fund is critical to our mission as a non-profit, as we must be successful in raising unrestricted funds in order to ensure the smooth operation of our business.

As a non-profit research organization, we are proud of the progress we are making toward developing new tools that will enable practitioners to diagnose and treat mental illnesses and brain disorders earlier in life and with more accuracy. And as a non-profit, we also must focus on being financially strong so that we can support our successful early-career researchers with the matching funds that they need to realize their full potential.

The Mind Discovery Fund will provide this type of support for the many promising researchers, post-docs and graduate students at MRN. By making matching funds available to these developing scientists, they will be able to submit proposals to numerous grant foundations, like Templeton, MacArthur and others that require organizations to bear part of the cost of the research.

The Fund was also formed in honor of Senator Pete Domenici. His goal to make New Mexico a leader in neurodiagnostic discovery by establishing the Mind Research Network was visionary. In the ten years since 1998 when the Senator first began formulating his idea, MRN has worked hard to help fulfill his pledge to do everything possible for those who are impacted by mental illness and other neurological afflictions. As an organization, we are stronger than ever. In the last 2.5 years we have acquired over \$30 million in competitive grants; increased staffing from 40 to over 130; diversified our funding to include state and private monies and recruited top-notch researchers to the organization.

The Mind Discovery Fund is the next vital step in our growth. By raising these funds, we send a message to both current and future researchers, we believe in you and your work; we will work together to achieve our mission—the discovery and advancement of clinical solutions for the prevention, diagnosis and treatment of mental illness and brain disorders.

NGL Open House

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that researchers, clinicians, statisticians, imaging and genetic equipment are all located under the same roof," explains NGL's Manager Marilee Morgan. "This allows for every day collaboration and communication between scientists and doctors, which expedites and streamlines the development of progressive and effective treatments."

MRN's biggest proponent, U.S. Senator Pete Domenici, agrees, "The Mind Research Network is leading the way in expanding our knowledge of illnesses and conditions that affect the brain, and I continue to support federal funding for ongoing research. This Neurogenetics Laboratory will allow researchers to better understand the link between genetics and neurological illnesses, which will pave the way for better treatment of these conditions in the future." Senator Domenici is the lead Republican cosponsor of a bill to increase support for, and better coordinate, federal investment in neurological research.

To study the human genome in its entirety requires sophisticated techniques, equipment, and analyses. The NGL houses the Illumina platform that utilizes microarray technology. This technology allows for the examination of entire genomes instantly and in one experiment. "It wasn't that long ago that a scientist's career focused on only one gene at a time,"

states Dr. Hutchison, "but it all changed after the human genome was sequenced." Microarray technology was quickly developed, which is a series of thousands to hundreds of thousands of microscopic spots of DNA sequences called features. These tiny features are then positioned on a surface to interrogate genetic differences between individuals and disease states. The DNA sequences are attached to the beads to generate the array components for experimental interrogation. "Illumina's technology is unique in that they assemble microarrays via random self-assembly of microspheres into ordered microwells allowing for great flexibility in both content and format."

One area that has benefitted from the advances in research is epigenetics, or environmental genetics. This refers to chemical modifications to genes that occur due to environmental factors, but do not change the DNA sequence itself. "Epigenetic modifications include addition of molecules, such as methyl groups, to the DNA backbone," Dr. Hutchison explains. "Adding these groups changes the appearance and structure of DNA, altering how a gene can interact with other molecules. Epigenetic mechanisms play important roles during normal development, aging, and a variety

Neurogenetics Core Director Kent Hutchison interviewed by Chris Schuler of Christopher Productions for their upcoming documentary



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Profiles

Melissa Hilleary, Chief Operations Officer

Chief Operations Officer Melissa Hilleary has been with Mind since 2004, but in fact wanted to be a part of the organization since its inception.

What brought you to Mind?

I had recently retired when I saw an employment ad for the then MIND Institute, and it was an opportunity that I hoped for ever since participating in the kick-off ceremony



back in 1998. At the time, I was working for UNM (as Assistant Director) of the New Mexico Engineering Research Institute, and was at the Research Park where they held the ceremony. Senator Domenici and then Secretary of Energy Bill Richardson were there announcing the establishment of a state-of-the-art neuroimaging research facility headquartered on campus.

Was there something specific about Mind that drew you to become involved?

Well, a major part of what I did for UNM was to support scientists in their research, so I knew I could be a help to the organization.

How did you know you could help?

In my time at UNM, I was involved in everything from contracts and grants—which (as you know) is vital to a non-profit research institute such as ours—to planning, budgeting and administering projects as a Program Manager. There were even projects involving Los Alamos National Laboratory, one of MRN's current collaborators. So I had the experience, but more importantly I had a personal inspiration to become involved with neuroscience research.

Did your background involve the study of neuroscience?

I did concentrate on biology and chemistry in college as part of my BUS Degree—so I had an interest—but it goes deeper than that. In 1997 my husband was diagnosed with AVM in his brain, which is basically means a section of blood vessels had formed a knot, instead of branching

normally. When the AVM began to leak, his life was truly on the line. His neurosurgeons used every possible means to plan the least evasive way to proceed with the required surgery, even drawing on the then new MEG scanner at the VA Medical Center.

It all turned out well?

Yes, he's fine now. So when the opportunity to work with neuroscience researchers came up, it was an easy decision. Being retired, I could have pursued less demanding work, but I wanted to be involved with something worthwhile. Here we have the chance to help so many people.

What do you see as the biggest change from where we started out?

We're finally fulfilling our original vision, in that collaborative relationships are taking over old style competitive lines, which is often the case in funded research. All the parts are in place now—from the support staff, IT, our neuroinformatics core, to the new neurogenetics lab—our scientists have been given what they need to be successful.

Mind Discovery Fund

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matching research dollars for early career scientists at Mind. "We are delighted that the Economic Forum and AztraZeneca have chosen to donate to mental illness and brain disorder research, and that we were able to accept their gifts at an event honoring Senator Domenici, who has been a tireless advocate for these issues," Rasure offers.

"I am very proud of what mind has accomplished in 10 short years," Domenici stated. "Today's launch of the Mind Discovery Fund is a very gratifying tribute to the work of Mind scientists, my staff and our partners the last decade. The Mind Discovery Fund will help propel important discoveries to give hope to and improved lifestyles for patients and their families."

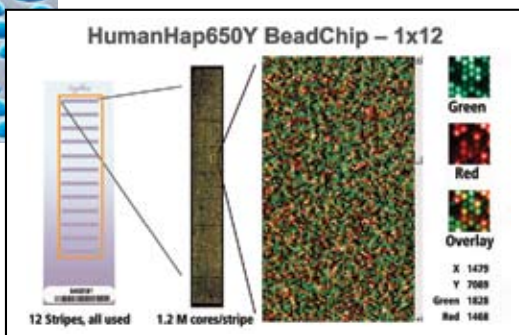
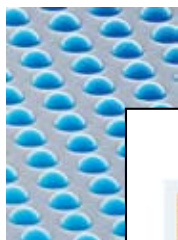
In fact, the Fund was established specifically to honor Senator Domenici and his creation of MRN. According to Rasure, "Senator Domenici pioneered



attention to mental-illness issues in Congress, such as the Mental Health Parity Act, increased funding for mental health research, and increasing funding for those in prison or homeless suffering from a mental illness. Through his high-profile work, he has brought mental illness to the forefront of the national public-policy dialogue and has begun to successfully address and erase some of the stigma that surrounds it."

NGL Open House

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Beads self assemble in microwells, and each is covered with hundreds of thousands of copies of a specific oligonucleotide that act as the capture sequences in one of Illumina's assays.

of disease conditions including cancer, MS, diabetes, and schizophrenia."

Another area of research benefiting from MRN's increased genetic capabilities is understanding the development and maintenance of addiction in individuals. Dr. Hutchison explains, "We are currently conducting a clinical trial to determine whether a specific type of medication might help reduce craving for alcohol and decreases alcohol consumption." It is thought that some alcoholics may be particularly vulnerable to the effects of alcohol on brain circuit that underlie craving and relapse, and this vulnerability is likely based on genetic factors.

"If that is the case, these genetic factors should predict the success of a medication that targets these brain circuits. Ultimately, matching individuals to treatment based on specific genetic variables has the promise of

increasing the overall effectiveness of the treatment."

Finally, the "bedside" aspect of the equation has been addressed with five interview rooms completed in conjunction with the Laboratory build. Although these rooms are used by several investigators conducting clinical studies at MRN, they are a vital component of Dr. Hutchison's research. He elaborates, "After an initial screening, which includes medical and psychological testing, subjects recruited for a clinical study then have a sample of their DNA taken via saliva sample and an MRI. Once this preliminary data is reviewed and a subject is deemed a good candidate, they are enrolled in the study." Subjects are then given medication for 12 weeks, during which time they participate in eight psychotherapy sessions and receive regular medical evaluations. "We have enrolled about 50 treatment-seeking alcoholics to date and are working hard to boost our recruitment. The hope is that the clinical component of our studies will encourage participation."

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NEWS & NOTES

- Mind would like to congratulate the new additions to our Board of Trustees, W. Ward Davidson, Jim J. Marquez and Robert “Bob” Goodman. A complete list of current Board members can be found on our website.
- MRN teamed with New Mexico Mathematics, Engineering, Science Achievement (NM MESA) to share emerging data with New Mexico educators on improving educational outcomes for children and young adults. Presented by MEG Core Director Mike Weisend, Ph.D., this program, dubbed SCORE (a Scientific Collaboration on Research in Education) was a free, professional development series designed to enable New Mexico teachers to incorporate recent neuroscience discoveries into classroom teaching techniques.
- The Mind and UNM will hold the fMRI Image Acquisition and Analyses Course August 4th-6th on the campus of the University of New Mexico, in Albuquerque. Hosted by MRN Investigators Dr. Vince Calhoun and Dr. Kent Kiehl, the course will cover experimental design, image acquisition, introductory MR physics, optimized image processing, statistical analyses (i.e., SPM2/5 with General Linear Model and Statistical Nonparametric Mapping (SnPM)) and Independent Component Analyses of functional magnetic resonance imaging (fMRI) data. It is designed for fMRI researchers who range from beginning to intermediate skill levels. See our website for more information on the course, agenda, suggested readings, travel information and how to register.
- MRN Headquarters in Albuquerque has had several visitors recently, including a group of 75 international fellows from The National Defense University. After a short program hosted by MRN’s Science Director Vince Clark, Ph.D., guests were given a tour that included our MRI and MEG facilities, the IT Center and the new Neurogenetics Lab. Over 48 countries were represented.
- MRN has appeared in the news several times over the last few months. In addition to articles in the Albuquerque Journal, The Santa Fe New Mexican, New Mexico Business Weekly and The New York Times, researchers Rex Jung and Gerry Yonas appeared on CBS affiliate KRQE’s morning news show, and Kent Kiehl was featured on the NBC Nightly News with Brian Williams. This segment, one in a series of five dealing with mental health issues, featured Dr. Kiehl’s psychopathy research utilizing the Mobile MRI Imaging System. Please visit www.mrn.org and follow the “Newsroom” link for copies of all the articles and videos.
- This spring MRN and the University of New Mexico offered a graduate level course in the new discipline of Neurosystems Engineering. ECE 595 ST was taught by Mind Researcher and UNM Professor Rex Jung, Ph.D. and Gerold Yonas, Ph.D., VP and Principal Scientist at Sandia National Laboratories.
- Dr. Vince Calhoun, Director of MRN Image Analysis and MR Research is the recipient of the UNM School of Engineering Junior Faculty Research Award in Electrical and Computer Engineering. He was recognized for his work in developing techniques to integrate complex brain imaging data. Calhoun was selected by a SOE committee comprised of the Dean, Associate Deans and Chairs.

The Mind Research Network is a non-profit partnership dedicated to the discovery and advancement of clinical solutions for the prevention, diagnosis and treatment of mental illness and brain disorders. Based in Albuquerque, New Mexico, MRN scientists collaborate with colleagues at nationally renowned partner sites across the country including the University of New Mexico, Massachusetts General Hospital, University of Minnesota, and Sandia and Los Alamos National Labs.

For more information, visit our website at www.mrn.org or call us at **505-272-5028**, or toll free at **866-254-6463**. Please direct any questions or comments about this newsletter to info@mrn.org

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