

Psychological Sciences Communique

Spring 2011

Shawn Christ Wears Many Hats

The clinical psychologist has works in progress that have the potential to benefit many with neurodevelopmental disorders

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 neuropsy-



Sara, Lauren, Anna, and Shawn Christ at Rock Bridge State Park in Columbia this past autumn.

chological 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

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Chair Chat

By Ann Bettencourt



Our department's number of undergraduate majors has reached an all-time high of over 1,200 majors, and we have over 70 gradu-

ate 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 these children thrive and grow. This is just one example of the ways in which research in the de-

partment 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 Debi 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 researchers to the department. Ian 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. Huiling Peng, a physicist, joined the staff of the Brain Imaging Center, and her work supports the research of the faculty 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.

Shawn Christ

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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 what 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 MRI technology to

help predict individual treatment outcome and make decisions for treatment allocation."

He is collaborating with Steve Kanne, David Beversdorf, and Janine Stichter from the autism center to look at a range of issues including pharmaceutical intervention, genetic stress markers, cognitive behavioral intervention, 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

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Who Is Janet Farmer?

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

By Todd Schachtman

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. The question? 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 achievements to pale by comparison, simply inhale deeply so that the inspiration offered by Farmer's achievements does not leave you breathless!

Tidbits: Farmer, as well as our own chair, Ann Bettencourt, both did operant conditioning experiments with non-humans early in their graduate training, and Farmer worked with Lizette Peterson-Homer as a graduate student.

Shawn Christ

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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 the neural and behavioral outcome in infants with craniosynostosis following cranial surgery.



The Thompson Center for Autism and Neurodevelopmental Disorders



Nelson Cowan, who recently received the Sustained Excellence Award from the University of Missouri president views student posters, with undergraduate Alex Boone in the background.

From right, graduate students David Morris, Kestrel Homer, Maria Niculete, Rachel Tomko, Emily Scheiderer, and Jarrod Ellingson at the Psych Day talk.



Psych Day

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.



Graduate student Angela Aubuchon, left, at the department reception.

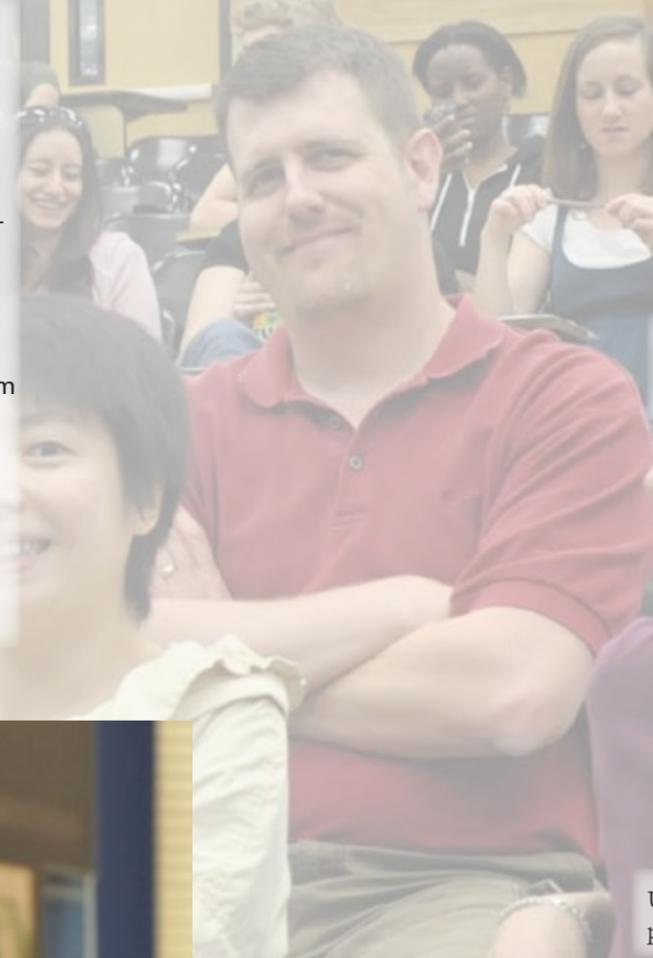


Graduate student Jennifer Walker.

John Harvey, Steve Weber, and Brenna Bry, members of the alumni board.



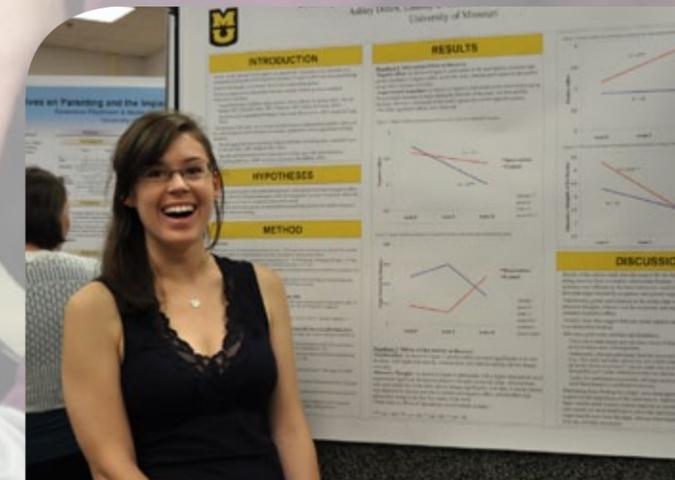
Robert S. Daniel Award winner Etti Naveh-Benjamin and honors student Kimberly Fleming.



Undergraduate Ashley Dillon with her research poster at Psych Day.



Executive Staff Assistant Bev Skyles and Emily Elliot, speaker at last year's event.



New to the Department



Huiling 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 likes reading, playing badminton, and swimming.



Assistant Professor **Ian Gizer's** research focuses primarily on understanding the genetic influences that contribute to the development of externalizing spectrum disorders. This includes childhood disorders such as attention-deficit hyperactivity disorder, oppositional defiant disorder, and conduct disorder as well as disorders of adolescence and adulthood such as drug and alcohol abuse and dependence and antisocial personality disorder. He is involved in research projects using candidate gene, genome-wide association, and

whole genome sequencing technologies to identify genetic variation involved in the development of these disorders. Before moving to Missouri, Gizer lived in Atlanta while earning his doctorate at Emory University, and then in Durham, N.C., where he did post-doctoral work in the genetics department at the University of North Carolina. Gizer and his wife have a 2-year-old son, and they spend most of their spare time coloring or playing with trains and dinosaurs or various pieces of playground equipment.



Assistant Professor **Jeffrey Johnson'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.

Psychological Services Clinic

The clinic provides valuable services to clients while offering hands-on training for clinical psychology graduate students

By *Debora Bell*

The clinical psychology program's in-house training clinic, the Psychological Services Clinic (PSC), provides outpatient services to children, families, adolescents, adults, couples, and groups from the University of Missouri and the mid-Missouri region. Clinical graduate students in training see the majority of clients. In addition, the clinic is staffed by a part-time psychiatry resident and clinic faculty who see clients and also provide the majority of supervision for students. The clinic provides students with training opportunities in a setting that combines the advantages of a professional community outpatient facility with the scientific foundations of an academic department.

Most clients of the PSC come from Columbia and surrounding communities, although several have come from as far as 100 miles away. Some of the more common services provided include assess-

ment of child and adult ADHD, intelligence or education achievement, personality functioning, and substance use; and treatment of child and adult depression, bipolar disorder, anxiety, affective dysregulation, eating concerns, substance abuse, antisocial behavior, anger management, ADHD, trauma reactions, personality disorders, family and marital discord, interpersonal problems, and problems in academic or occupational functioning.

The PSC emphasizes empirically supported, problem-focused treatment. Treatment is frequently short-term in nature, although approximately 70 percent of cases are seen for more than 10 sessions, as consistent with the empirical literature for the problem type or diagnosis. For example, one specialized training opportunity for students is the dialectical behavior therapy program, which provides intensive, empirically supported treatment for people with borderline personality disorder.

Honors Capstone Students Leave Their Marks on MU and Beyond

Many of the best and brightest undergraduates that the Department of Psychological Sciences has to offer participate in the year-long honors capstone program. While all undergraduate students must complete one research- and writing-intensive senior capstone course, students in the honors capstone must have a 3.30 cumulative GPA, commit to two semesters of working one-on-one with a faculty member on an original research project, as well as presenting the findings at the annual meetings of the Midwestern Psychological Association in Chicago in the spring. For this additional work, students who complete the program are entitled to graduate with departmental honors.

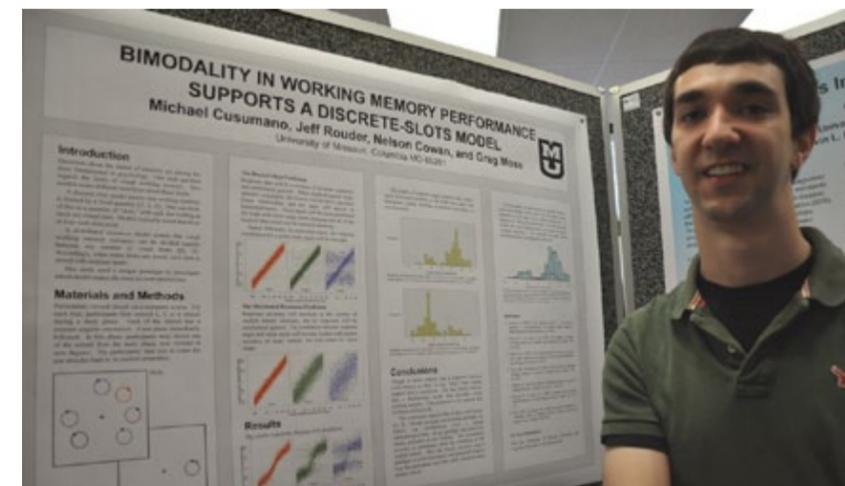
Initially developed in the early 1980s by Professor Harris Cooper, a former chair of the department, the program also brings together all of the students conducting individual senior honors theses during weekly meetings to provide research support, as well as information about applying to graduate programs and preparing for future careers in psychology. Under the direction of Professor Melanie Sheldon since 2007–08, the program has grown to

include over 20 students per year. They each must complete journal-length manuscripts of their research projects, as well as formal research posters presenting their findings. While all of the students submit and present their posters at the MPA meetings and the department's annual Psychology Day poster session, many of these students also present their posters at several other on- and off-campus poster sessions, which have resulted in multiple awards and recognition for our students and their faculty collaborators (see sidebar).

Tracey Latimore, BA '09, a former honors capstone student and current doctoral student in school psychol-

2009–10 Honors Capstone Award Winners (and faculty advisers)

- Elise Bascome (Wendy Slutsky): Midwestern Psychological Association Psi Chi Award
- Daniel Campbell (Ken Sheldon): Fred C. McKinney Scholarship, Department of Psychological Sciences
- Michael Cusumano (Jeff Rouser): Max F. Meyer Outstanding Achievement, Department of Psychological Sciences
- Ashley Dillon (Lynne Cooper): Sam Brown Outstanding Achievement, Department of Psychological Sciences
- Cynthia Maupin (Nicole Campione-Barr): Midwestern Psychological Association Psi Chi Award; Life-Sciences Week Award (Science & Society Division)
- Alissa Rasmussen (Bruce Bartholow): Midwestern Psychological Association Psi Chi Award; Undergraduate Research & Achievements Forum Award (Social & Behavioral Science Division)
- Chelsea Swope (Moshe Naveh-Benjamin): Undergraduate Research & Achievements Forum Honorable Mention (Social & Behavioral Science Division)
- Melissa Tarantola (Tom Piasecki): Midwestern Psychological Association Psi Chi Award



Michael Cusumano with his poster at Psych Day.

ogy at MU also found the experience to be crucial to her academic development. "The honors capstone afforded me the opportunity to gain experience with scholarly writing, developing and presenting research posters, and discussing and conceptualizing research," says Latimore. "Therefore, as a graduate student, I had a solid knowledge base for how to write literature reviews, create posters, etc., because I had successfully accomplished those activities with the remarkable guidance of my honors capstone mentor."

It is through the efforts of these hard-working students and their devoted faculty members that the Department of Psychological Sciences is continuing to impact the broader field by preparing tomorrow's leaders for success.

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The department appreciates hearing from alumni and friends. Send announcements or milestones to the address listed above.

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National Newsmakers

News of research from the department has been published in the *Daily Mail* (U.K.), *Times of India*, *The Toronto Star*, *Discover Magazine*, esciencenews.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.