Auditory Neuroscience Laboratory

www.brainvolts.northwestern.edu

Discovering early markers of language development by studying brain activity, listening, and learning



spring has sprung & year 3 is underway...



We're delighted to see so many families coming in. We can hardly believe that many families have entered their third year in our study. As you can see from the photo, our BIOtots have learned to put their science money to good use!

It is an exciting – but crazy – time in the lab, because we're renovating! We hope you'll pardon our dust as we install some new windows, new carpet, some new furniture here and there, and give everything a fresh coat of paint. Things might be a bit awkward when you come by, but we think it will be worth it. Since day one, our architects' and builders' goal has been singular: to make the lab a warmer and more inviting place for our participants and their families. We can't wait to show you around.

A highlight of the past month has been a visit from an audiologist who is using our discoveries to help her patients: incorporating the same brain metrics we measure during movie watching has had a profound impact on her practice. It is our participants' and our families' contributions that lay the foundation for these discoveries, and it's a foundation that is making a big difference in peoples' lives. Let's see what's next!

-The BlOtots research team

Researcher Spotlight:



Evan Davies Research Assistant

Evan Davies has been a research assistant in the Auditory Neuroscience Laboratory since 2014. His role in the lab is to guide families through their participation in our research, ranging from scheduling, to playing data collection games with children, to doing critical "behind the scenes" work such as processing and vetting our mountains of data, not to mention making sure that each and every BIOtot comes to lab for their annual visits at the right time of the year.

He has a longstanding interest in child development, and his favorite part of working with families is forging long-lasting relationships and interacting with children year after year as they grow up. Evan previously worked on the Michigan Longitudinal Study, where he studied the impact of substance abuse on child development across multiple generations of the same families. For that project he had to drive all over the state to collect data, so he's grateful that the BIOtots families come to him!

Evan has a degree in communications and psychology from Michigan State University. Since playing with the BIOtots isn't enough physical activity, he spends his time outside of the lab practicing yoga, swimming, and biking.

If you have any questions about the project or would like to share photos of your child with us, please call or email: (847) 491-2457 biototsresearch@gmail.com

How does your ear work?



Did you know that you have a **musical** instrument inside your ear? Believe it or not you have a **drum** in your ear. It's called an ear**drum**! When you hear a sound, it travels into your ear and pushes on your ear**drum**. Just like when you hit a drum, your ear**drum** vibrates. These vibrations then travel to your **brain** and tell you what those sounds mean!

Do you remember the **mountain game** we play every time you come to visit the lab? We put a tube in your ear to push on your ear**drum**. You get to see how your ear**drum** works by watching it make mountains on the little computer screen. Those mountains tell us if your ear**drum** is good at vibrating!

We can't wait to see you again and make more mountains together!

A day in the life of a BIOtot team member

7:15am Rise, eat, and get ready. Check email before leaving apartment - don't forget to pack lunch!

8:15am Jump on Purple Express for a bumpy commute to Evanston while reading a novel or listening to a podcast.

8:45am Walk a mile to campus and wade through students to get to the lab.

9:00am Get the lab running. Lights on, mail checked, coffee made. Prepare for a BIOtot: calibrate our equipment, prepare movie booth with supplies, and wake up Mickey. Stock waiting area with new drawing paper, ear flashlight, mountain machine, and some snacks.

10:00am Meet family and escort them to the lab. Review paperwork, look in child's ears, and play the mountain game!

10:20am Go down the hall to the underwater world room to play games. Do you remember the name of a big, brown dog that lives there?? (Hint: his name starts with an A).

11am Play the Mickey game and drum together!

11:30am Take a snack break and pick out a movie to watch while wearing the buttons. Put on buttons, put in ear pillow, and start collecting brainwaves.

12:57pm Money time! Collect the child's autograph and pay them for their time.

1:05pm Clean up lab spaces, wash electrodes, and put supplies back for the next BIOtot.

1:30pm Lunch time

2pm-5:30pm Meetings, enter data from the morning, scheduling, data analysis, and more. Science is fun, but busy!

5:45pm Take Purple Line Express home. Another long day down, another BIOtot to play with tomorrow!

BIOtots go to Baltimore!

BIOtots families are helping the Kraus Lab make big discoveries about brain development and its impact on speech and language. Ellie and Kali shared some of the lab's findings at an international auditory research conference held in February in Baltimore, Maryland. Over 1500 people attended! Ellie and Kali each presented posters to the visiting scientists about our BIOtots work.



Ellie's Poster



We know that our bodies are good at specializing: our hands are great at picking things up, for instance, but definitely not our feet. Our brains specialize, too; the left side of an adult's brain is particularly good at processing fast parts of speech, such as telling the difference between consonants. Ellie wondered if children's brains might specialize in this same way. Ellie looked at BIOtots' brain activity and found that our youngest children already show this leftwards bias for processing fast information! She also discovered that BIOtots who are excellent listeners, even when background noise interferes, demonstrate this pattern especially strongly. Ellie would like to further explore these findings. Stay tuned!

Kali's Poster



studying the development of Kali is speech processing skills. She looked at how closelv children's brain responses copy the sound pattern of speech syllables. (This is one of the tasks BIOtots help us with while watching movies.) Kali found that timing precision in the brain rapidly improves as children mature. But this developmental pattern isn't completely straightforward: older children appear to tune into slow information in speech, while younger children rely on faster information in speech when listening. With your help, Kali will collect more data will look these findings and into further. investigating the effects of speech processing on language and literacy.

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To learn more about our work, visit our website: www.brainvolts.northwestern.edu start under "slideshows" to learn about our current projects

We want to keep in touch!

Moving? Have a new e-mail or phone number? Update your contact information with us by shooting an email to biototsresearch@gmail.com or calling us at (847) 491-2457. We're looking forward to seeing you this year!





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