

STATE OF MIND

The **Mind**
RESEARCH NETWORK
FOR NEURODIAGNOSTIC DISCOVERY

AUTUMN 2007

Official Newsletter of the Mind Research Network

MIND INSTITUTE EXPANDS TO MRN

“More Accurately Reflects National Operational Structure”

The MIND Institute will now be referred to as The Mind Research Network (MRN). The change is intended to better reflect the mission of the MIND Institute, according to John Rasure, the President and CEO of the MRN. “The name more accurately reflects our national operational structure, organized to forge partnerships between national collaborative research centers that study traumatic brain injury, psychopathy, addiction, schizophrenia and other neurological conditions that affect individuals and society at large.”

The Mind Research Network combines multi-modal neuroimaging, genetic mapping and neuroinformatics to more quickly advance research, diagnosis and treatment of mental disorders and brain injuries under study at various MRN centers. “Studies of mental illness and brain injury can advance more quickly by integrating data from each of our partners with existing and new collaborators,” Rasure adds.

“Our mission is to integrate data from different sites that use various neuroimaging modalities, in order to produce significantly more meaningful and usable data. Ultimately, we are creating a new paradigm for mental health research that will produce quicker results with fast-track clinical applications.”

“As the MIND Institute, we already have extensive experience in the design, conduct and analysis of multi-centered clinical trials,” Jeremy Bockholt, the Director of Neuroinformatics explains. “This includes the MIND Clinical Imaging Consortium, which generated data from more than 400 human research volunteers across four sites (University of New Mexico, The University of Iowa, University of Minnesota,

and Harvard University) that had comprehensive neuroimaging, genetic, clinical, socio-demographic and neuropsychological assessments.”

This strategy-sharing techniques and expertise across sites and combining multiple approaches to understanding the human mind and brain—positions the MRN to apply answers to crucial questions about the mechanisms and treatment of neurological disorders. For more information about the research taking place at the MRN, please visit www.mrn.org

Dr. Kent Hutchison Joins the Mind Research Network

Not to be lost amid the clamor of the change of The MIND Institute to The Mind Research Network, is the arrival of our newest researcher, Dr. Kent Hutchison. Most recently at the University of Colorado in Boulder, Dr. Hutchison will be wearing many hats within New Mexico. He is the Director of the new Neurogenetics Core, the liaison between the MRN and CASAA (UNM’s Center on Alcoholism, Substance Abuse and Addictions), and a Professor of Psychology and Neuroscience at UNM.

The focus of Dr. Hutchison’s research is the improvement of treatment for addictions. He approaches this through an investigation of the genetic risks for addiction and the matching of these risks to potentially efficacious medications. “Abuse and addiction to illegal substances, alcohol and nicotine cost Americans nearly a half trillion dollars each year when you factor in medical, economic, criminal and social costs to society.” Then there are the costs in lives, Hutchison explains, “Alcohol abuse contributes to 75,000 deaths each year.

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Letter from the President



It's an exciting time at The Mind Research Network—from the change in our name, to the continued growth and expansion of our research staff, projects, and capabilities—the organization is now strategically poised to move to the next level of excellence in neuroscience research.

I am especially excited about the arrival of Dr. Kent Hutchison and Dr. Francesca Filbey. Their critical research on the mechanisms that underlie substance abuse and dependence has far-reaching implications, not only for individuals, but for society as a whole.

To sustain our forward momentum, we need to continue to bring successful investigators into the organization. Scientific research fields are growing and changing rapidly, making the competition for the best and the brightest scientific minds fierce. But neuroscience research offers exciting opportunities to new researchers and the chance to contribute to solving some of humanity's most devastating diseases and disorders. We recognize the importance of developing, encouraging, and nurturing these individuals as they progress in their fields, and that their successes help us attain our organizational goals.

Another achievement we want to build upon is the \$500,000 appropriation for the Mobile MRI we received during the 2007 New Mexico legislative session. Throughout the next few weeks, we will be developing our strategy for the 2008 session that begins in January. We'll begin laying the groundwork immediately by meeting with key legislators, executive staff, and other major players who can help us improve the quality of life of millions of people by supporting the work that we do.

On the federal side, we continue to work with our Congressional Delegation to secure continued funding from the Department of Energy. Additionally, we are working with our federal relations team to have legislation introduced that will provide resources for the accurate diagnosis and treatment of traumatic brain injuries and Post-traumatic Stress Disorder—two devastating health issues that afflict two-thirds of the veterans who are returning from the Iraq and Afghanistan conflicts.

Finally, I want to mention our strengthened partnerships with Sandia National Laboratories and the University of New Mexico. I recently had the opportunity to meet with Dr. David Schmidly, UNM's new president. We had a productive and positive meeting that I believe will lead to a stronger collaboration between our organizations. In fact, we are currently working with folks from UNM and Sandia on creating the Neuroscience for National Security Center. We acknowledge the importance of our partners, and look forward to working with all of them as we move forward with our mission.

I hope you enjoy our newsletter. And please feel free to contact me at any time with your comments, feedback, or questions.

John Rasure

A Thank You to the State Legislature

We would like to thank Governor Richardson and his staff, Finance & Administration Secretary James Jimenez, State Representative Rick Miera, and others for their efforts in helping the Mind Research Network obtain a \$500,000 appropriation for the first mobile MRI unit in the country dedicated to research. Because of their efforts, to date, our lead researchers Dr. Kent Kiehl and Dr. Pilar Sanjuan have completed more than 250 brain imaging sessions at correctional facilities throughout New Mexico.

This information is critical to the study of the mental processes underlying substance abuse and

persistent criminal behavior, which we know imposes a huge economic impact on individuals, families and communities. By the summer of 2008, we hope to complete brain imaging sessions on 1000 inmates. This would constitute the largest dataset that has ever been collected in this population in the history of medicine.

The MRN appreciates the ongoing support of these mental health advocates. Their assistance will have an immeasurable impact on the cutting-edge research that MRN scientists are engaged in today—and the treatment, prevention, and cures of tomorrow.

Dr. Kent Hutchison

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Currently, excessive drinking is the third leading lifestyle-based cause of death. Add to that the nearly 450,000 deaths from tobacco, and you have a major socioeconomic problem." If solutions are to be found, new approaches will need to be taken. "There is no simple solution for addiction. We know that many factors are involved in addiction, and that these factors are not the same for everyone."

Combining his background in genetics with the multi-modal neuroimaging capabilities at the MRN, Dr. Hutchison hopes to develop better addiction treatments. "To develop more effective pharmacotherapies, we have focused our attention on medications that target the basic neurobiological and behavioral mechanisms involved in the development and maintenance of addiction." He explains, "We're focusing on the genetic

factors that may vary from person to person—not only what makes one person more susceptible to addiction, but also who may be most likely to respond favorably to a given medication."

The neuroimaging capabilities of the MRN should yield valuable insights. "The move to Albuquerque transports our laboratory-based research to a neuroimaging environment. By integrating neuroimaging with our genetic research, we can better understand how genetic variations interact with exposure to alcohol and drugs to change the way the brain functions."

MRN's scanning capabilities weren't Dr. Hutchison's only attraction to Albuquerque. "Colorado was a wonderful environment—it's been said that no one ever leaves Boulder—and although it is different, Albuquerque offered the same high quality of life." Albuquerque uniquely offered Dr. Hutchison the opportunity to work at two top research centers, the MRN and CASAA, a center devoted to understanding addictions. "One of the

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Profiles

Julie Weaks Gutiérrez

There is no better place to start our *Profiles* series than with Julie Weaks Gutiérrez, who has served on our Board of Trustees from its inception in 1999 and as its chair since 2004. She played numerous key roles in UNM administration during her tenure there and received both her bachelor's and MBA degrees from the University. She was UNM's Vice President for Business and Finance from 1999-2004.

How did your involvement with the Board come to be?

Fellow Board members Leonard Napolitano and Bob



Taichert approached me because of my financial management strengths and background when they were first putting the organization together. I was intrigued with the idea of a neuroscience research facility, especially one that would bring together resources at the University of New Mexico, Los Alamos and Sandia Labs, and a personal call from Senator Domenici certainly helped win me over.

Being involved from the onset, you've seen a lot of changes. How have things evolved? This organization has made the transition from an idea to a reality and from a research foundation into a research company. We are performing cutting edge neuroscience research and have also implemented management and business planning initiatives to insure the financial viability of the organization. From the beginning we knew that the duration of our federal earmark was limited and that we must figure out how to be a self-sufficient, sustainable organization when it terminated. We are well on our way to accomplishing that goal. We have a fantastic CEO, Dr. John Rasure, who brought to the organization a combination of experience in academics and research coupled with expertise as an entrepreneur with a start-up business. He, in concert with the Board, has implemented a successful research and business plan for the organization. We are now generating forty percent of our own revenue, and by the end of 2009, we will generate one-hundred percent of our own funding through a combination of competitively won grants and contracts, private fund-raising and other entrepreneurial activities.

How does sustainability come about? It is a long and arduous process which involves establishing a track

record in research, while carefully managing the financial and administrative components of the organization. We have been quite successful in terms of recruiting some very talented researchers to the Institute, and they are able to obtain competitive grant funding for their research. However, finding the funding to sustain management and operating costs of the Institute and to seed research start-ups is the next challenge. We are working hard to diversify our funding.

What other kinds of funding opportunities are you pursuing? We launched a private fund-raising initiative last year and as a result of that initiative received our first large contribution (\$500,000) from a private donor. We also approached the State of New Mexico for funding for the first time last year and are very pleased that we were able to obtain \$500,000 from the State Legislature to fund some of our capital equipment needs. We are also pursuing other opportunities including philanthropic endowments, strategic partnerships, etc.

What are some of the challenges facing the MRN?

We face all of the challenges that any start-up business would, and the financial climate in the country at present is a fairly volatile one. There have been limitations imposed by Congress on federal research funding for agencies like the NIH and NSF, so that makes the work of securing grant funding especially challenging. Also, the volatility of markets at this time may cause potential private donors, whether they are foundations or individuals, to scale back their philanthropic activities. There are a lot of significant and controversial issues occupying the national consciousness at present, and sometimes it is especially easy to overlook the need for basic research funding in this kind of a atmosphere.

And the future? I am very optimistic. This organization has made tremendous progress so far, and all of the pieces are in place for that success to continue. Not only are we doing high quality research, but we have brought over forty new jobs to New Mexico in the past year. This is exactly the kind of a business activity needed to bring sustained economic development to our state.

Diana South

The second subject of this issue's profile is Diana South, MRI Manager. She is an AART Board-Certified MRI Technologist, and has been involved with our MR research for the past eight years. Diana is in a unique position here, as she not only is involved with nearly all

the research taking place, but also the person most likely to interact directly with the scan subject.

How does being a scanner operator here differ from your last position? "After ten years in trauma at University Hospital, this was a welcome change. Long-term studies and drug trials may last up to five years, so there is more of an opportunity to establish a relationship with the subject."

I'm sure the average person doesn't have any idea how one goes about becoming an MRI operator. "Well, after receiving my Associate's Degree from UNM in Radiology, I started working at University Hospital. From there, I studied CT (Computed Tomography) and eventually took the Boards for licensing. Since one of the requirements for MR licensing is you must first have a license in either Radiology, Nuclear Medicine or Ultrasound, I was able to cross train in Magnetic Resonance Imaging and take the advanced certification test for my MR license."

January saw the arrival of the new 3.0T MRI system (visit the Gallery at mrn.org for photos). How is it working? "Surprisingly, it only took about a month to install and bring on line. It was much a simpler process than installing a system from the ground up. The shielded room was already built, the required power in place. But the biggest advantage was that our facility was set up with removable walls to allow for a magnet swap."

Any changes for you in the foreseeable future? "As a matter of fact, we are about to begin clinical scanning, probably by the time this is published. The plan is to generate external income to help with the funding of our research projects. As for me, I've been finishing up my radiology degree. And those of us from the old-school can never have enough computer training."

Is there one thing you like best about your job? "It's a versatile position—I not only act as scanner operator on most research studies and clinical scans, but as the Manager I'm handling daily scheduling and use of the scanners. Having to be involved with every aspect of the process doesn't leave any time to get bored." In addition to all her duties, she is also responsible for establishing and implementing standard safety procedures. "And sometimes there's floor mopping," she adds.



NEWS & NOTES

- The MRN has been named a "Charity of Choice" for the **25th Weems International Artfest** to be held Nov. 9-11 at the New Mexico Expo State Fairgrounds in Albuquerque. The Weems Artfest is billed as New Mexico's number one arts and crafts festival, with the work of over 250 international artisans on exhibit. Guest artists will include Isleta Pueblo's Teller Family, along with book signings, food booths and live music. Friday evening will also include a tribute to Art Patron Thelma Domenici. Proceeds from the event will also benefit the Animal Humane Association, Rachel's Courtyard at Presbyterian Hospital, Golden Apple Foundation of New Mexico and the Nancy Floyd Hayworth Breast Cancer Foundation. For more information call (505)293-6133 or visit the festival's website at www.weemsgallery.com
- The Mind Research Network is pleased to announce that one of its researchers, Rex Jung, Ph.D. has been awarded a grant from the John Templeton Foundation. Titled "The Neuroscience of Creativity", his proposal consists of a multi-year study of creativity, utilizing structural MRI, DTI, functional imaging and cognitive testing. For more information on the Templeton Foundation, please visit their website at www.templeton.org
- "Celebrating 40 Years of Leonardo" - The 40th Anniversary International Conference will be held October 14-19, 2008 at the University of New Mexico in Albuquerque. Leonardo is the trademark for the not-for-profit organization the International Society for the Arts, Sciences and Technology, as well as the name of the Journal published by the organization. Forty years ago in Paris, a group of artists, scientists and engineers got together and decried the lack of professional venues where emerging work bridging the two cultures could be presented, debated and promoted. Frank Malina, himself a research engineer and a professional artist, convinced Pergamon Press to take on the challenge of publishing a peer-reviewed scholarly art-science-technology journal. To date they have published the work of more than 5,500 artists, researchers and scholars. While still more than a year away, MRN is proud to be associated with Leonardo and its involvement with the international anniversary conference. More information will be available on their website, www.leonardo.info

What's IT All About?

When discussing the technology behind the neuroscience taking place at the Mind Research Network, the focus is usually on the cutting-edge neuroimaging equipment like the 275-channel Omega275 MEG scanner, or possibly the 1.5T Mobile MRI system—one of the only such systems in the world. What often gets overlooked is the infrastructure behind these state-of-the-art tools. "Like most high-profile research centers, the support staff behind the scenes at MRN is involved with some fairly high-tech equipment of their own," states Jeremy Lawrence, the Director of Information Technology (IT). "The storage requirements alone are huge." He continues, "In the two years I've been here, the amount of data we're backing up has increased three-fold. Our investigators are collecting and analyzing almost a terabyte per month." Roughly speaking, that translates to ten times the capacity of the average home PC each and every month.

Considering the time and expense required to acquire this data, it's an understatement to call it a valuable asset. "When an investigator turns their data over to us, they have the right to expect it's safety," explains Lawrence. "That introduces a whole litany of issues—uninterrupted power, server room climate control, and of course, just in case, data backup." He continues, "For the most part, what IT does goes unnoticed—if we're doing our jobs correctly, there's little reason to consider our part in the process." When the IT Department is suddenly in the spotlight, it usually means some potentially catastrophic event preceded it. "No one has any control over a power outage or when a piece of equipment reaches the end of it's life," Lawrence states "What we can control is our preparedness for these events."

As the Network Administrator at the MRN, Chris Hamilton agrees. "It's just not as simple as restarting after a power outage. If it happens at your home, you reset the clock on your microwave. Here, the consequences are potentially dire—damage to equipment, a loss of data that is impossible to recreate." These scenarios could

translate to hundreds of thousands of dollars, even before factoring in the loss of man-hours while repairs are taking place—thus the need for backup generators supplying uninterrupted power. Hamilton adds "Also, it's a 24 hour a day operation whether there are people working in the building or not. An air conditioning unit in the server room going down at 3 am just can't wait until morning."

Equally important when discussing data is its availability to all who need it. Sometimes years will pass from the start of a large-scale study to its conclusion, so both the raw and analyzed data must remain accessible during that time. This brings up another large part of the IT Department's function—keeping the day-to-day infrastructure running smoothly. The nearly 250 systems networked throughout the building require constant attention to maintain transparent connectivity and the uniform transfer of data across those Linux, Windows and Macintosh systems. Along with Hamilton, that falls on the shoulders of Raul de la Garza and Steve Marinelli, who are responsible for a wide range of tasks—software purchasing and installation, hardware repair, email, web access and data backup are just the start. "Today, maintaining a secure computing environment is a full-time job in itself." Lawrence continues, "We have researchers out in the field that need the same secure access to our network as they would have in our facility."

The Mobile MRI system was a particularly complex problem. Rather than the transfer of data over an in-house network, the Mobile is out in the field acquiring immense amounts of information that must be collected and stored back home on a daily basis. Lawrence is aware of the huge responsibility that is inherent in the process. "It's no secret that this data is obtained from human subjects. These people expect their privacy to be maintained, and that is something that is taken very seriously by everyone involved in the process." And the future? "There's no time to be complacent. We're in a business where it pays to stay ahead of the curve."

Just what happens to all that data accumulating on MRN's servers? As the Director of the Neuroinformatics Core (NIC), Jeremy Bockholt explains, "A gigabyte of data acquired by a scientist here at MRN will triple in size after being processed and analyzed. In it's raw format, the data has limited uses for an investigator." That's where the Neuroinformatics Core comes in. "Neuroinformatics is a hybrid of the neuro and computer science disciplines whose major goal is to produce databases and software for data acquisition, data management and data exploration. Our job is to help investigators integrate all neuroscience research information sources collected within a research study—such as genetic information, clinical assessments scales and brain morphometry measures."



Jeremy Bockholt has had 16 years of experience in neuroscience research and software development and has lead neuroinformatics support and centralized morphometric analysis efforts at the MRN

for the past four years. Mr Bockholt leads the NIC and oversees all aspects of data management from all project investigators. The NIC team will work with the study investigators to finalize the study data collection forms and build a computerized database system. "Having the NIC in the same location where the MR, MEG, EEG analysis occurs, in addition to where a statistician is located, facilitates communication and coordination of data related issues", he explains. "What the NIC is doing here allows an investigator to focus on understanding the function of the brain rather than getting bogged down by data use and integration issues."

Dr. Kent Hutchison

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things that I am most excited about is the chance to unite and develop active research collaborations between the MRN and CASAA." As a Professor within the Departments of Psychology and Neuroscience, Dr. Hutchison also looks forward to teaching promising students. "These are both very dynamic fields. The opportunity to mentor a student who may someday be responsible for the next advancement in addiction treatment is very gratifying. I consider it a vital component of my research."

Dr. Hutchison is also enthusiastic about the available neuroinformatics capabilities at the MRN. He explains, "Within the MRN, we can conduct much more sophisticated analyses than we were able to at Colorado. In New Mexico, we will be collecting a "gene chip"

from each participant. This chip contains 1.8 million genetic markers of a possible 6 million variations in the genetic database, allowing infinite possibilities in examining genetic variations." The hope is to isolate a group of markers that influence a person's susceptibility to addiction. Hutchison continues, "If we can find the genetic marker that influences the effect of alcohol and drugs on brain function, then we're on the path to determining how these genes affect the development of addiction." Ultimately, the data that Dr. Hutchison collects will position him to take the next step towards matching treatments to individuals, thereby improving the effectiveness of these treatments, and improving the quality of life for those struggling with addiction.

The Mind Research Network is a non-profit partnership dedicated to helping people now by improving the diagnosis and understanding of neurological disorders, and in the future by finding methods of prevention, better treatments and ultimately cures. Based in Albuquerque, New Mexico, MRN scientists collaborate with colleagues at nationally renowned partner sites across the country.

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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