



**Boston
Children's
Hospital**

**F.M. Kirby
Neurobiology
Center**

Winter 2024

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Website**

KIRBY CENTER NEWS & UPDATES

Elizabeth Engle, MD, wins the Bernard Sachs Award!

Congratulations to **Elizabeth Engle, MD**, for receiving the prestigious Bernard Sachs Award from the Child Neurology Society! The **Sachs Award** is given annually to honor someone of international status who has done leading research related to the care of children with neurological disorders. Dr. Engle's work uncovers the genetic, cellular, and molecular mechanisms underlying congenital disorders of eye and face movement. **Her lab** has defined the clinical manifestations and genetic causes of a series of disorders affecting the development of cranial nerves, which control our ability to see, hear, taste, smell, and more. She will receive her award and give a talk at the annual CNS meeting.



Welcome to Dr. Eric Gaier, Kirby Affiliate Faculty

Eric Gaier, MD, PhD, is a pediatric neuro-ophthalmologist at BCH with research focused on understanding and treating amblyopia ("lazy eye"), a neurodevelopmental disorder accounting for visual impairment among a significant number of children and adults. His lab conducts basic science research related to amblyopia using a mouse model. By elucidating and leveraging the mechanisms that underlie visual, experience-dependent synaptic changes in the brain, his research efforts aim to advance our understanding of and develop new treatment



strategies. His work was recently featured in an [NPR segment](#).

Dr. Fagiolini hosts ACD Symposium

February 1, 2024, was International Creatine Deficiency Disorders Day. In honor of that, [Michela Fagiolini, PhD](#), teamed up with the [Association for Creatine Deficiencies \(ACD\)](#) to host a symposium that brought together clinicians, researchers, and affected families to discuss their experiences and progress in care and research.



Dr. Ferguson was featured as a Keynote Speaker at the HBPA Symposium

On December 8, the [HMS Black Postdoctoral Association](#) hosted a symposium where [Brielle Ferguson, PhD](#), was a keynote speaker. In her talk, "The Unlikely Neuroscientist: Persisting Beyond Rejection and Isolation on the Path to Fulfillment," she discussed her personal journey to becoming a researcher.

RESEARCH IN THE

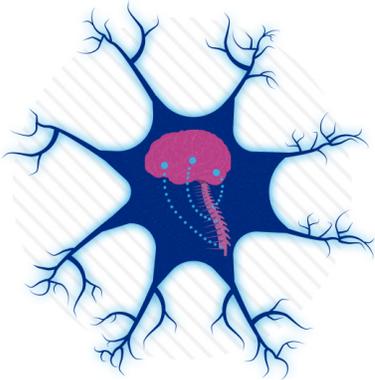
NEWS & MEDIA

Clifford Woolf, MB, BCh, PhD and Lab Featured in New York Times

Boston Children's partnered with the New York Times to create the interactive webpage, "[A Better Way to Fight Pain?: Improving Treatments for Acute and Chronic Pain,](#)" to showcase chronic pain research at Boston

Children's. The page featured work done by [Dr. Clifford Woolf's lab](#) on understanding the mechanisms that drive pain response and the AI and machine learning tools they use to gather better data in animal studies.

Zhigang He's Lab featured in BCH Answers



The post, "[New leads for spinal cord injury: Mapping spinal-projecting neurons in the brain,](#)" outlines the recent findings shared in a Nature article by the lab of [Zhigang He, PhD, BM](#). His lab took on the task of profiling those neurons in the brain that send projections to the spinal cord. This atlas will help continue the lab's mission of creating regeneration following spinal cord injuries.

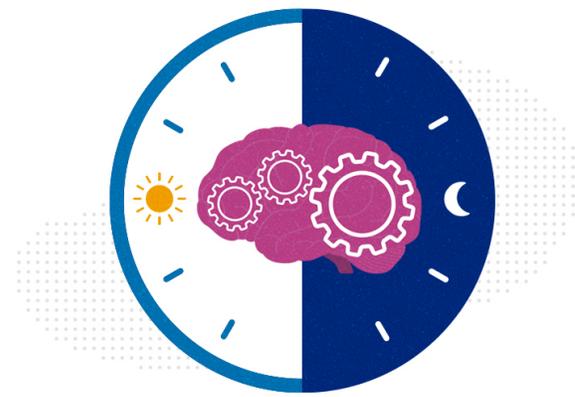
Dr. Holt's Research in The Boston Globe

The work of Jeffrey Holt, PhD, was mentioned in the Boston Globe article, "[Gene therapies with ties to Boston hold promise for congenital deafness.](#)" Dr. Holt has been working on the proper virus vector for hearing loss gene therapies for over two decades.

Lipton Lab featured in BCH Answers

[Jonathan Lipton, MD, PhD](#), and his lab's recent publication in *Science Advances* about their work with circadian rhythm and regulation at synapses was highlighted in the recent BCH Answers post titled,

"Timing is everything: How circadian rhythms influence our brains."



Dr. Lee's research on decision-making, highlighted by HMS

Wei-Chung Allen Lee, PhD's recent publication in *Nature*, featured his collaborative research with Dr. Christopher Harvey at HMS. This work is the first to combine structural, functional, and behavioral analyses to explore how neuron-to-neuron connections support decision-making. The paper and the collaboration were summarized in the online article ["How Does the Brain Make Decisions?"](#)

EVENTS



Kirby Center Holiday Party

In December, the Kirby Center celebrated the holiday season with a festive holiday party full of food and fun. The Fagiolini lab won the gingerbread house competition!



In the inaugural Kirby-wide "Diversity Discussions" event, Nicole Teaney and Emma Martin (Sahin Lab) led a group in reflecting on the importance of cultivating an inclusive and equitable environment that celebrates the diversity of our labs! We identified topics to address in later sessions, including women in STEM, mental health, LGBTQ+ inclusivity, and special events that feature our department's diversity.



Valentine's Day Celebration

On February 14th, we enjoyed some Valentine-themed treats to celebrate all of our members who are the heart of the Kirby Center!



TRAINEE & LAB NEWS

Support for Fellows Entering the Job Market

If you are entering the market and would like assistance preparing to do so, please email [SJ Cunningham](#) and [Mike Do](#) well in advance of your first deadline. If you communicate your particular needs/research interests (e.g., "I am a biophysicist with neuroethological leanings for whom English is a second language"), we will convene a Practice Committee of Kirby faculty members who are appropriate for your research. This Committee will:

1. Review a draft of your application.
2. Provide coaching on preliminary interviews.
3. Offer feedback on your job talk.
4. Take you through a mock chalk talk.
5. Provide advice on closing the deal.

When reaching out to us, please copy your advisor and ask them to give the green light for this process. We are most effective when your application, talk, and chalk talk are each at the fine-tuning stage.

Note that BCH offers a related service. Please choose one to avoid overburdening our faculty.

AWARDS & PUBLICATIONS

Recent Awards

Mandana Arbab, PhD, was awarded the Chan Zuckerberg Initiative Collaborative Grant with Dr. Richard Sherwood for their project, RNA-protein interaction sequencing for tandem repeat disorders.

Darius Ebrahimi-Fakhari, MD, PhD, was awarded a grant from the Spastic Paraplegia Foundation for his project, Hereditary Spastic Paraplegia – Centers of Excellence Research Network (HSP-CERN).

Brielle Ferguson, PhD, was given a three-year grant from an anonymous foundation for her project, Uplifting Black Scholars in Neuroscience: Enabling a motivated early-career scientist to build community in Boston and Worldwide.

Brielle Ferguson, PhD, was awarded a Child Health Research Award from the Charles H. Hood Foundation for her project, Characterizing the role of two subcortical nuclei in prefrontal regulation of attention.

Zhigang He, PhD, BM, was awarded a new five-year NIH R01 for his project, Kinase Regulators of retinal ganglion cell survival and axon regeneration.

Zhigang He, PhD, BM, was awarded a grant from Wings for Life for his project, A novel and translatable strategy to promote axon regeneration and functional recovery by targeting gliotransmitter signaling.

Zhigang He, PhD, BM, and colleagues at Harvard Medical School secured funding for an NIH P30 grant to help fund vision projects in the Viral Core.

Zhigang He, PhD, BM, was awarded funding from ECRAC for a Class II bio-safety level laminar flow hood with a UV light option for the Viral Core.

Emily Osterweil, PhD, was awarded funding from the University of Edinburgh for research on Fragile X.

Mustafa Sahin, MD, PhD, was given a five-year grant by an

Recent Featured Publications



Poduri & Walsh Labs. Variant Correlates With Stereoelectroencephalography-Derived Electrophysiology. *Neurol Genet.* Dec 2023.

RSZ-TNC. Brain Gene Registry Consortium. Clinical variants paired with phenotype: A rich resource for brain gene curation. *Genet Med.* Dec 2023.

Engle Lab. A cell type-aware framework for nominating non-coding variants in Mendelian regulatory disorders. *NIH Preprint.* Dec

anonymous foundation for his project, Development and validation of a neuron-specific connectivity map (NMAP).

Judith Steen, PhD, was awarded funding for a Biology Image Analysis Software (BIAS) Gold Package from ECRAC.

Beth Stevens, PhD, received a grant from the Cure Alzheimer's Fund for her project, Neuroimmune Consortium: Effects of peripheral inflammation on myeloid cell function in Alzheimer's Disease.

Beth Stevens, PhD, was awarded an R01 from the NIH for the project Mechanisms of activity-dependent microglia-neuron interactions in Development and disease.

Clifford Woolf, MB, BCh, PhD, received a grant from the Spinal Muscular Atrophy Foundation for his project, Promoting recovery of motor function in SMA.

Clifford Woolf, MB, BCh, PhD, received a grant from the Mass Life Sciences Center for a project titled, MAP4 kinase inhibition as a neuroprotective strategy for neurodegeneration.

Yu-Ting Cheng, PhD (Woolf), received an HMS Hearst Fellowship for his project, In-vivo modeling of human neuron maturation and regeneration using grafted cerebral organoid.

Mengxu Ge, PhD (Xi He), was awarded a grant from the National Eczema Association for her project, Wnt/ β -catenin signaling in barrier function and allergic skin inflammation.

Silmara Souto de Lima, PhD (Fagiolini), was awarded a grant from the Gilbert Family Foundation for her project, NF1-OPG in vitro model for target nomination and drug development.

Akiko Terauchi, PhD (Umemori), received an HMS Hearst Fellowship for her project, Pathway-specific dopaminergic synapse organizers and their implications for neuromotor disorders.

Wang Zheng, PhD (Holt/Geleoc), received an HMS Hearst Fellowship for his project, Decoding structure and function of TMEM63B in brain developmental disorders.

2023.

Z. He Lab. A transcriptomic taxonomy of mouse brain-wide spinal projecting neurons. Nature. Dec 2023.

Steen Lab. Quantitative profiling of posttranslational modifications of pathological tau via sarkosyl fractionation and mass spectrometry. Nat Protoc. Jan 2024.

Sahin & Ebrahimi-Fakhari Labs. High-content screening identifies a small molecule that restores AP-4-dependent protein trafficking in neuronal models of AP-4-associated hereditary spastic paraplegia. Nature Comm. Jan 2024.

Sahin Lab. ALDH5A1-deficient iPSC-derived excitatory and inhibitory neurons display cell type specific alterations. Neurobiol Dis. Jan 2024.

Lee Lab. Synaptic wiring motifs in posterior parietal cortex support decision-making. Nature. Feb 2024

Woolf Lab. The secondary somatosensory cortex gates mechanical and heat sensitivity. Nat Commun. Feb 2024.

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