



Psychology & Neuroscience News

fMRI at CU Boulder, Five Years On



Five years have passed since the magnetic resonance imaging scanner arrived on the CU Boulder campus, a much-anticipated event. This system allows researchers to use magnetic resonance imaging (MRI) to examine brain anatomy and to determine which parts of the brain are active at any given time.

The Intermountain Neuroimaging Consortium (INC) marked its fifth year overseeing the scanner with an anniversary party in September. At the gathering, Marie

Banich, professor in our department and the executive director of INC, described the many changes and improvements that have occurred since the arrival of the scanner in 2011. INC, originally a joint collaboration between the University of Colorado Boulder and the Mind Research Network (mrn.org) has grown to include researchers from the broader Colorado community including the University of Colorado Denver, Colorado State University, the University of Denver, and the National Institute for Standards and Technology in Boulder. Professor Banich noted that INC's primary goal is to build a community of scholars, and by doing so become a hub for neuroscientific research along the Front Range.

The scanner has seen major improvements since it first arrived, including adaptation with new measurement tools that are used in combination with the magnet. In addition to the original capacity to track brain activity in
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Message from the Chair



It's the day after Christmas, fall classes are over, and it's time to ramp up for the spring semester. It is also a good time to reflect on the past year—a year that has created a sense of uncertainty in both the academic and non-academic world. During

such times it is important to assess our core strengths—our people—and how we are positioned to remain as a top unit on campus and in the nation. We can take pride in the fact that our faculty, staff, and students are remarkable. I encourage you to peruse our department website (<http://www.colorado.edu/psych-neuro/news>) that lists many of the accomplishments of our faculty and students during the past year. Especially notable is the number of awards received by members of our department.

- Logan Brock, a neuroscience major, was named the 2016 Outstanding Undergraduate in the College of Arts and Sciences.
- Professor Randy O'Reilly was elected a fellow of the Society of Experimental Psychology.
- Professor Charles Judd received the 2016 Methodological Innovations Award from the Society for Personality and Social Psychology.
- Professor John Hewitt received the James Shields Award for Lifetime Contributions to Twin Research from the International Society for Twin Studies.
- Professor Tiffany Ito received an Outstanding Graduate Student Mentor award from the Graduate School.
- Professor Yuko Munakata received the 2016 Outstanding Mentor award from the Office of Postdoctoral Affairs.
- Professor Angela Bryan received the Senior Mentor Award from the Society of Behavioral Medicine.

- Research Associate Nomita Chhabildas, Professor Yuko Munakata, Research Assistant Professor Emily Richardson, and Professor Erik Wilcutt each received CU Boulder Outreach Awards to extend their work to the community.
- Graduate students Casey Gardiner and Courtney Stevens each received research awards from the Society of Behavioral Medicine.
- Graduate students Brooke Carter, Matt Hartsock, Chris Mellinger, and Jesse Niebaum were each awarded prestigious NSF Fellowships.
- Laura Michaelson was the recipient of the Carol B. Lynch Fellowship given to a graduate student whose interests reflect the value of interdisciplinary work.
- Sarah Banchefsky, a postdoctoral researcher, received a Chancellor's Award for Excellence in Stem Education.
- Mike Baratta, a senior research associate, received a fellowship from the Center for Nanoscale Biophotonics to collaborate with colleagues in Australia on research addressing how to instill stress resilience.

Our staff are the backbone of the department. Without their behind-the-scenes contributions to our mission, we would have no hope of succeeding. Owing to circumstances beyond their control, for nearly a year our Business Office staff have endured an almost unbearable situation in attempting to ensure that all of our people are paid. I want to thank Denise Bender and her staff—John Carroll, Nancy Coleman, and Olga Platitsyna—for hanging tough throughout this ordeal.

It is with the comfort of knowing that we have great people amongst us that I look forward to the coming year and the successes it will bring. I hope that you will continue to support the efforts of our faculty and students by contributing to one of the funding opportunities, information about which can be found on the back page of this newsletter.

— *Jerry Rudy*

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fMRI at CU Boulder, Five Years On (continued)



The MRI scanner undergoing a major upgrade in spring 2016. Photo courtesy of Nicole Speer.

response to visual and auditory stimuli, researchers can now provide exposure to other stimuli including drinkable liquids, and thermal changes such as applied heat. In addition, while participants are in the magnet, scientists can collect data on eye-tracking and pupillometry, as the measurement of both eye position and pupil diameter can indicate interest and effort. Other new tools include those that allow measurement of heart rate, breathing, facial expression, and the ability to record vocal responses from participants in addition to the original button-box responses.

More significantly, the inner workings of the scanner were completely overhauled during an eight-week period in the spring of 2016, with a new bore and new electronics. This upgrade allows researchers to look at brain activity on a more refined sub-second level, capturing an entire brain image every half second. Such refinements allow researchers to relate brain activity to the experimental task with much better temporal accuracy. Since brain activity changes very rapidly, this scanner speed is a major improvement over the original 1-2 second capture time. The upgrade also allows for the collection of brain images with better anatomical and structural detail.

This major upgrade of the scanner has come as a result of CU's selection to be part of a \$300-million, 10-year longitudinal study, the Adolescent Brain Cognitive Development (ABCD) study (abcdstudy.org) that will involve 10,000 children across 19 sites in the U.S. This study is designed to examine adolescent brain development and the factors and experiences that influence it. The group here at CU Boulder will be examining brain development in twins to disentangle genetic and environmental influences on brain development and is being co-led by Professor Banich and Professor John Hewitt.

Professor Tor Wager, who uses the magnet for most of his research, believes the scanner upgrade is an important step for our research community. "This will allow us to produce state-of-the-art scientific research in top-tier journals," he says. "It allows us to acquire better data faster." He notes that these improvements also give our site a significant advantage in the ability to share data. "This upgrade allows us to collect data on the same platform as other leading centers around the country and to integrate those data with ours. This will let us leverage the intellectual resources from other world-class sites in the U.S. We'll also be able to receive software for the scanner from other sites, which will give us vetted methods that are considered current best practices for acquiring data. All of this will allow us to be part of a larger consortium, with access to resources that we otherwise wouldn't be able to utilize."



The MRI scanner fully upgraded and ready for action. This photo and cover photo courtesy of Teryn S. Wilkes.

Research News

Health Care Outcomes of Racial/Ethnic Minorities

by Professor Irene Blair



My research investigates the disturbing fact that members of stigmatized social groups (e.g., racial/ethnic minorities) get sicker and die earlier than expected. Although socio-economic disadvantage is a major factor, it doesn't entirely account for the problem. Funded by the National Heart, Lung, and Blood Institute of NIH, and the American Heart Association, my interdisciplinary research team examines the problem from multiple angles. We have shown, for example, that doctors have implicit racial/ethnic biases like those found in the general population. Furthermore, the greater a doctor's bias, the lower the doctor's African American patients rated their clinical interactions with that doctor. But doctors' implicit bias is not the whole story, as we found no evidence that implicit bias was related to treatment decisions or outcomes with regard to hypertension.

Approaching the problem from a different angle, my colleagues and I have also looked at how minority patients may feel psychologically threatened by negative stereotypes in the health care setting (a process known as stereotype threat). We have demonstrated that a relatively simple intervention can help ameliorate stereotype threat during clinic visits, and potentially improve patient motivation to address their health problems. We are currently working on a large-scale investigation of this intervention to test for its effectiveness and generality. For more information, see <https://www.ncbi.nlm.nih.gov/pubmed/23128568>.

Our third angle on the problem is to look at bias and discrimination in terms of chronic stress. That is, it is well established that chronic stress has multiple negative effects on health, particularly with regard to cardiovascular health. Members of minority racial/ethnic groups report many experiences of bias and discrimination during their daily activities. This constitutes a unique stressor that does not usually impact majority group members. We have just begun a four-year study with American Indians living in the Denver area to assess their experiences with bias and discrimination, and the relation between those experiences and biomarkers of stress in the body. We believe this study will provide insight into the social experience of race/ethnicity for urban-dwelling American Indians and the ways in which that experience may affect the community's health.

Learning Disabilities and ADHD: Shared Genes and Neural Processes

by Professor Erik Willcutt



My previous and current research has focused primarily on attention-deficit/hyperactivity disorder (ADHD) and learning disabilities (LD) in reading, math, and writing. One important result from our lab is the finding that ADHD and LDs often co-occur in the same people. This result was surprising at first because we thought that each disorder would be caused by a set of risk factors that were unique to that disorder, but it turns out that some of the same genetic influences increase risk for both LDs and ADHD.

We then used neuropsychological measures to test which neural processes might be involved in both ADHD and LD, and found that both disorders are associated with a significant difficulty on measures of cognitive processing speed, as reflected by slower completion of measures that require sustained rapid responses throughout a relatively straightforward task. In addition to this shared weakness in processing speed, LD and ADHD are distinguished by different weaknesses on other neuropsychological tasks. For example, children with reading disability have trouble learning the correspondence between the physical print on a page and the sound that corresponds to each letter or string of letters, leading to difficulty "sounding out" new words. In contrast, ADHD is associated with difficulty in specific aspects of executive functions such as the inhibition of behaviors that may lead to short-term positive outcomes (e.g., skipping homework to play a much more enjoyable video game) but longer-term negative outcomes (trouble at school the next day when the homework isn't done, or poor grades at the end of the semester). Our laboratory will continue to expand our work on LD and ADHD over the next 5-10 years, including new grants that have allowed us to include neuroimaging measures in our studies for the first time.

Finally, in addition to our ongoing studies of LD and ADHD, during the past year we developed a new but related line of research with our colleagues in the Department of Psychology and Neuroscience and the School of Education. This new initiative has allowed us to expand our work on LD to examine a broader range of strengths and weaknesses in social and emotional learning (SEL). Over the next several years we plan to develop this program of research to provide the foundation for new intervention studies with children, families, and educators.

Faculty News



College Professor of Distinction Charles Judd was chosen to receive the 2016 Methodological Innovations Award from the Society for Personality and Social Psychology (SPSP). The award will be presented to him at the SPSP convention taking place in San Antonio in January 2017.



Professor John Hewitt, director of the Institute for Behavioral Genetics, received the 2016 James Shields Award for Lifetime Contributions to Twin Research. This award, from the International Society for Twin Studies, was presented to him at the annual meeting of the Behavior Genetics Association in Brisbane, Australia.



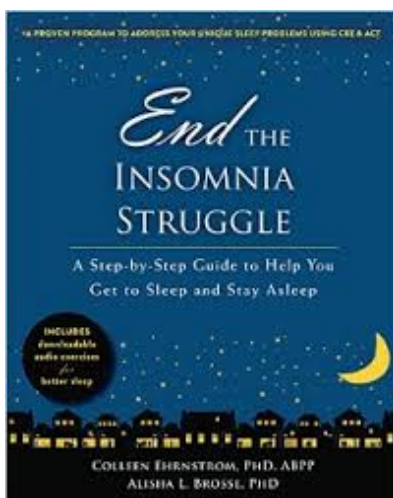
Professor Yuko Munakata received the 2016 Outstanding Mentor award from CU's Office of Postdoctoral Affairs. The award was based on "leadership, creating a supportive training environment suited to the needs of the individual postdoc, advocating for and guiding towards professional independence, and providing regular and constructive feedback to postdocs to develop their independent careers."

Dr. Jennifer Stratford accepted the position of Instructor for Psychology and Neuroscience as of Fall 2016. She received her PhD in Behavioral Neuroscience from Florida State University in 2008 and was a postdoctoral fellow at the CU School of Medicine. She previously taught at the CU School of Medicine as a Senior Instructor.



Springer International Publishers is publishing a three-volume set of the collected works of **Professor Emeritus Richard Jessor**. The first volume, "*The Origins and Development of Problem Behavior Theory: The Collected Works of Richard Jessor*," has just been published. Volume II, "*Problem Behavior Theory and Adolescent Health*," is now in press. Volume III, "*Problem Behavior Theory and the Social Context*," will be published in early 2017. While the first volume traces the transformations of the theory from its earliest application in a tri-ethnic community in southwestern Colorado to its latest application in Beijing, China, the second volume collects works on the variety of behaviors that can compromise or enhance adolescent health and development. The focus of the third volume is on the application of the theory in settings of disadvantage, including youth in the inner cities of the U.S. and the slums of Nairobi, Kenya.

Alumni Bookshelf: *End the Insomnia Struggle*



CU alumni Alisha Brosse (PhD '00) and Colleen Ehrnstrom (PhD '01) first met in the 1990s when they attended the clinical psychology doctoral program at CU Boulder. Their like-minded commitment to evidence-based interventions led to numerous collaborations after graduation including community trainings, consultation, supervision, and client workshops under the auspices of the Boulder Center for Cognitive and Behavioral Therapies (boulderccbtt.com). Their most recent collaboration is the culmination of over a decade of work on sleep—*End the Insomnia Struggle: A Step-by-Step Guide to Help You Get to Sleep and Stay Asleep* was published by New Harbinger Publications in October 2016.

This workbook guides the reader in using the current gold standard treatment, cognitive behavioral therapy for insomnia (CBT-I). It is the first to offer a comprehensive overview of each component involved in the treatment with a detailed review of why, when, and how. *End the Insomnia Struggle* is also the first book to integrate additional strategies from acceptance and commitment therapy (ACT) to optimize CBT-I. Using techniques such as willingness/acceptance, mindfulness, and cognitive defusion, it offers a range of tools to help even those

with the most challenging insomnia issues. With its compassionate tone and clear language, it provides an essential evidence-based tool for both clients and clinicians. (Contributed by Colleen Ehrnstrom and Alisha Brosse)

Alumni Spotlight: Mark Arnoldy, Class of 2010

Mark Arnoldy (BA '10) is the CEO of Possible, a nonprofit healthcare company that delivers high-quality, low-cost healthcare to the world's poor (see possiblehealth.org). Before working with Possible, he helped develop systems to treat malnourished children in Nepal, and helped create two businesses that fund nutrition programs there. Arnoldy completed Harvard's Global Health Effectiveness Program, and was a Fulbright Scholar in Nepal.



Mark Arnoldy has always been interested in healthcare. “For most of my life, I wanted to be a doctor,” he says. “I had a lot of health problems, so I wanted to be the doctor I never had.” Although he focused on social psychology, positive psychology, and behavioral economics at CU, he also took pre-med courses. While traveling internationally as an undergraduate, his focus on medicine made him aware of a serious lack of healthcare in many areas. “I realized that with my health problems, if I’d been born anywhere else in the world, I probably wouldn’t be here,” he says, explaining how that realization and a series of experiences during that trip transformed the direction of his life. During his travels, a friend invited him to Nepal to explore educational programs for the country. While there, he had a life-threatening reaction to nuts, the result of a severe allergy. He survived, but in the process, learned what it meant to be without healthcare, the condition of most people in Nepal.



Then, in a strange twist, nuts ended up playing another role in his future. “Ironically, a few days later, I heard about a fortified peanut butter product used to treat malnourished children. This prompted me to think about using that in Nepal since they have a high rate of childhood malnourishment. I came back to CU, wrote my honors thesis related to nutrition work, and then returned to Nepal and founded a nutrition program that led to the work I do now.”

Arnoldy now runs Possible, an organization based on a concept called durable healthcare, which brings together public, private and philanthropic sectors. He finds his

work as CEO both satisfying and challenging. “I underestimated how challenging it would be, especially in terms of lifestyle,” he says. “I spend a third of my time in New York City, a third in Nepal, and a third on the road worldwide, doing things like recruitment, raising money, and building partnerships. So I’m away from home about two-thirds of the year, which is a physically tiring lifestyle to maintain. But that’s a small price to pay to work with such dedicated people, everyone from my senior team to our community health workers in remote villages.”

He talks about the deep satisfaction of what he calls “absolute moral clarity.” “I don’t have to live in an existential crisis—I get to wake up each day and be sure the work we’re doing in the world is making a difference, knowing that if we didn’t do this work, our patients wouldn’t have healthcare.”

Arnoldy often interacts with young entrepreneurs and young people who want their work to align with their moral aspirations. The advice he offers is to witness the problems they hope to solve. “You have to start by experiencing suffering, by witnessing things like poverty. You need to get out there and experience the problem that you want to spend your life solving. Then ask yourself, ‘Is this is something I can dedicate ten years of my life to?’ I’ve learned that it’s hard to accomplish much in under ten years.”

In serving others, he’s also learned to take more time for himself. “I’ve gotten better about valuing my support systems as I’ve grown older. Time connecting with friends and family is very important to me now. I think the greatest challenge for a leader is to manage their own energy, even more so than managing their time,” he says. He now goes on a retreat with friends in Colorado once a year, and takes an annual week alone in the solitude of the New Hampshire mountains, reading, writing and thinking.

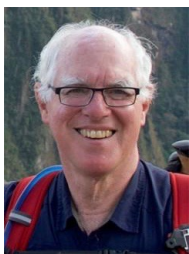
Arnoldy says he welcomes all inquiries about Possible and the work he’s doing (mark@possiblehealth.org).



The hospital that is the hub for a health system operated by Possible in rural Nepal. Photos courtesy of Mark Arnoldy.

Faculty Pastimes: A Matching Quiz

Take this matching quiz to find out how much you really know about our faculty members and their interests.



1. Lew Harvey



2. Alice Healy



3. Marie Banich



4. McKell Carter



5. Gary
McClelland



6. Jennifer
Stratford



7. Randy O'Reilly



8. Heidi Day



9. Joe Berta



10. Tim Curran

- a. Volunteers weekly to walk dogs at the Humane Society and is a Wisconsin sports fanatic.
- b. Rides a single-speed dirt jump bike to practice dirt-jumping tricks on the ride to and from work.
- c. Reads approximately 50 Regency romance novels each year.
- d. Spends a surprising number of Saturdays listening to flams and paradiddles while supporting high school son in competitive drumline activities.
- e. Played the accordion as a youth and even got paid for a few gigs. Is now looking for a used accordion to resume musical career.
- f. Enjoys swimming and tries to take a swim in the Mediterranean Sea at least once a year, preferably somewhere on the Italian coast.
- g. Commutes to school on a longboard and was recently convinced to wear a helmet.
- h. Enjoys singing and once sang the national anthem at a minor league baseball game.
- i. Loves movies, especially great, obscure ones that make powerful political statements and/or involve other cultures.
- j. Likes to construct electronic circuits, especially sound level meters.

Answer Key: a-10, b-4, c-2, d-8, e-5, f-3, g-7, h-6, i-1, j-9



Visit our Alumni News website for updates from alumni who sent us news.

To find the Alumni News website,
first go to the department website at:
www.colorado.edu/psych-neuro

Under **Quick Links** (bottom of the page):
Click on **Alumni Resources**, then
click on the **Alumni News** link.

For login information, email
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