Assistant Professor Shawn Christ was the 2009 recipient of the Department of Psychological Sciences’ Max Meyer Outstanding Junior Faculty Research Award. He studies the development of cognitive abilities in children with neurodevelopmental disorders, including autism spectrum disorder (ASD) and phenylketonuria (PKU). A major focus of his work is the study of successful pharmaceutical and behavioral interventions for children with these disorders. His research examines neurocognitive changes associated with these interventions, with the goal of understanding how and why they are effective so that improvements or new interventions can be developed.

Christ received his doctorate in psychology from Washington University in St. Louis in 2004 then completed two years of post-doctoral training there before joining the faculty at MU. In addition to his position in the department, he is an adjunct professor at the MU Thompson Center for Autism and Neurodevelopmental Disorders, and he is associate director of the MU Brain Imaging Center.

Neurodevelopmental Disorder Research

His research uses a range of methods to paint a clearer picture of the difficulties and possible solutions for children with neurodevelopmental disorders. Those methods include traditional neuropsychological measures (e.g., the Delis-Kaplin Executive Function System), neuroimaging techniques (functional and structural MRI), and innovative technologies (eye-movement monitoring and three-dimensional hand-movement tracking).

One line of research he pursues focuses on the effects of disruption in dopamine on brain and behavior. Problems with dopamine, a neurotransmitter, have been implicated in several disorders (e.g., schizophrenia, substance abuse, ADHD), but it is often difficult to tease apart the neural and cognitive problems that are unique to dopamine disruption from those associated with other aspects of these disorders.

“Research on PKU has been at the forefront of advances in genetics and metabolic medicine for over 25 years,” says Christ. “Through our research, we hope to bring the study of this disease to bear on our understanding of mental-health disorders as well.”

Christ’s research focuses on PKU as a model system for studying the relationship between dopamine disruption, brain function, and cognition. PKU is a rare metabolic disorder that prevents the breakdown of the amino acid phenylalanine, which, in turn, leads to a disruption in dopamine synthesis. It is largely unique among dopamine-related disorders in that the cause and metabolic disruptions underlying PKU are relatively well understood. By studying PKU, he hopes to provide insight into other dopamine-related disorders.

Christ was lead author on a 2010 paper with graduate student Amanda Moffitt and collaborator Dawn Peck that represents the first study to apply functional MRI techniques to the study of PKU. Results from the study suggest that both prefrontal cortex dysfunction and disruptions in functional connectivity...
Our department’s number of undergraduates has reached an all-time high of over 1,200 majors, and we have over 70 graduate students. The research and teaching talents of our faculty continue to attract the best students to our department. In this newsletter, we update you on our research and teaching endeavors with an eye toward the ways these endeavors benefit society.

I hope you will enjoy our featured article on the research and outreach pursuits of one of our faculty members, Shawn Christ. His research on children with neurodevelopmental disorders has the capacity to enable better understanding of these disorders and bring about interventions that will help the children thrive and grow. This is just one example of the ways in which research in the department benefits people’s health and well-being.

In last year’s newsletter, we provided an update on the Thompson Center for Autism and Neurodevelopmental Disorders. The department and the center have forged a variety of exciting interdisciplinary research collaborations. In this issue, we acquaint you with Janet Farmer, director of academic programs at the center. Because of Farmer’s apt leadership, Missouri has a state-of-the art facility designed to fulfill research, teaching, and service missions, which ultimately helps children with neurodevelopmental disorders and their families. This spring, at Psychology Day, Farmer will give a talk about the research and outreach activities at the center.

One article explains the training and service activities of the Psychological Services Clinic. It exists to fulfill two primary missions: to train clinical psychology graduate students in providing evidence-based psychological services, and to serve the public — that is, to give back to the community. With the skillful leadership of Debbi Bell, the clinic provides a variety of empirically supported assessment and therapy services that enhance the psychological health of its clients.

Thankfully, even in these tough fiscal times, we were able to recruit three new research associates to the department. Lisa Gizer brings his expertise in genetics to the study of externalizing disorders. Jeff Johnson brings his expertise in cognition and human memory, using the methodologies of fMRI and EEG. Huling Peng, a physicist, joined the staff of the Brain Imaging Center, and her work supports the research of the facuty members and students who use the center. The department’s and the center’s mission to conduct groundbreaking research is greatly enhanced by the addition of these new members of the department.

The Brain Imaging Center, the Thompson Center for Autism and Neurodevelopmental Disorders, and the Psychological Services Clinic are invaluable resources at the University of Missouri. They enable our faculty members to conduct innovative research and to train graduate students in research and service. The articles in this newsletter provide just a few examples of the many ways in which these efforts benefit the members of the local community and society at large.

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Shawn Christ

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Shawn Christ

may contribute to the cognitive impairments experienced by individuals with dopamine disruption related to PKU. He is collaborating with colleagues at Washington University on several studies investigating a potential treatment for the negative effects of PKU using BH4 (an important substance in the synthesis of dopamine). This work may show the types of improvement in cognitive and neural functioning those with PKU may experience when treated with BH4.

He also has four active autism-related projects in his lab: (1) a study utilizing a combination of functional MRI, structural MRI, and diffusion tensor imaging (DTI) to evaluate the integrity of the prefrontal cortex (particularly the inferior frontal gyrus) in adolescents with autism; (2) a study looking at potential structural and functional changes in the brain associated with participation in a 10-week social competence intervention for children with autism; (3) a study of the neural basis of atypical pupillary light response in individuals with autism; and (4) a study looking at the relationship between performance on lab-based measures of executive function and adaptive behavior and repetitive motor behaviors in autism.

“Going forward, we have two overarching goals in our autism research,” says Christ. “The first is to increase our understanding of the cognitive strengths and weaknesses associated with autism, thus allowing for the development of better, more focused interventions for the children. The second is to explore the feasibility of using fMRI technology to help predict individual treatment outcomes and make decisions for treatment allocation.”

He is collaborating with Steve Kanne, David Beversdorf, and Janette Sticher from the autism center to look at a range of issues including pharmacological interventions, genetic stress markers, cognitive behavioral treatment, and detection of sub-threshold autistic symptoms in young adults.

“Dr. Christ has given several talks at the Thompson Center, all of which have been well received; however, his most recent talk was regarded by all who attended as one of the best they have seen here,” says Kanne, associate director of the Thompson Center. “In addition to being informative and translating difficult topic matter to those not as well versed in the area, Shawn’s presentation style was fantastic. Everyone noted that they have never laughed as hard and learned as much in a single talk.”

In addition, Christ collaborates with faculty in health psychology, pathology and anatomical science, and plastic surgery on several other lines of research with the goal of advancing our understanding of the brain and behavior. These projects include a study of selflessness in patients with traumatic brain injury and a study of a neural and behavioral outcome in infants with craniomicrosomia following cranial surgery.

Who Is Janet Farmer?

Learn a little about one of the driving forces behind MU’s Thompson Center

By Todd Schaefer

Warning: Examination of the origin and development of the Thompson Center and Janet Farmer’s role will raise many questions and answers, but the answers can leave one breathless and pale — see below: Quiz: the answer is: She has a master’s degree in experimental psychology, she published for more than eight years with one of the most cherished colleagues in our department, she attended KU and K-State in addition to MU, she has devoted her professional life to assisting children with health-related issues, and she was born in New York City.

And the question is? Give up? Here’s a hint: She is director of academic programs at the Thompson Center for Autism and Neurodevelopmental Disorders. The correct question is: Who is Janet Farmer?

In professional circles, one occasionally runs across an academic with energy, motivation, and love for her work who causes one to wonder, “How can one person achieve so much over a particular period of time?” Such a question could make one’s own achievements pale in comparison. Farmer, since 1992, one year after completing her doctorate in our department, has served as director of Child Neuropsychology Services, director of the Division of Pediatric Psychology and Neuropsychology, clinical director of TIPS for Kids (an interdisciplinary training program), and, along with Judy Miles and with a generous gift from Bill and Nancy Thompson, became the founding director of the MU Thompson Center in 2005.

The Governor of Missouri appointed her to the Missouri Commission on Autism in 2008 and again in 2009. Here’s another answer. This center started with eight faculty and two staff members and in five years grew to 27 faculty and 45 staff members, while initially providing two services to the community, it now provides 14 of them. The question is? What is the Thompson Center in Columbia, Mo.? Farmer’s research regarding the provision of specialized health services not only helps children but also focuses on parental satisfaction and family-centered care. Her work underscores the role that psychologists can play in the development of comprehensive, coordinated, and community-based systems of care that improve the health and well-being of children with complex needs and their families.

If reading this article causes your breath to fail, simply inhale deeply so that the inspiration offered by Farmer’s achievements does not leave you breathless!
The Department of Psychological Sciences is pleased to announce its fourth annual Psychology Day, Friday, April 29, 2011.

Alumna Janet Farmer, PhD ’91, professor of health psychology at the University of Missouri (see article on Page 3), will be the featured speaker. Her presentation is titled “Picturing Autism: A Snapshot of Brain, Behavior, and Development.”

During the day, undergraduate honors students and graduate students will present findings from their research. Farmer will give her talk at 3:30 p.m. The day will wrap up with a reception in the cast gallery at the Museum of Art and Archaeology in Pickard Hall on campus.

All alumni are invited to attend Psychology Day. For more information, or to let the department know you are coming, contact Kelly Davis at 573-884-6277 or daviskel@missouri.edu.

Want to know more? Please visit the department’s Web site at psychology.missouri.edu.
Assistant Professor Ian Gizer’s research interests are in human memory. In particular, he is interested in what the brain can tell us about why we sometimes remember specific pieces of information, while at other times are only vaguely aware that a past event occurred. His research combines two non-invasive measures of brain activity — functional magnetic resonance imaging and electroencephalography — to understand the neural processes that underlie these memory abilities and which brain regions are especially important to memory. Johnson is originally from Missouri, and he says he finally feels at home again after living in different corners of the U.S. In his free time, he enjoys traveling with his wife, attending nearby sporting events, and checking out local concerts.

Assistant Professor Jeffrey Johnson’s research interests are in human memory. His free time includes playing with trains and dinosaurs or various pieces of playground equipment. He has a 2-year-old son, and they spend much of their spare time coloring, playing with trains and dinosaurs, or various pieces of playground equipment.

Huilin Peng’s research interests are in magnetic resonance imaging (MRI), particularly diffusion tensor MRI (DTI) and functional MRI (fMRI). A post-doctoral researcher, she studies changes in the diffusion properties of brain tissue in diseases such as epilepsy, HIV, and psychiatric disorders, and she investigates the relationship between white matter integrity and neurological function using DTI and fMRI. She is also interested in developing new diffusion tensor acquisition techniques and post-processing algorithms. Originally from China, Peng feels at home in Missouri, and when she has free time she likes reading, playing badminton, and swimming.

Michael Cusumano with his poster at Psych Day.
News of research from the department has been published in the Daily Mail (U.K.), Times of India, The Toronto Star, Discover Magazine, sciencenews.com, calgaryherald.com, Science Daily, and Medical News Today, among others.

An MU study reveals that certain types of fights can affect the quality of sibling relationships. Assistant Professor Nicole Campione-Barr found that conflicts among adolescent siblings about personal space have a negative impact on trust and communication between siblings.

Professor Charles Borduin found that multisystemic therapy is more effective in the lives of troubled youth and costs less than the current method of individual therapy.

Assistant Professor Kristy vanMarle has determined that infants are able to quantify non-cohesive substances, such as water, as early as 10 months. This could give scientists additional information about a child’s progress in math-related skills.

Professors Jeff Rouder and Laura King were featured in an article on the front page of The New York Times. They called into question the findings of a study on ESP that will be published this year.

Curators’ Professor of Psychological Sciences David Geary and graduate student Drew Bailey found that cranial size and the corresponding brain size have grown smaller over the last 20,000–30,000 years. It’s possible that with more complex societies, and less struggle to remain alive, brain size has not needed to remain as large as it once was.