

The groundbreaking ceremony for the new Thompson Center took place on April 25 at the South Providence Medical Park in Columbia. The new state-of-the-art facility is set to open early 2026.



DISCOVERY

Spring 2024 Research Newsletter

Publication by



Thompson Center for
Autism & Neurodevelopment
University of Missouri

Working Together: Interdisciplinary Research in Autism & Neurodevelopment

As part of the University of Missouri, the Thompson Center is fortunate to be able to collaborate with researchers from a variety of disciplines to further our understanding and expand services available to people with autism and other neurodevelopmental diagnoses.

The Research Core at the Thompson Center serves as a central resource to support, facilitate, and encourage high-impact, multidisciplinary research into the causes, pathophysiology, medical and behavioral differences, and

treatment strategies for autism and other neurodevelopmental diagnoses. Research Core staff work jointly with research faculty at the Thompson Center and throughout the University of Missouri to store and access data from multiple studies, facilitate research subject recruitment including access to patient populations, and provide research-grade psychometric testing by certified autism psychometricians available to research teams gathering new data.

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The following researchers are among the many collaborating with the Thompson Center Research Core on their studies:

Dr. Laura Morett, Speech, Language, and Hearing Sciences, investigating the use of gestures as part of communication among those with ASD

Dr. Laura Morett and her team are recruiting for a new study that seeks to understand the relationship between gestures and language in individuals with autism, with the hopes of shedding light on the underlying mechanisms of communication differences experienced by many autistic individuals. The dynamic between gesture and speech is often taken for granted in neurotypical individuals but is often marked by disruption for people who are neurodivergent. Previous research has shown atypical activity and connectivity in the brains of autistic people in terms of social-communication, but the specific nuances of gesture-speech integration have remained largely unexplored.

For this study, children with and without autism will participate in tasks that involve only gestures, only spoken words, or a combination of gestures and spoken words. The researchers will use cutting-edge technology known as functional near infrared spectroscopy (fNIRS) to monitor brain activity throughout the tasks.

The research team is excited to utilize fNIRS in a new context. “We think it’s pretty cool because no other studies have done this before,” says Dr. Morett, “and our findings may be able to inform future interventions for kids with ASD and help reduce social-communicative barriers for them.”

Dr. Paul Carney, Pediatric Neurology, seeking treatment for the rare disorder, Baker-Gordon Syndrome

Baker-Gordon Syndrome is a rare, genetic form of autism resulting from a critical protein in the brain--called Synaptotagmin 1 or SYT1--not functioning properly. Children and adults with Baker-Gordon Syndrome have a variety of symptoms, ranging from intellectual disability, autism, behavioral problems, repetitive behaviors, problems with sleep, and even

seizures in some cases.

Dr. Paul Carney was introduced to Baker-Gordon Syndrome just two years ago, when he evaluated a five-year-old patient at the Thompson Center for developmental delay. After an extensive evaluation, he discovered she had a SYT1 mutation. Dr. Carney did some research on the mutation and found that it had only recently been reported for the first time in England. After telling the patient’s parents that there were no known treatments for the disorder, the family raised \$250,000 in just two weeks to start a pilot research program.

Dr. Carney and his team are ultimately trying to develop a novel treatment for children with Baker-Gordon Syndrome by leveraging models, cellular systems, and bioinformatics. They are working with the National Institutes of Health toward understanding the natural history of the disorder through parent interviews, onsite testing, brain imaging, and advanced genetics. Through collaboration with partners in bioinformatics, the team is using the information they’ve collected in conjunction with artificial intelligence to identify new purposes for existing medications.

In addition to research activities, this project also sparked a clinical component. Dr. Carney collaborated with Dr. Benjamin Black to start the MU Child Neurologic Rare Disease Clinic at the Thompson Center in 2022. This specialized clinic allows patients with Baker-Gordon Syndrome and other rare neurodevelopmental conditions to see a multidisciplinary healthcare team--including a developmental-behavioral pediatrician, child neurologist, genetic counselor, and social worker--all in one appointment. Dr. Black reflected on the impact the clinic has had on the Thompson Center: “We’ve all learned a lot through our clinical care in the Rare Disease Clinic, and that helps us all become better at what we do.”

In his 20 years as a pediatric neurologist and researcher, this project stands out to Dr. Carney because of the dedicated and passionate group of parents involved. The families have given input on what should be studied, raised research funds, and networked with other rare disease groups, researchers, and industry

partners. “For a clinical scientist like me,” says Dr. Carney, “to have the trust of so many families is humbling.”

The Baker-Gordon Syndrome Foundation was formed by and for families to further this project. Their website, <https://www.bagosfoundation.org/>, has more information about the condition and a registry form for parents of children with Baker-Gordon Syndrome to fill out to get involved.

Dr. Brad Ferguson, Health Psychology and Radiology, & Dr. Fang Wang, Engineering, testing new technology to measure social communication outcomes

As an autism researcher, Dr. Brad Ferguson was often asking parents “how social has your child been over the past month?” It’s a difficult question for parents to quantify, and their answers can’t account for experiences their children have outside of the home at school or with friends. Relying on parent feedback to measure social communication often leads to inconsistent research findings.

Dr. Ferguson, along with Dr. David Beversdorf from the Thompson Center, reached out to Dr. Fang Wang from the MU College of Engineering to develop a new way to measure social interactions using technology. The result was an app for smartwatches called CORE Autism, which is currently being tested in the real world environment. Study participants first come to the Thompson Center to obtain a smartwatch that has the CORE Autism app installed. As part of the setup, the wearer’s voice is registered with the app so it can determine their voice compared to others. Then, as the study participant wears the watch for 2-3 weeks, it records the voices of the wearer and the people around them. The app automatically process the voices and sends the data to a dashboard for the research team. At the end of the study, the participant returns the watch and provides feedback on their experience.

This phase of the study is focused primarily on making sure the app consistently reports accurate data. The research team is manually analyzing the voice recordings and comparing

Meet Our New Director: Dr. Connie Brooks



Dr. Connie Brooks was appointed the new executive director of the Thompson Center for Autism & Neurodevelopment in March. Dr. Brooks has been an integral part of the Thompson Center since she joined in 2015 and then became a member of the executive leadership team in 2020. Use the QR code to read more about her background, passions, and vision for the future of the Thompson Center.

their results to that of the app. The next step will be to develop ways for the app to determine if the wearer of the watch is experiencing anxiety or other emotions during a social interaction. Another possible way to further analyze the data in the future is to use a smartwatch’s location information to map where certain types of socialization are occurring. For example, this could show researchers whether a student engages in more conversation at home or at school.

The ultimate goal is to be able to use CORE Autism as a way to measure social communication outcomes during clinical trials testing potential treatments for autism and a variety of other groups, such as elderly people and stroke patients. When the measurements of the outcomes are more precise, it is easier to determine whether a particular therapy or medication is truly making a difference on a person’s social communication. This technology also has the potential to help clinicians monitor patients who are receiving treatments targeting verbal social abilities; these providers would be able to make adjustments to the treatment plan using remote feedback and without additional office visits.

Thompson Center Psychometry Team Assists with EarliTec Study

The Thompson Center offers a space for collaboration between departments within the center. This cross-collaboration allows for staff to provide support for projects within their area of expertise, while fostering an environment for learning new skills and for the expansions of a project's impact.

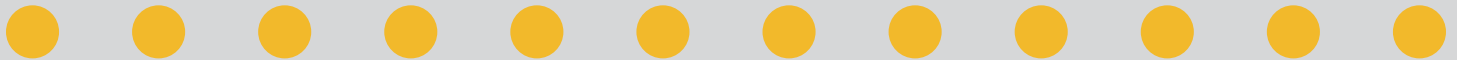
An example of an interdepartmental collaboration at the Thompson Center is between the psychometry team and the Research Core. Psychometrists provide cognitive or developmental assessment support for the Research Core's EarliTec Study. The psychometrists administer the assessments, score them, and compile the data for the researchers.

The EarliTec Study started at the Thompson Center in October 2023. This study uses a tablet device called the EarliPoint Evaluation for Autism Spectrum Disorder to track the child's eye movements in response to stimuli. These eye movements are fed into an algorithm that shows the likelihood of autism versus no autism. After the child has gone through this eye tracking simulation, one of the psychometrists will do cognitive or developmental testing and collect behavior observations that are useful during the clinical portion of the child's visit.

Peyton Matthews, a psychometrist I at the Thompson Center, has been involved in the EarliTec Study. "I personally enjoy getting to expand my knowledge about autism and new technology in the autism world," Peyton said about her involvement in the EarliTec Study. "I have taken a more intense interest in helping with research as a psychometrist and feel as though opportunities like these broaden my perspective of not only autism, but the impact that our jobs can make in this field."

Thompson Center Senior Psychometrist Courtney Oden also talked about the impact that being part of this study has had on her and her team. "Being able to contribute to the study and assist our Research Core is valuable for our professional growth as we extend beyond just clinical work," said Courtney. "We enjoy getting to collaborate with other divisions within the center and expand our knowledge of autism and autism research."

This is just one example of the interdepartmental collaborations that takes place at the Thompson Center. These collaborations are an important part of the work that's done at the center because it fosters the growth of current skills and the space to acquire new skills.



Postdoctoral Fellow Awarded National Institute of Mental Health F32 Grant

Erin Andres, Ph.D. has been awarded an individual postdoctoral fellowship (F32) by the National Institute of Mental Health to support training and a specific research project. The F32 fellowship grants are part of a prestigious program of the National Institutes of Health to invest in and promote talented early-stage researchers.

Dr. Andres' research project will build on and expand work in Dr. Stephen Sheinkopf's research group, bringing in new ideas to the team's ongoing studies of infant cries in relation to developmental outcomes. She will be investigating what caregivers think or perceive about infant cries (e.g., how distressed an infant sounds) and how a caregiver's perception influences the caregiver-infant interactions.

Her fellowship also includes a range of training experiences, including deepening her knowledge of the clinical characteristics of autism, acoustic analysis methods, and advanced statistical methods. The fellowship also supports her professional development

through multiple activities including presenting scientific findings to different types of audiences. The training and mentorship team includes Drs. Stephen Sheinkopf and Connie Brooks at the Thompson Center, Dr. Phil Wood in the University of Missouri's Department of Psychological Sciences, and Dr. Gordon Ramsay at the Marcus Autism Center at Emory University.

Dr. Andres' background is in applying family-based genetic analysis to the study of language impairment. As she moves her clinical research focus to autism and other neurodevelopmental conditions, this fellowship will support her in becoming an independent researcher and her goal to contribute to more precise behavioral measurement for use in future genetic investigation of language impairment and autism.

Dr. Andres will collect new data from caregivers about their perception of prerecorded infant cries and analyze existing data collected by researchers at the Marcus Autism Center.

Trainee Spotlight: Mackenzie Cissne

Mackenzie Cissne joined the Thompson Center in June 2021 as a graduate research assistant working with Dr. Kerri Nowell. Mackenzie is also working with Dr. Connie Brooks and Dr. Michael Morhland on the psychology team as a practicum student. Her research areas of interest include cognitive and functional outcomes of individuals with developmental disorders, specifically outcomes in executive functioning, including inhibitory control, working memory, flexibility, and metacognition.



Tell us about your educational background.

I received my Bachelor of Arts in psychology from the University of Nebraska in 2018, my Master of Arts in clinical psychology from the University of Missouri in 2022, and I am pursuing my Ph.D. in clinical psychology from the University of Missouri.

What brought you to the Thompson Center?

During my first year of graduate school, I worked with Dr. Christina McCrae, a research collaborator of the Thompson Center, on a clinical trial investigating a cognitive behavioral therapy for insomnia in children with autism. Through this collaboration, I came to know and love the Thompson Center research team, our values, and our patients, and I happily accepted an invitation to join the research core more officially to work with Dr. Kerri Nowell.

How did you first get involved with autism research?

During my undergraduate and post-baccalaureate career, I was involved with research studying cognitive outcomes and neural underpinnings of individuals with traumatic brain injury. I knew I wanted to continue pursuing research in cognitive outcomes, especially in executive functioning, but I became interested in exploring these outcomes in children with autism. I then joined the clinical psychology doctoral program at Mizzou to pursue this research.

What's your favorite thing about working in this field?

First, I love our patients and families! Beyond that, I have a passion for diagnostic and neuropsychological assessment in pediatric populations, as early diagnosis can lead to early intervention and support for our patients.

What study have you been most excited to be involved in?

I have been involved in several studies at the Thompson Center investigating whether technology can be used as a tool to help clinicians in diagnosing the presence and severity of autism spectrum disorder. These studies have given me the unique opportunity to join the clinical team during autism diagnostic appointments, which has helped grow my skills in psychological assessment, case conceptualization, and diagnostic decision-making. One of these studies was particularly exciting because we collaborated with pediatric healthcare clinics in Columbia to conduct our research during well-child visits.

What are your plans for after your time as a trainee?

Following my time as a graduate trainee, I plan to complete a pre-doctoral internship in clinical neuropsychology, followed by a postdoctoral fellowship in clinical neuropsychology, and eventually practice as a licensed clinical neuropsychologist.

How do you think your time at the Thompson Center will influence the direction of your career?

The Thompson Center has been one of if not the most valuable experience I've had in my graduate training. A few approaches I hope to incorporate in my future career are interdisciplinary collaboration, family-centered care, and an emphasis on training and supervision.

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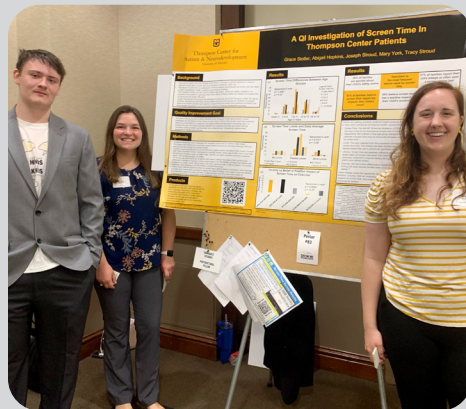
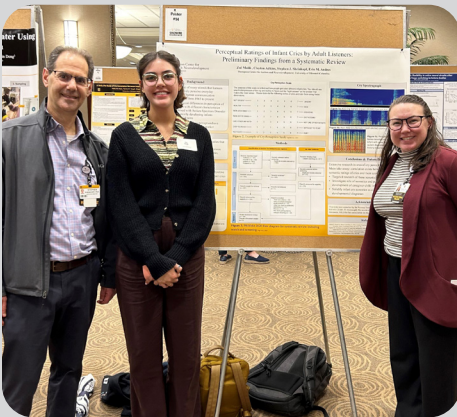
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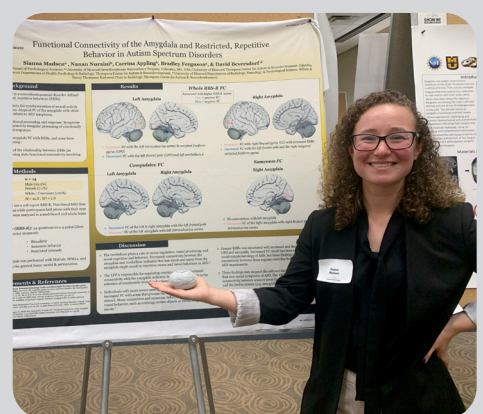
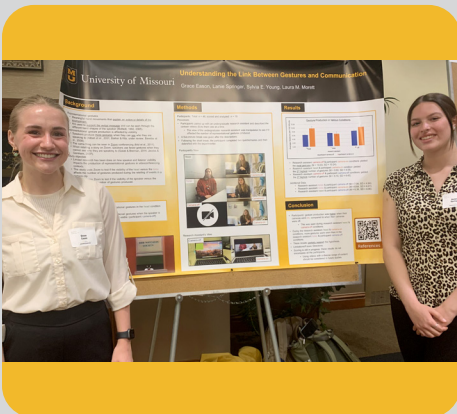
September 12-13 • St. Charles, MO



Show Me Research Week 2024



Several researchers and trainees from the Thompson Center presented posters at Mizzou's Show Me Research Week last week. Topics included neuroscience, speech-language pathology, and more!



Recent Publications

- Beversdorf, D. Q. (2024). Understanding the Heterogeneity of Neurodevelopmental Disorders and Its Implications: An Exploration of Repetitive Behaviors. *Biol Psychiatry Cogn Neurosci Neuroimaging*, 9(4), 370-371. <https://doi.org/10.1016/j.bpsc.2024.02.006>
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- Sohl, K., Oberweiser, C., Ranum, E., Oberweiser, C., & Cornell, W. (2024). A Pediatrician's Practical Guide for Navigating Transition to Adulthood with Autistic Youth and Their Caregivers. *Pediatric Clinics*, 71(2), 315-326. <https://doi.org/10.1016/j.pcl.2024.01.007>
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- Woo, T., King, C., Ahmed, N. I., Cordes, M., Nistala, S., Will, M. J., Bloomer, C., Kibiryeva, N., Rivera, R. M., Talebizadeh, Z., & Beversdorf, D. Q. (2023). microRNA as a Maternal Marker for Prenatal Stress-Associated ASD, Evidence from a Murine Model. *J Pers Med*, 13(9). <https://doi.org/10.3390/jpm13091412>



Want to see more from Thompson Center researchers?

Scan the code or visit <https://thompsoncenter.missouri.edu/publications/> for a full list of studies by Thompson Center authors and links to each publication.

Join A Study

fNIRS

The purpose of this research study is to examine verbal and nonverbal communication in Autism Spectrum Disorder (ASD).

- Eligibility: Age 5-10 with and without a diagnosis of ASD
- Time required: One visit lasting approximately 3 hours
- Location: Thompson Center
- Monetary compensation: \$50

MapLight

Participate in a clinical trial exploring the potential effects on social communication and other behaviors.

- Eligibility: Age 12-45 with a diagnosis of ASD AND participation of a parent/guardian
- Time required: Up to 10 visits and 1 phone call over approximately 25 weeks
- Location: Thompson Center
- Monetary compensation: \$50 per completed visit

Early Years

The goal of this research study is to learn about how behaviors observed in newborns relate to meeting developmental milestones during the first years of life.

- Eligibility: Expectant parents age 18+
- Time required: Participants will submit newborn cry recordings and complete online surveys about baby's development through age 3
- Location: Online surveys, some families will be invited to the Thompson Center
- Monetary Compensation: Up to \$265

SPARK

SPARK is a free online study with a simple mission: to speed up research and advance the understanding of autism. By building a community of tens of thousands of individuals with autism and their biological family members who provide behavioral and genetic data, SPARK will be the largest autism research study to date.

- Eligibility: Diagnosis of ASD
- Time required: Complete a few questionnaires, provide a saliva DNA sample using collection kits sent directly to your home
- Location: Online surveys
- Monetary compensation: gift card up to \$50

Biomarker Study

The goals of this study are to: 1. Gather additional information on subpopulations of autism spectrum disorder as identified by the Sponsor and 2. Learn more about autism spectrum disorder by identifying subgroups of patients with autism based on biomarkers. Biomarkers are also known as "biological signs" that can be linked to a condition and how it progresses.

- Eligibility: Age 12-45 with a diagnosis of autism spectrum disorder AND participation of a care/study partner, such as a parent or spouse
- Time required: One visit lasting approximately 3 hours
- Location: Thompson Center
- Monetary compensation: \$100 per completed visit, meal voucher, and travel compensation

RI-CART Adolescent & Young Adult Study (RAYS)

Thompson Center and Brown University researchers are conducting a study examining the challenges and problems that adolescent and young adults experience over the course of adolescence and young adulthood.

- Eligibility: Age 12-24 with ASD and parent/guardian
- Time required: 4 study visits one year apart for 3 years
- Location: Online surveys and interviews
- Monetary Compensation: up to \$395 for youth/young adult and up to \$225 for parent/guardian

Interested in these studies or others?

Call the Research Core at 573-303-8405, email tcresearch@missouri.edu, or scan the QR code to learn more.



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