THE ELISON LAB

for developmental brain and behavior research

What's new in 2022?

The past year has brought many exciting changes to the Elison Lab (E-Lab). Despite the challenges brought by the COVID-19 pandemic, we have been able to re-open many of our in-person studies and families have been able to safely participate in our research for the past 7 months. We have also expanded our remote data collection efforts, so many participants have been able to contribute to our work from their own home. Thank you to all the families that have continued to support our research throughout this difficult year!

In addition to resuming our studies, our lab has also welcomed five new staff members and two new graduate students to our team. Their contributions have helped us continue the exceptional work done in our lab. The E-Lab underwent one other major change this year – we moved to a new building! Our lab is now located at the Masonic Institute for the Developing Brain, a new University of Minnesota facility which houses research, clinical, and community resources (*see pg. 6 for more information*).

In this newsletter, we'll tell you about the projects our lab has been working on, and how YOUR participation is helping to advance modern research. We will also provide you with information about how to get involved in more of our current research studies. If you have any questions, you can always reach us at elab@umn.edu. May you all have a safe a happy 2022!

Inside this issue:

Understanding early pathways of adaptation in infancy

Isa Stallworthy

Traditionally, researchers tend to focus on the deficits and negative outcomes associated with developing autism spectrum disorder (ASD), a neurodevelopmental disorder that affects 1 in 44 children. This past year, we established a new conceptual framework for thinking about the development of ASD from an integrated risk and resilience perspective. This framework invites researchers to focus on the many processes through which many infants do well despite being at increased risk for ASD-related disabilities. One important area of research finds that girls are about 4 times less likely than boys to develop ASD-related disability. We highlight how this work may offer some clues about why girls might be protected from ASD-related disability, and the potential underlying adaptive processes at play, to help us better support positive development early in life.

Following up this idea, preliminary findings from our lab from a sample of infants at increased familial likelihood of developing ASD suggest that adaptive functioning skills may help promote girls' development more generally. We found that, regardless of familial history and eventual ASD diagnosis, girls tend to have stronger growth in their adaptive functioning capacities across the first 3 years of life than boys. Adaptive functioning skills, that encompass the collection of motor, social, and language abilities that enable fulfillment of everyday developmentally appropriate tasks, may be an important target for early interventions.

In another study of babies at high and low familial likelihood of developing ASD, we were interested in whether basic social motivations to engage with others play a role in early development. We found that babies whose social motivation increased the fastest between 6 and 12 months of age had better abilities to share attention with others, which were in turn related to stronger language abilities.

Together, this collection of work is helping us better understand the "active ingredients" that are most important for setting infants on a path of successful development.

The Uganda Phenoscreening Project

Emmanuel Bonney, Ph.D.

One of the goals of our research in the E-Lab is to improve early identification of autism spectrum disorder (ASD) across the United States and around the world. In Africa, there is profound treatment gap for children with ASD largely because of resource constraints. A major challenge is the lack of locally validated screening tools for early identification of autism. Most healthcare workers in Africa rely on tools created by Western researchers which often do not consider cultural variability around symptom expression, meanings of autism or developmental disabilities in non-Western contexts and comprehensibility of questions.

As a first step toward addressing these challenges, our lab launched the Uganda Phenoscreening Project (UPP) in 2019. The goal of this study was to investigate whether a context-dependent, population-based screening approach can be deployed to accurately identify early signs of autism in non-Western communities. Working with partners from Makerere University, we recruited 250 infant and mother participants across three immunization sites in Kampala (the capital city of Uganda). Mothers completed questionnaires about their child's development and behavior. Based on questionnaire responses, 40 infants were invited to participate in direct clinical assessments. This study has successfully ended and the data are being analyzed. Learnings from this project will be shared with the scientific community and relevant stakeholders. We will also use the findings to refine our approach and test it across diverse cultures in Africa. Our overarching goal is to produce a low-cost, standardized, objective screening method that health workers and educators can use to facilitate early identification of autism in Sub-Saharan Africa.

We are profoundly grateful to the many participants and stakeholders who made this project possible.

Sex Differences in Autism – BIRCHWH Grant

Casey Burrows, Ph.D.

Casey Burrows, assistant professor in the Department of Pediatrics and head of clinical training in the E-Lab, was awarded a career development grant (BIRCWH K12) from the National Institutes of Health. Her project will broaden our understanding of sex differences in autism spectrum disorder (ASD) by optimizing assessment tools for identifying ASD in females and characterizing neural biomarkers for ASD in females. The project uses two sets of research data accessed through E-Lab collaborations, both of which collect data on the younger siblings of autistic children who have a higher likelihood of developing autism. "My hypothesis is that there are a lot of girls with ASD that are being missed early on in development. This could be because the tools we use to diagnose ASD aren't as sensitive in detecting autism in young girls," Dr. Burrows said. The BIRCWH project hopes to identify more girls who need ASD-related supports by improving the first steps in the process. Intervention and treatment are dependent upon diagnosis, and diagnosis is dependent upon a clinician's assessments. If the assessments can be improved, then hopefully the care children receive will improve with it. Without those services, kids can continue to fall behind, making a correct and timely diagnosis imperative to keeping them on the right track. Learn more about this project here: https://med.umn.edu/news-events/bircwh-scholar-studying-sex-differences-autism-spectrum-disorder-symptom-progression-and-presentation

Parent Eye-tracking Study

Carolyn Lasch

Thank you so much to everyone who participated in questionnaires and phone interviews during COVID as part of our Parent Eye-tracking Study! Through this study, we hope to learn what parents' looking patterns can tell us about the patterns of their child's social looking and development by examining the differences and similarities between looking patterns from children and their parents. As some children from the BCP return to the lab for additional visits, keep your eyes open for emails inviting parents to participate in eye-tracking again. While our original study focused on parents' looking and their children's development in infancy and toddlerhood, everyone continued to grow up during COVID - we will now be able to learn more about parent looking patterns and children's development into toddlerhood and early school age. We are excited to see our families back in the lab soon!

All the eye-tracking data already collected from parents has been pre-processed thanks to the hard work of our undergraduate research assistants, and we are excited to begin sharing results of our analyses with you and the scientific community in the coming year!

The Phenoscreening Study

Sophie Richardson

Early intervention improves developmental outcomes for many children with autism spectrum disorder and yet early identification remains an enduring challenge. Early screening and assessment efforts commonly approach classification in a way that does not account for the phenotypic heterogeneity inherent to ASD. Our Phenoscreening study works with a broad population of children 17 months to 42 months, some of whom have a higher likelihood of developing ASD, while others have a lower likelihood. Any 17-month-old born in the metro area is eligible to participate, even if they have since moved. During our sessions, we administer a battery of developmental assessments along with parent questionnaires to get a sense of the child's characteristics and overall developmental trajectory. By capturing such a diverse population, we hope to leverage the variability of early symptom presentation with machine learning to inform individually-tailored clinical recommendations.

To learn more, please email our team at EarlyChildStudy@umn.edu.

Infant Brain Imaging Study (IBIS)

Camile Borja

One of the goals of our research in the E-Lab is to improve early detection of autism spectrum disorder (ASD). New numbers out this year suggest that 1 in 44 children are diagnosed with ASD. In Minnesota, the ASD prevalence rate is higher, with about 1 in 36 children diagnosed with ASD. While the average age of diagnosis is 4 years old, children can start showing early signs of ASD as young as 6 months old. Moreover, families who have one child with ASD have an increased likelihood of having another child with ASD. Early detection of autism and access to early intervention services is crucial to improving long-term outcomes for these children.

The E-Lab is a proud member of the IBIS (Infant Brain Imaging Study) Network. The IBIS Network is a consortium of researchers across North America that use a combination of behavioral testing, parent interviews, MRI brain imaging, and EEG to uncover important clues about infant development that can aid in early detection of ASD. Previous research by the IBIS network on infants with older siblings with autism found that MRI brain scans of infants as early as 6 months old can accurately predict later ASD diagnoses.

The IBIS-EP research study is currently recruiting! We're looking for families who have a child with autism and a new baby who is 6 months or younger. If you or someone you know is interested in participating in the study, please contact us at ibis@umn.edu or visit our website at www.ibis-network.org.

The Masonic Institute for the Developing Brain

Lana Hantzsch

The University of Minnesota opened the doors to the Masonic Institute for the Developing Brain (MIDB) on November 1st, 2021. This new institute is led by Drs. Damien Fair, PhD and Michael Georgieff, MD, who embody the interdisciplinary ideals of the MIDB. Housing researchers, clinicians, and community outreach specialists under one roof, the MIDB "has the goal of advancing brain health from the earliest stages of development across the lifespan, supporting each person's journey as a valued community member." Minnesota families can now seek out care, contribute to research, and participate in community education and engagement all in one place.

What is the research experience like for participating families at MIDB?

The E-Lab is now located in this new facility, and some of our research participants have already gotten a first look at our lab space. The MIDB is full of natural light, colorful murals, and friendly people, making it a welcoming space for children and their families. When families arrive at MIDB for a research visit, they enter the MIDB lobby, and check in at the front desk. From there, they are directed to the Research Waiting Area. This waiting area includes a large, enclosed playroom for participating children to play in before their visit, or for their siblings to play in while they wait during a research visit. At the beginning of their visit, participants are escorted to the E-Lab's private suite of research rooms, where they meet the rest of our study team and proceed with their study visits. Other amenities at the building include an outdoor playground, free garage parking for participants, a small UMarket with food and drink available for purchase, and a nursing/changing room available for visiting parents.

Celebrations & Achievements in the E-Lab!

Welcome to new E-Lab staff

In this past year, we've added new staff members, clinicians, and graduate students to our team – welcome to Dr. Lauren Haisley, Dr. Chimei Lee, Sophie Richardson, Camile Borja, Lana Hantzsch, Ekom Eyoh, and Sanju Koirala!

Special welcome to Emmanuel Bonney, Ph.D.

Our long-time collaborator and friend, Emmanuel Bonney, has finally been able to move to Minneapolis to work with us at the E-Lab. Having worked in his home country of Ghana and completed graduate studies in both China and South Africa, he brings a unique global perspective to our research. Through his work, he is helping to challenge Westernized ideas of the diagnosis and treatment of autism and hopes to improve access to care services and resources for autistic individuals and their families in low-income countries.

Isa Stallworthy awarded funding from James McDonnell Foundation

Isabella (Isa) Stallworthy received a James S. McDonnell Foundation 21st Century Postdoctoral Fellowship Award in Understanding Dynamic and Multi-scale Systems. This fellowship provides students in the final stages of their Ph.D. degree more autonomy in identifying and securing postdoctoral training opportunities and is designed for students who have already demonstrated maturity independence of thought and self-initiation. Isa's application is titled "Leveraging Complexity Science to Investigate the Developmental Origins of Social Life" and funding will support her postdoctoral training at the university of her choice. Congrats, Isa!

Robin Sifre completed dissertation defense

In 2021, Robin Sifre successfully defended her dissertation, in which she utilized brain imaging and eye tracking data from the Baby Connectome Project to study the coordination of infant attention and how this development supports visual attention.