THE NEXT DECADE OF DISCOVERY
2008 ANNUAL REPORT

The Mind
RESEARCH NETWORK
For Neurodiagnostic Discovery

This annual report was designed and produced in-house

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A MESSAGE FROM THE PRESIDENT

As the Mind Research Network enters its second decade, we are well positioned to continue our mission to discover and develop tools for earlier and more accurate diagnosis of mental illness and other brain disorders. We have created a strategic advantage for discovery by merging critical technologies in a shared infrastructure.

Scientists at MRN are easily able to integrate genetic and imaging data, along with psychological assessment, with the support of a strong informatics and brain image analysis groups. Centralized management of all of these resources under one roof, combined with an atmosphere that fosters collaboration, are unique strengths of MRN.

This tremendous capability to advance our understanding of the brain can only deliver value when it is translated into real and effective clinical solutions. MRN's involvement in the Early Assessment and Resource Linkage for Youth (EARLY) program, a research, education, intervention and treatment initiative for psychotic disorders in young people, exemplifies how MRN is connecting clinical neuroscience research to patients in need.

The funding success and productivity of MRN's scientists are evidence of the strengths described above. In 2008, MRN investigators achieved an impressive 35 percent win rate of reviewed grants and increased the amount of National Institutes of Health grant funding by 149 percent.

In the decade ahead, the ultimate measure of our success will be the impact that we have on the health and well-being of patients and their families. With this focus, and your support, we will make a difference.

John Rasure, PhD
President and *CEO*

BIPOLAR DISORDER OR SCHIZOPHRENIA?

"We engineers like to think about networks, and you can think of the brain in the same way." As an Electrical and Biomedical Engineer, Dr. Vince Calhoun, MRN's Chief Technology Officer and Director of Image Analysis and MR Research, uses his background to identify networks in the brain. As an undergraduate in Electrical Engineering at the University of Kansas, Dr. Calhoun also studied biology; and it was as a senior that he was first exposed to magnetic resonance imaging (MRI) technology. "I thought the physics behind it was really cool. It began my move into bioengineering, where I became aware that many of the body's physiological process such as blood flow and the electrical impulses in the brain could be modeled using engineering principles."

Preliminary results in Dr. Calhoun's research, a collaboration between the National Institutes of Health, Yale University, the University of New Mexico and Hartford Hospital, have shown a single functional MRI scan can differentiate between schizophrenia and bipolar disorder with a 93 percent accuracy rate. "fMRI is an MRI scan that gives you a picture of changes in blood flow over time. This allows us to see how an individual's brain is activating while doing a task, or while at rest," explained Dr. Calhoun.

"Various networks in the brain can be identified using fMRI. When looking at schizophrenia and bipolar disorder, we found two in particular to be significant. One is the temporal lobe, the region of the brain essentially responsible for processing sound." This would explain why individuals with schizophrenia often have auditory hallucinations. Calhoun continued, "The other is default mode, basically the regions that tend to be active when you're not focused on a task. In an earlier study, both these areas showed profound differences in schizophrenia. In the current study, once we identified these networks, we were able to look at whether the changes in these areas could help us better differentiate schizophrenia from bipolar disorder from healthy individuals."

Schizophrenia and bipolar disorder impact about eight million people, or about 3.5 percent of the population over the age of 18. Current diagnoses for these disorders are based primarily on symptoms and clinical interviews. Historically, one of the problems with obtaining a proper diagnosis is that a subset of these individuals have overlapping symptoms, causing great difficulty in differentiating between the two disorders.

"Sometimes it will take months or years to get an accurate picture of which illness these individuals have," Calhoun stated. "However, one of the things we do know is: the earlier we can diagnose and provide people with the proper treatment, the better their long-term outcome. There's a lot of potential for imaging to make an impact, because you're looking at something that can be measured definitively."

VINCE CALHOUN, PhD

BREAKTHROUGHS

THE NEUROSCIENCE OF CREATIVITY

"It's a funny kind of finding, and I wish I knew why," Principle Investigator Dr. Rex Jung admitted. If you're one of the 9 percent of the population with an IQ of 120 or higher, then your brain's biology handles creative tasks in a different manner than everyone else's. Jung (along with other researchers from MRN, University of California, Irvine and the University of New Mexico) arrived at this conclusion after scanning 56 college students as part of a three-year study funded by the John Templeton Foundation.

But how do you define creativity? Along with being scanned using magnetic resonance spectroscopy, subjects took an IQ test as well as having their capacity for "divergent thinking" measured. This was achieved by asking subjects to participate in creative thinking exercises. For example, given a common object like a brick, subjects were asked to think of as many different uses for it as possible. Some answers included building a wall, displacing water in a toilet tank or propping a door open. But one subject noted that the brick could be "tied to an elf's shoe to drown him." The responses were rated by the researchers as to what degree they were both "novel and useful."

Overall, the volunteers' creativity scores were correlated with a chemical found almost exclusively in neurons within a brain region called the anterior cingulate gyrus (ACG), which helps coordinate mental activity throughout the brain during attention, problem solving and decision making. While low chemical levels in the ACG correlated with high creativity in people of average intelligence, in people with IQs of above 120, the opposite was true. These findings were published in a recent issue of the Journal of Neuroscience.

"This is the first time we've seen real biological evidence that creativity works differently at different levels of intelligence." Jung explained, "My theory, and it's currently just a theory, is that in the average intelligence group, you need to hit more nodes in your brain to hunt for that novel and unique idea. In the high IQ folks, it seems that the ideas they generate may be more novel to begin with, so the brain tends to rely more on its knowledge base in these individuals."

By studying what the brain does well, a field of research known as "Positive Neuroscience", Dr. Jung hopes to discover better ways to understand what might be affecting the brain in neurological and psychiatric disorders. "This research could show us something quite important about the brain, relevant to both health and disease."

REX JUNG, PhD

MICHAEL WEISEND, PhD

MAPPING BRAIN FUNCTION AND DYSFUNCTION

As is often the case with any type of clinical research, including that in mental illness, there is little immediate feedback from the people you are ultimately helping. "My mentor once said he wore two hats. When he wore his 'schizophrenia hat,' he was helping people in the next decade, but when he wore his 'epilepsy hat,' he was helping people the next day," said Research Scientist Dr. Michael Weisend. "Applying scientific knowledge to human problems today, tomorrow, next year and in the next decade is important. It is exciting and gratifying work."

While working at the VA Hospital in Albuquerque, Weisend learned how to pinpoint the origins of an epileptic seizure through the use of magnetic source imaging (MSI), a noninvasive method used to examine the function and structure of the brain. The MSI examination is performed in two steps, magnetoencephalography (MEG) and magnetic resonance imaging (MRI). MEG takes advantage of the fact that the brain produces electrical currents which generate a surrounding magnetic field. Using special sensors, it is possible to measure the brain's tiny magnetic signals.

Since healthy brain tissue produces different magnetic patterns than unhealthy brain tissue, MEG can be used to determine the specific regions that are malfunctioning. MRI, on the other hand, is the preferred method for providing images of the brain's structure. When MEG and MRI data are combined, they provide a detailed picture of the relationship between brain structure and brain function. "This provides physicians who are considering neurosurgical intervention a very clear picture of what's going on inside someone's head before the surgeon begins," said Weisend.

MSI is performed in patients scheduled for brain surgery. "Pre-surgical imaging for patients with epilepsy or brain tumors is often a good idea." Weisend explained, "It's not just about pinpointing the location of brain dysfunction, it's also important to identify the properly functioning areas that the surgeon should avoid when attempting to remove the damaged tissue."

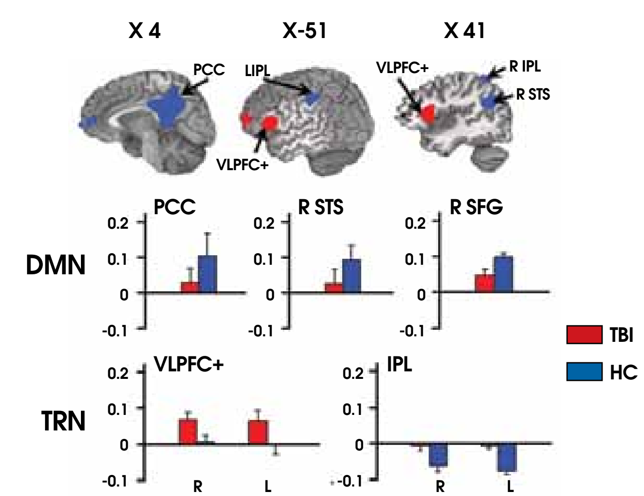
Dr. Weisend, together with Dr. Bruce Fisch of the University of New Mexico's (UNM) Neurology Department, is initiating a program to scan as many as three patients with epilepsy or brain tumors each week. "Considering patients with epilepsy make up nearly 1 percent of the general population, and of those, 40 percent experience seizures that cannot be completely controlled with medication, nearly 8,000 New Mexicans could benefit from MSI."

The impact of MSI prior to brain surgery will reach far beyond New Mexico. Since there are fewer than 30 centers with MSI capability in the U.S., patients from all over the country are likely to visit Albuquerque for MSI examinations. Weisend continued, "UNM Hospital's Epilepsy Program is nationally recognized and will benefit tremendously from MRN's involvement. The partnership with Dr. Fisch will allow our scientists to help people today and many tomorrows to come. This is the realization of Senator Domenici's vision for a successful neuroimaging center in New Mexico."

SELECTED RESEARCH
TRAUMATIC BRAIN INJURY

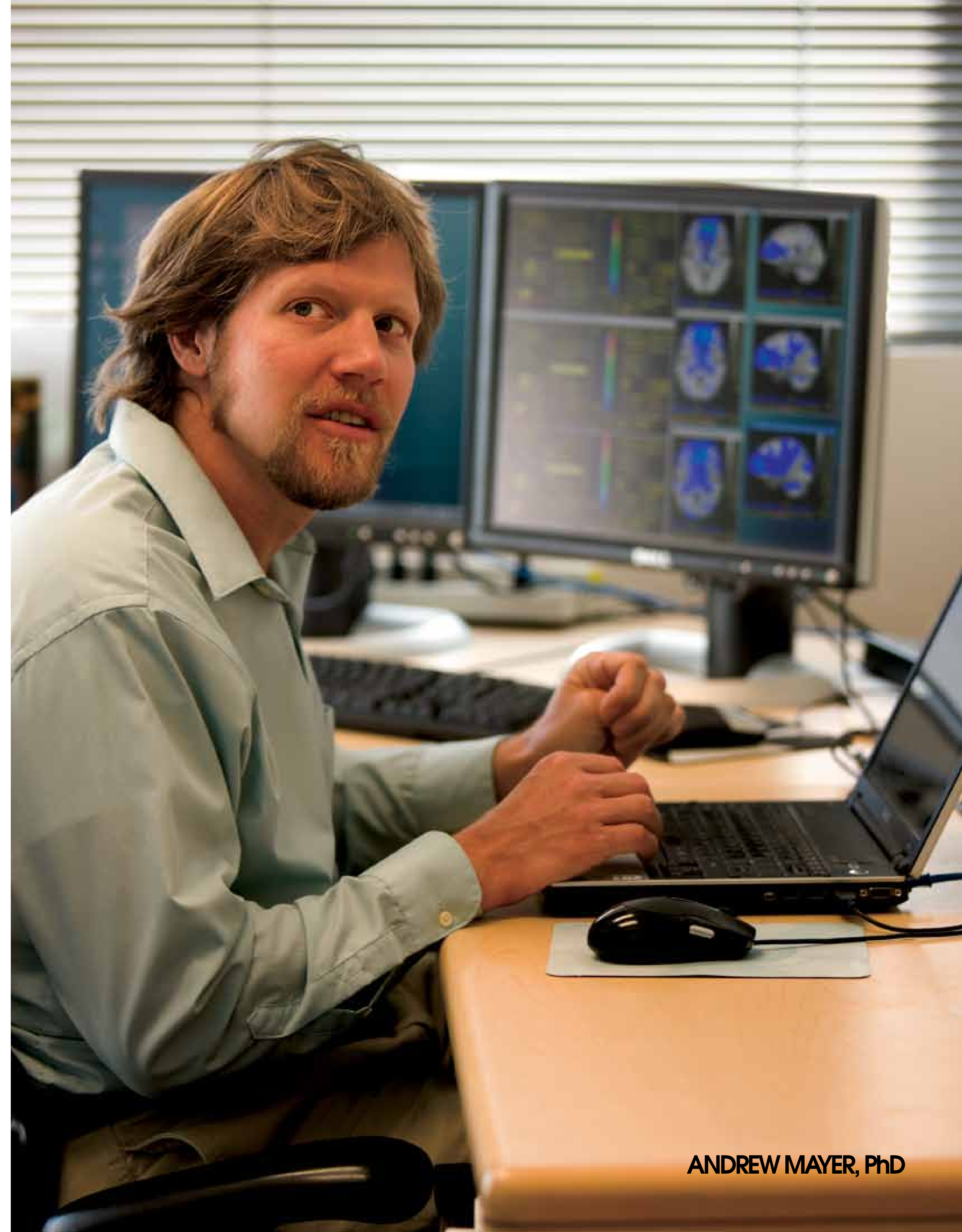
A group of dedicated scientists at the Mind Research Network (MRN) are currently using a variety of novel neuroimaging techniques to better understand mild traumatic brain injury (mTBI). In the United States alone, there are approximately 1.2 million mTBI cases per year that result in an estimated cost of $56 billion dollars. Symptoms can range from subtle problems with attention, concentration or emotional control, to severe physical and mental disability. Cognitive difficulties are often present in the first few weeks of injury, but typically decrease within three to five months post injury in 80-90 percent of patients. “The first step for understanding these cognitive difficulties is to develop biomarkers (biological indicators) that indicate neuronal injury and the subsequent recovery process that occurs for most patients,” said MRN Researcher, Dr. Andrew Mayer. “This will be critical not only for mild TBI, but also for more severe forms of TBI as well.”

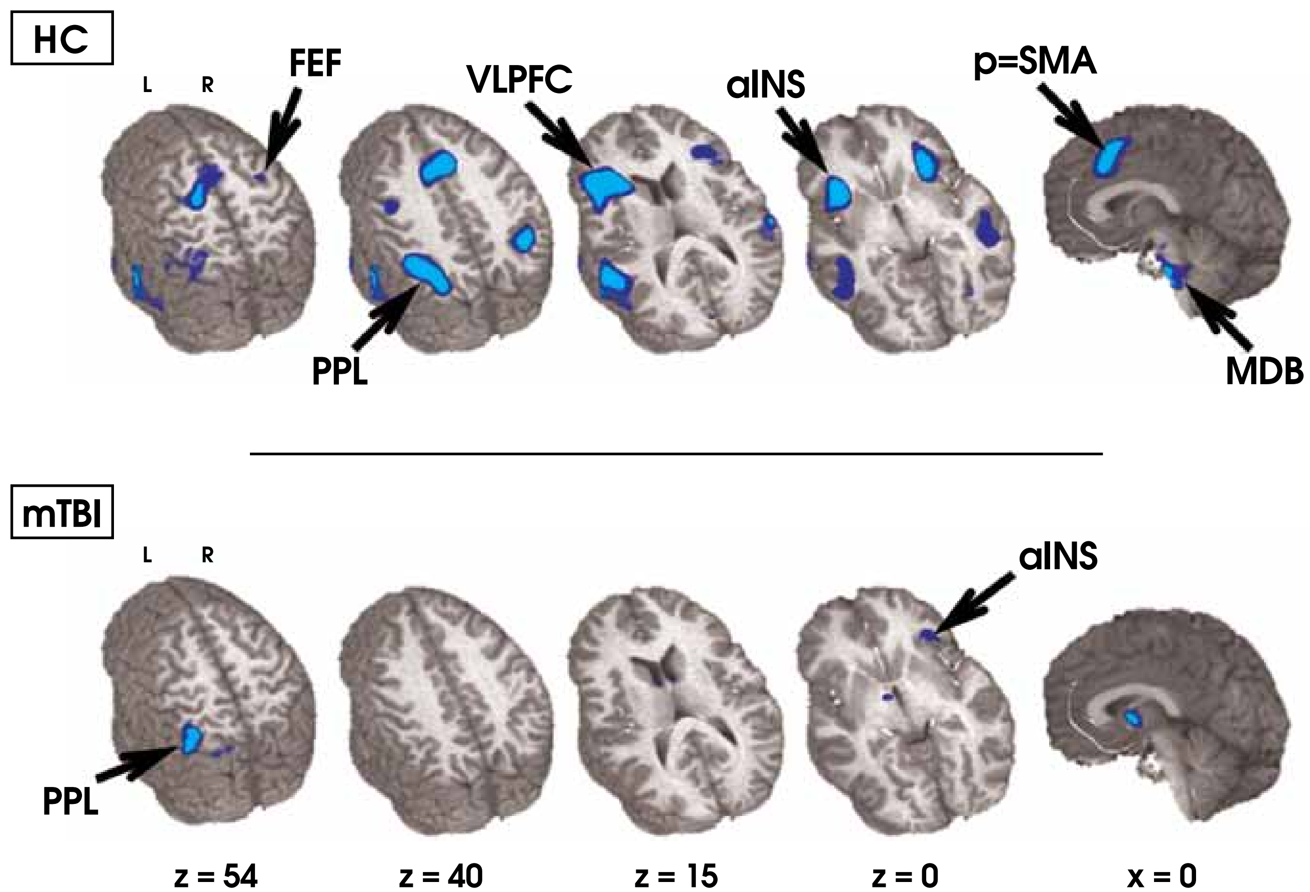
However, the pathology underlying cognitive deficits in mTBI is likely to be subtle, and hard to detect with conventional imaging techniques such as CT or MRI scans. “To date, only a few studies have utilized multi-modal neuroimaging to study mild TBI during the semi-acute stage of injury.” Dr. Mayer is carrying out a long-term study of mTBI during both the semi-acute and chronic phase that combines various imaging technologies with the goal of developing a human recovery model of mTBI. To do this, Dr. Mayer is testing the diagnostic and predictive capabilities of more research-based neuroimaging techniques such



Mild TBI may affect how two of the brain’s major networks (default mode & task-related) communicate at rest. The connectivity coefficients for mTBI are shown in red (TBI) and healthy controls (HC) in blue.

as functional MRI (an indirect measure of gray matter functioning and blood-oxygen content), diffusion tensor imaging (a measure of white matter integrity), MEG (a measure of electrical impulses), and magnetic resonance spectroscopy (a direct measure of neuronal and axonal health). The use of multiple neuroimaging techniques is crucial because they each measure different signals (blood-oxygen content or electrical impulses for example), that originate from different tissue sources in the brain (such as white versus gray matter). Utilizing all these resources will be critical for identifying the widespread and diverse injuries that may occur following head trauma. “The combination of information from these different imaging techniques is





These results show the very different brain responses of healthy controls (HC) and mild traumatic brain injury (mTBI) patients when they are forced to switch their attention to an unexpected location following an invalid cue.

Healthy controls showed robust activation during attentional disengagement within the frontal eye fields (FEF), posterior parietal lobule (PPL), ventrolateral prefrontal cortex (VLPFC), anterior insula (aINS), pre-supplementary motor area (p-SMA), and midbrain nuclei (MDB), which was either absent or greatly reduced for mTBI patients.

likely to be synergistic and will probably exceed the sum of each individual modality alone."

When asked what led him to study brain injury, Mayer responded, "My graduate work focused on child and adult neuropsychological assessment of multiple neurological disorders, including traumatic brain injury." After moving to New Mexico in 2001 to complete a clinical internship and post-doctoral fellowship, Dr. Mayer continued his specialization in neuropsychological assessment at HealthSouth Rehabilitation Hospital, where he was able to work with many TBI patients. "That experience, plus the fact that much of my research focuses on how people pay attention to their environment, has prepared me well for working in this field. Patients with TBI often struggle with different aspects of attention, so it was a natural fit."

Developing an identifying process for these biomarkers will not only help to understand the cognitive deficits as well as the subsequent normal recovery process, but may be useful for distinguishing the small percentage of mTBI patients who suffer long-term cognitive problems due to the injury. "The hope is that by recognizing those 15 percent or so of patients who will continue to experience symptoms, we can positively influence their outcome. We could do this by providing different therapies to improve neuroplasticity, but also by developing better coping strategies for the patient and their family. Mild TBI is similar to most illnesses in that the earlier a proper diagnosis can be made, the better the outcome," said Dr. Mayer. "It may mean the difference between a good recovery and a poor one."

NEURODEVELOPMENT

It's something of a miracle that the complex process of brain development usually proceeds just fine, leading to happy, bright, socially-adjusted children. Too often though, things don't go so smoothly and a brain disorder develops, leading to cognitive deficits that impact quality of life. This is precisely what happens in autism and epilepsy, two of the most common neurological disorders in children. MRN Principal Investigator, Dr. Julia Stephen uses state-of-the-art noninvasive neuroimaging and genetics technologies to study both healthy and atypical brain development with the goal of positively impacting the lives of these children.

Autism is more properly referred to as autism spectrum disorders (ASD) since it is actually a range of neurodevelopmental disorders, all characterized by social and communication difficulties, and in some cases, severely restricted interests and highly repetitive behaviors. ASD is usually only identified when it manifests as cognitive and behavioral problems, often at four or five years of age. There is overwhelming evidence showing that the earlier atypical neurodevelopmental issues are properly diagnosed and addressed, the better the outcome for the child, their family and society. "Our goal is to develop tools to diagnose ASD earlier and to make those diagnoses more precise," said Dr. Stephen.

Using the world's first pediatric MEG neuroimaging system, called babySQUID® (super conducting quantum interference device), Stephen and her team identified a biomarker of atypical brain development in ASD-diagnosed children as young as twenty months. The researchers showed that these children do not integrate hearing and touch information as quickly as healthy children. This sensory processing delay is likely due to problems with connectivity between the brain areas that process sound and touch, and may lead to difficulty generating a coherent percept of the world. "We're hopeful that this finding will lead to the identification of similar markers in even younger children who are at risk of developing an ASD," said Dr. Stephen. In addition, her lab is correlating these brain measures with genetic and environmental-exposure data, with the hope of giving clinicians the tools to refine the diagnosis of this disorder, thereby allowing for more targeted interventions.

Like ASD, epilepsy is not a single disorder, but a syndrome with multiple forms. All forms are defined by the presence of recurrent seizures, caused by abnormal bursts of electrical activity (so-called "ictal" events, from the Latin

From **FightingAutism.org**

- 297,739 cases of autism in 2007, ages 3-22
- 1558% cumulative growth rate of autism from 1992 to 2007 (19% average annual growth rate)

From **EpilepsyFoundation.org**

- Epilepsy and seizures affect almost 3 million Americans of all ages
- Approximately 200,000 new cases of seizures and epilepsy occur each year
- Ten percent of the American population will experience a seizure in their lifetime
- Three percent will develop epilepsy by age 75

JULIA STEPHEN, PhD

word ictus, meaning a blow or stroke) originating from one or more locations in the brain known as seizure onset zones (SOZ). Epilepsy can begin at any age but is most common in children, with the highest incidence in the first year of life. Recurrent seizures generally have adverse effects on developing brains, often leading to learning and memory problems, neuropsychiatric issues and social difficulties, any one of which can be more disabling than the seizures themselves. The stress and burden on families can be profound.

There is, therefore, enormous motivation to diagnose these children and identify the most effective treatment as early as possible. With a grant from the National Institute of Child Health and Human Development, Dr. Stephen hopes to develop a noninvasive tool to reliably and precisely localize the SOZ, so that it can be surgically removed or isolated. Well over half of all cases of epilepsy are the result of a single SOZ, and its removal may either cure the epilepsy or provide relief by reducing seizure frequency and/or severity.

Currently, SOZs are found by opening the skull and inserting recording electrodes for one week. Given the risks of infection associated with this invasive method, the first line of treatment for epilepsy is medication which may decrease the seizures, but will not cure the disorder. Clinicians typically try several medications, during which time the brain may be damaged by continued seizure activity. In many cases, none are effective and only then does surgery become an option. With a noninvasive and accurate tool for localizing SOZ, neurosurgery would become a more attractive option, thereby increasing the likelihood of curing or controlling the epilepsy before the seizures do irreparable harm to the developing brain. Earlier surgical intervention is also desirable, because the younger the child is, the more easily their brain recovers from the surgery. Indeed, the side effects of surgery can be imperceptible compared to those associated with long-term use of certain anti-seizure medications.

The biomarker that Dr. Stephen hopes to develop would be an electrical signature unique to SOZs that can be recorded noninvasively. Between seizures, one can often detect more frequent "inter-ictal" events within SOZs and outside them–often, most likely in tissue damaged by the seizures. In addition, a second type of brief electrical event, called an HFO (high-frequency oscillation), has been known to piggy-back on some inter-ictal (and ictal) events. However, these were identified invasively, during surgery, and only in adult patients.

Using the babySQUID®, Dr. Stephen and colleagues have measured HFOs noninvasively during some inter-ictal events in infants and young children with epilepsy. The fact that HFOS were associated with only some of the inter-ictal events is consistent with Dr. Stephen's hypothesis that the HFOs might be a biomarker for SOZs in children with epilepsy. "We now need to demonstrate that these HFOs are indeed unique to the SOZs," said Dr. Stephen. "If we can do that, we will have taken one giant step closer to giving these kids a greater chance for a healthy, fulfilling life."

SELECTED RESEARCH
NEUROSYSTEMS FOR NATIONAL SECURITY

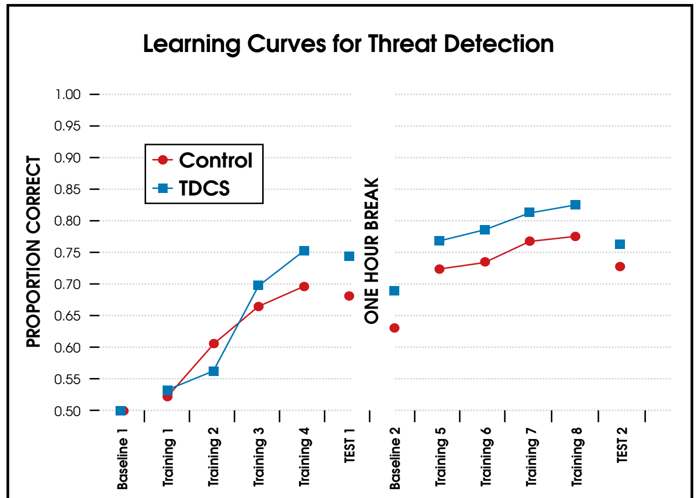
A soldier's ability to master and consequently perform their job can have life or death consequences. The situation is exacerbated by the fact that the soldiers have to learn so much, in so little time, and that they are then expected to apply that knowledge under very strenuous circumstances.

MRN Researcher Dr. Michael Weisend and Dr. Gerry Yonas, a Principal Scientist and Vice President of the Advanced Project Group at Sandia National Laboratories, hope to tip the scales in favor of a soldier performing well. They are doing so through a research program at MRN that aims to better understand the skill acquisition process, and to accelerate and enhance that process. With his PhD in Engineering Science and Physics from Caltech, Dr. Yonas' involvement on this project exemplifies the collaborative and multidisciplinary approach to problem solving at MRN.

This learning study is taking place within an MRN program known as Neurosystems for National Security, or NS2, which applies neurosystems engineering principles to vital human-centered national security applications. Neurosystems engineering is a hybrid field, combining neuroscience and systems engineering. "In human cognitive neuroscience, researchers typically look at how psychological and cognitive functions are produced by the brain. Systems engineering focuses on how complex engineering projects should be designed and managed. Therefore, the neurosystems engineering aspect of the NS2 program aims to support human performance in complex environments by understanding and aiding brain processes," Weisend said.

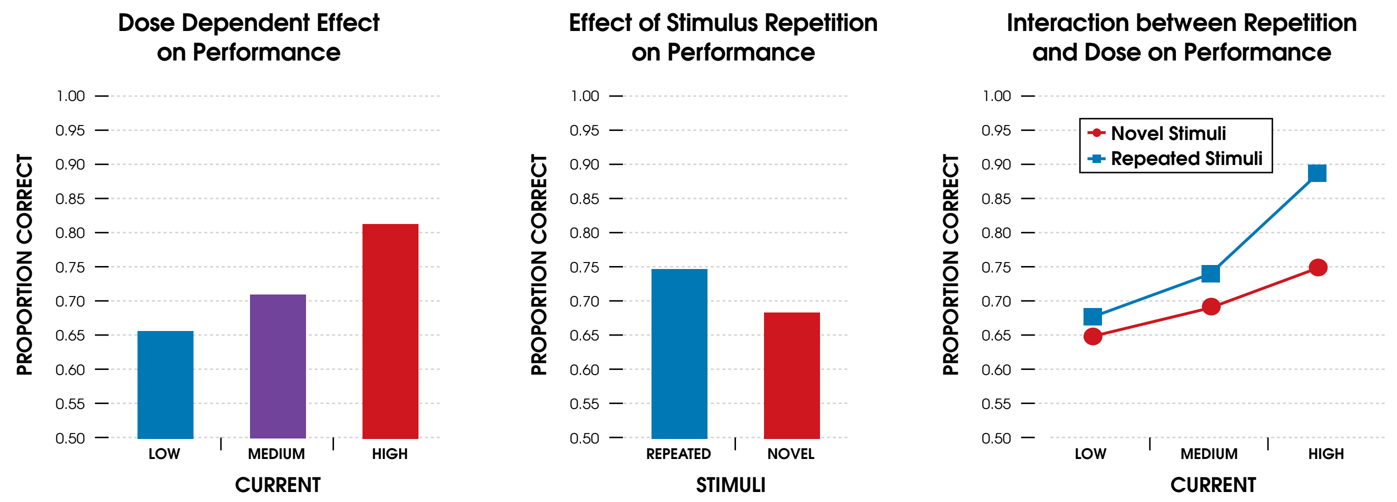
The NS2 group integrates neuroimaging and behavioral data as research participants progress through a training paradigm, acquiring some motor and/or cognitive skill set. These data should advance our understanding of the neural basis of both the learning process and the variation that exists between individuals in the ability to acquire new skills. In addition, this research could provide tools to identify learning problems earlier than is currently possible, thereby creating an opportunity to adapt training paradigms appropriately.

Researchers then use noninvasive brain stimulation, specifically transcranial direct current stimulation (TDCS), to try to influence the learning process, perhaps increasing



Application of TDCS accelerates the learning process as illustrated here where performance is plotted as a function on training.

GERRY YONAS, PhD



LEFT: the effects of different doses of TDCS are displayed. "HIGH" dose is 2mA for 30 min. CENTER: figure shows the advantage repeated material has over novel material during a retention test. RIGHT: the effect of different doses of TDCS are examined within familiar and novel material. Retention of the repeated material is enhanced by increasing doses of TDCS. Performance in novel material is also facilitated by TDCS, albeit to a lesser degree. TDCS appears to have effects on memory and on some other aspects of performance that we have not yet quantified.

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the speed of learning or improving retention. TDCS utilizes scalp electrodes to deliver low amplitude direct currents to localized areas of the cerebral cortex (the superficial part of the brain), thereby modulating the level of excitability, or, put another way, increasing or decreasing the probability that neurons will talk to each other. Weisend went on to say, "Even though TDCS has been applied to humans safely for decades, we are just beginning to learn how it helps to accelerate the learning process. Within the next couple of years, I expect great progress toward this goal." While Yonas' and Weisend's long-term goal is to improve learning performance in realistic military applications, their research has broader implications. A number of studies suggest that noninvasive brain stimulation could be used therapeutically to treat a range of motor, cognitive and affective disorders including depression, schizophrenia, chronic pain, stroke, epilepsy and Parkinson's disease. TDCS has the advantages of being inexpensive, easy to administer, noninvasive, painless and having only mild adverse effects. To return to military applications, which Dr. Yonas has devoted his long and distinguished career to, one can envision soldiers with PTSD benefiting from TDCS-based therapy as an adjunct to other therapies.

FINANCIAL REPORT

In 2008, MRN achieved another year of impressive growth, with grant revenues reaching a new high of more than $18 million. The largest sources were federal grants and awards, which MRN investigators were extremely successful in obtaining. As a result, MRN more than doubled its contract base from 17 grants valued at $29.1 million in 2007 to 40 grants valued at $45 million in 2008, which included a new $11.6 million Department of Energy award to study mental illness and other brain disorders.

Our financial position is strong as we start our second decade, but to make our organization even more robust we will concentrate on growth and strategic investment, as well as diversification and fundraising.

To meet the goal of increasing staff to roughly 250 by 2011, our numbers went from 117 in 2007 to 147 in 2008. In the past year MRN also invested in infrastructure to position the research staff for success. Important capital expenditures included the construction of our state-of-the-art Neurogenetics Core laboratory, as well as the purchase of our previously leased magnetic resonance imaging (MRI) scanner and mobile MRI, the first in the world designed for functional brain imaging.

The second prong of our strategy is diversification and fundraising. Ninety-eight percent of our funding comes from NIH, DoE, HHS, DoD and NSF–all federal dollars. Our target in the coming decade is to increase non-federal revenue to 10 to 20 percent of our total revenue budget.

Finally, we would be remiss if we did not take this opportunity to extend our thanks and gratitude to those who have supported MRN over the years. Among them is the DoE, which provided our initial funding and continues to support our work, and of course our founder, Senator Pete Domenici (Ret., NM). We also wish to extend a special thank you to the individuals, corporations and foundations that generously contributed in 2008 to MRN's goals. Many of the private, corporate and foundation contributions went towards the establishment of the Domenici Discovery Fund, and show a clear vote of confidence in MRN's ability to meet its goal of having real and lasting impact on those affected by mental disorders.

Robert Goodman, MBA
Chair, MRN Finance Committee
MRN Board of Trustees

FINANCIAL DATA

REVENUES AND EXPENDITURES

REVENUES		
Government grant funding	$	16,892,448
Private grants and gifts		1,564,055
Other		9,465
Total Revenues	**$**	**18,465,968**
EXPENDITURES		
Research	$	12,966,543
Management and general		2,407,463
Fundraising		94,763
Total Expenditures	**$**	**15,468,769**
Change in Net Assets	**$**	**2,997,199**

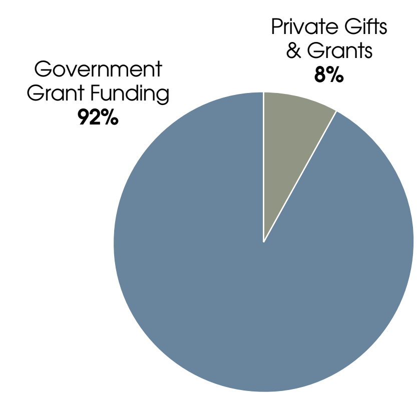
ASSETS AND LIABILITIES

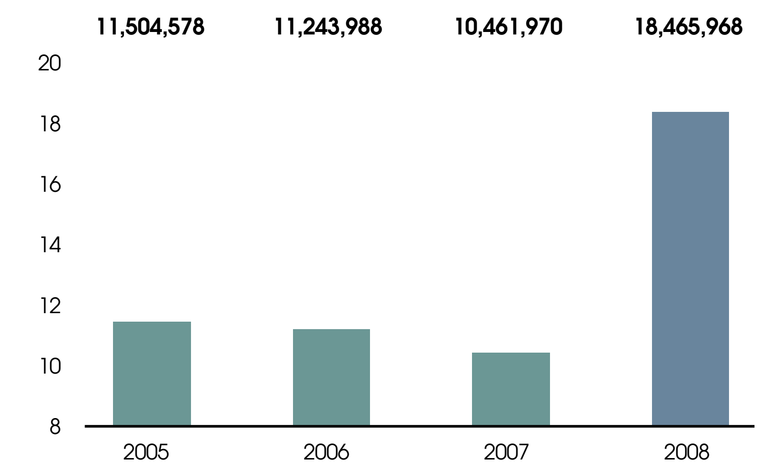
ASSETS		
Cash and equivalents	$	412,939
Grants receivable, pledges receivable and other		2,621,498
Prepaid rent and other expenses		3,544,885
Property		6,358,151
Total Assets	**$**	**12,937,473**
LIABILITIES		
Accounts payable and accrued expenses	$	3,053,047
Advances and deferred obligations		160,428
Total Liabilities	**$**	**3,213,475**
NET ASSETS		
Unrestricted	$	5,968,071
Temporarily restricted		3,755,927
Total Net Assets	**$**	**9,723,998**
Total Liabilites and Net Assets	**$**	**12,937,473**

Fiscal Year Ended December 31, 2008

SUMMARY

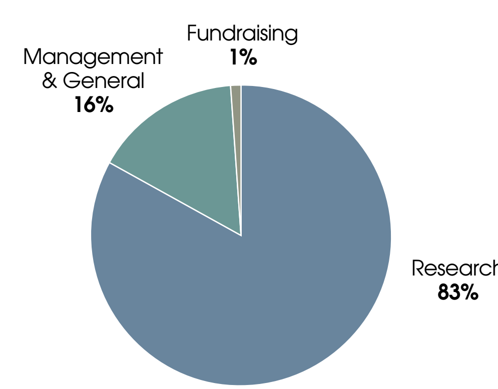
Percentage of Revenues





Revenue Growth (in Millions)

Percentage of Expenditures



The Mind Research Network maintained a strong financial position in 2008 with revenues of over $18 million, representing a 76 percent increase over 2007. The largest source of revenue was government grants which exceeded $16 million, as our scientists continued to be highly successful in a very competitive funding environment. Over $3 million of that federal funding was for state-of-the-art research equipment.

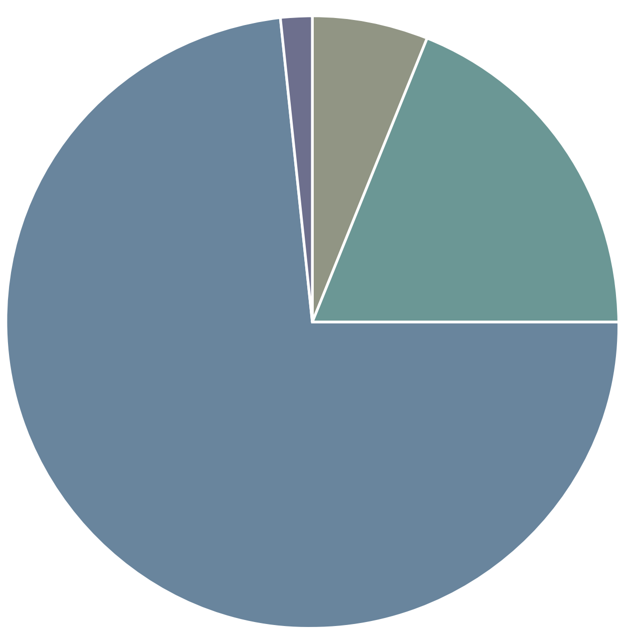
Also notable was a sizable increase in funding from private donations. This philanthropy has significant impact, as much of this support is invested in the research efforts of our outstanding junior investigators.

FUNDING

BY AREAS OF RESEARCH

	Total Funding	Percent
Infrastructure	14,303,460.00	24.6
Addiction	13,164,362.89	22.6
Psychosis	12,687,774.85	21.8
Forensics & Social Cognition	8,651,388.44	14.9
Neuroinformatics	6,797,153.46	11.7
Neurodevelopment	1,268,131.80	2.2
Other	739,136.50	1.3
TBI	437,934.00	0.8
NS2	144,578.00	0.2

BY SOURCE



Source	Percent
Department of Defense	6.2
Department of Energy	18.7
National Institutes of Health	73.4
Foundations	1.7

ACTIVE CONTRACTS AND GRANTS

Principal Investigator	Title
	INFRASTRUCTURE
John Rasure	2008 Department of Energy Grant
Vince Calhoun	Health Care and Other Facilities (Equip Grant for new 3T)
	ADDICTION
Kent Kiehl	Neurocognitive Change Associated w/Behavioral Treatment
Francesca Filbey	The Effects of DNR1 on Brain Function in Cannabis Users
Kent Hutchison	A New Pharmacotherapy for Alcohol Dependence: Olanzapine
Kent Hutchison	Alcohol Dependence: Integrating Genetic & fMRI Methods
Kent Hutchison	Sensitivity to Intravenous Ethanol: Genetic Determinants
Kent Hutchison	HIV Prevention with Adolescents: Neurocognitive Deficits and Treatment Response
Arvind Caprihan	Adoloscent Neurodevelopment and Alcohol
Matthew Shane	Error Detection and Error Awareness in Incarcerated Cocaine Dependent Individuals
Julia Stephen	Fetal Ethanol-Induced Behavioral Deficits: Mechanism, Diagnoses and Intervention
Vince Calhoun	Alcohol Use in College Students: Cognition and fMRI
Kent Hutchison	Alcohol and Substance Use Disorders from Adolescence through Age 30
Matthew Shane	Using fMRI to Modulate Neural Responses to Drug and Non-Drug Rewards in Cocaine Dependent Individuals
Sarah Feldstein Ewing	AMICA-Assessing the Fit of Motivational Interviewing by Cultures w/ Adolescents
Kent Hutchison	Multilevel Analysis of Self-regulation and Substance Abuse
Kent Hutchison	A New Pharmacotherapy for Alcohol Dependence: Olanzapine (ARRA Supp)
Jingyu Liu	A Multilevel Vulnerability Study of Substance Abuse Via CNV, Brain Activation and Behavior
	PSYCHOSIS
Kent Kiehl	Aberrant Functional Connectivity in Psychosis
Hongji Chen	Brain Glutamate and Outcome in Schizophrenia
Vince Calhoun	Neural Mechanism of Schizophrenia:Use of Mutliple Neuroimaging Tools to Examine Dysfunctions in Neural Integration
	FORENSICS AND SOCIAL COGNITIVE RESEARCH
Kent Kiehl	Neurocognitive Assessment of "Callous" Conduct in Disordered Youth
Carla Harenski	Multimodal Imaging of Social Emotion and Decision Making in Psychopathy
Kent Kiehl	MacArthur Law & Neuroscience Project
Kent Kiehl	Socio-Moral Processing
Kent Kiehl	The Cognitive Neuroscience of Female Psychopathy
	NEUROINFORMATICS
Vince Calhoun	Resource for Quantitative Functional MRI
Vince Calhoun	A Unified Framework for Flexible BRain Image Analysis
Vince Calhoun	Multivariate Methods for Identifying Multi-task/Mutimodal Brain Imaging Biomarkers
Jeremy Bockholt	National Alliance-Medical Imaging Computing (NAMIC) (RMI)
Vince Calhoun	Characterization of Two Distinct ADHD Neurobiologies with fMRI
Vince Calhoun	Complex-Valued Signal Processing and its Application to Analysis of Brain Imaging Data
Jeremy Bockholt	fBIRN: Functional Imaging Research for Schizophrenia Testbed
Vince Calhoun	Informed Data-Driven Fusion of Behavior, Brain Function and Genes
	NEURODEVELOPMENT
Rex Jung	The Neuroscience of Creativity
Julia Stephen	High Frequency Activity in Infants with Epilepsy
Julia Stephen	Realistic Simulations and Empirical Data: MEG Reconstructions of Time
Rex Jung	Employee Lease Agreement
Rex Jung	Neuropsychological Evaluations in Support of Dr. Adair's Elan Study
Rex Jung	CS&T Programmatic Support
Rex Jung	Robust Knowledge Capture
	OTHER
Rex Jung	Libman Sacks Endocarditis
Faith Hanlon	Noninvasive Assessment of Lateralized Hippocampal Function in Patients with Unilateral Hippocampal Sclerosis
Andrew Mayer	Neurochemistry of Pain: Measuring Glutamatergic Brain Activity in Response to Pain
Arvind Caprihan	Specialized Image Analysis Services
Julia Stephen	Imaging the Development of Memory Strategies in Aging
Michael Doty	Miscellaneous
Michael Weisend	Atomic Magnometer for Human Magnetoencephalography (MEG)
Charles Gasparovic	Citalopram to Enhance Cognitive Functioning in Early HD
	TRAUMATIC BRAIN INJURY
Andrew Mayer	Attentional Dysfunction and Recovery in Traumatic Brain Injury (TBI)
Vince Calhoun	Mitigation Strategies for Traumatic Brain Injury (TBI)
	NEUROSYSTEMS FOR NATIONAL SECURITY
Michael Weisend	Brain Stimulation to Accelerate Learning of Threat Detection, Phase II

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Consultants	5
Graduate Students	18
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Volunteers	77

32 Administrative and IT Staff support a Research Staff of 134, which includes 32 PhDs and 1 MD

JANET NAPOLITANO, PETE DOMENICI, DANIEL INOUYE

NANCY AND PETE DOMENICI

The promise of more personalized treatment for individuals suffering from mental illnesses was underscored by the research unveiled at MRN's first Domenici Neuroscience Symposium in Washington, D.C.

The May 2009 symposium honored MRN founder Senator Pete Domenici (Ret., N.M.) and featured presentations from MRN scientists and other leading neurodiagnostic facilities (the National Institute of Mental Health, the National Institute of Alcohol Abuse and Alcoholism, the National Institute on Drug Abuse, and Harvard University). The researchers showcased their enterprising approaches to unlocking the puzzles of schizophrenia and addictive disorders.

A reception following the day-long symposium heralded the accomplishments of Senator Domenici, and MRN Board of Trustees pioneers Nobel Laureate Dr. John Nash, Jr. and Dr. Leonard Napolitano, who received special recognition from his daughter, Homeland Security Secretary Janet Napolitano.

Guests included Senators Rudy Boschwitz (Ret., MN), Daniel Inouye (D., HI), Tom Udall (D., NM) and Congressman Ben R. Luján (D., NM).

MRN is committed to making the DNS a yearly conference for the nation's best investigators to collaborate and discuss how to pave the way for better treatment, recovery, and prevention of brain disease and injury.

THE DOMENICI NEUROSCIENCE SYMPOSIUM
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