



**Boston  
Children's  
Hospital**

**F.M. Kirby  
Neurobiology  
Center**

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## Kirby Center News & Updates



On October 12, 2022, the Kirby Center and the HMS Department of Systems Biology co-sponsored a dance and drumming performance followed by a dance workshop by the [Jean Appolon Expressions Dance Company](#), a contemporary dance company rooted in Haitian-folkloric culture which seeks to preserve Haitian dance and music through contemporary interpretations. Their performance included an excerpt from their show [Traka](#), meaning “troubles” in Haitian Kreyòl. *Traka* explored how dance, culture, and community are pathways to healing for victims of traumatic events and premiered on May 13 & 14, 2022 at the ICA, where it was [reviewed by the Boston Globe](#).



**JEAN  
APPOLON  
EXPRESSIONS**



Boston Children's Hospital hosted its inaugural [Ride to Cure Kids](#) event on Saturday, November 12, 2022 at the new TRACK at New Balance. The Kirby Center Cyclists were captained by **Tom Schwarz**, PhD, and included **Guoli Zhao**, PhD, **Clifford Woolf**, MB, BCh, PhD, and **Scott Pomeroy**, MD, PhD, all of whom put in at least 45 minutes of cycling time. In all, 150 people participated in this event, and our team managed to raise \$1,050 to contribute to the total fundraiser amount of \$80,414. Additional Kirby participants included **Sindhuja Gowrisankaran**, PhD, **Siva Nagappan Chettiar**, PhD, **Ceren Uncu**, **Christelle Achkar**, MD, **Kira Dies**, **Maya Chopra**, MBBS, and **Balaji Venkatasubramanian**. Well done, team!

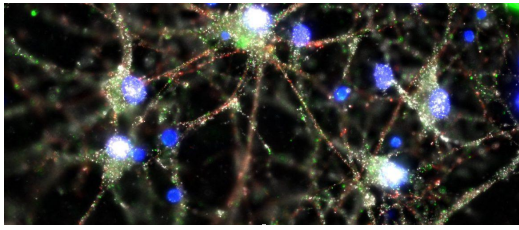


**Boston  
Children's  
Hospital**

**rideto  
curekids**

A full-day event, Music and the Brain: from Health to Healing, took place on Friday, January 20, 2023. This immersive program focused on how music can elicit emotion, guide movement, and promote social inclusion, particularly for individuals with ASD. Speakers were invited to present on topics such as “Music Therapy in Parkinson’s Disorder” and “Emotional Regulation Sculpted by Childhood Music”, and the day was concluded with a live performance by [Jean Appolon Expressions](#). Music and the Brain was organized by Kirby Center faculty members





[Beth Stevens](#), PhD and Mike Carroll, PhD received a 5-year renewal of their NIH Conte Center grant, Neural-immune mechanisms and synaptic connectivity in psychiatric illness. This [Conte Center for Neuroimmune Studies](#) supports research devoted to investigating how brain disorders like Alzheimer's and schizophrenia take hold and how they can be treated or reversed. Dr. Stevens, of the Kirby Center, focuses her investigation on the impact of the immune system in brain development, while Dr. Carroll, a faculty member in the Program in Cellular and Molecular Medicine, leads a team that investigates the way the immune system functions are carried out within the brain. This grant was our first to qualify for a new Children's Indirect Cost Incentive Plan, which returns 20% of indirect cost revenue associated with multi-investigator grants to PIs who bring in significant indirect dollars and prestigious grants to BCH. (Photo: [Conte Center for Neuroimmune Studies](#))

This holiday season, the Kirby Administrative team donated 13 gift bags to the [Devon Nicole House](#), including crayons, stickers, gift cards, and homemade baked goods. The Devon Nicole House was opened at BCH in 2004 to provide children and their families with an affordable, safe place to rest while their kids are being treated at Boston Children's Hospital.



On October 14, 2022, **Brielle Ferguson**, PhD got married! Congrats and best of luck to Brielle and her spouse, Bryan Thomas.

Preclinical Program Manager **Henry Lee**, PhD, was selected to receive a 2022 Young Investigator Award from the [American Epilepsy Society](#) (AES). Dr. Lee is one of 20 young investigators conducting basic translational, or clinical epilepsy research who were recognized out of a total 1,300 submissions. These investigators were awarded a \$1,200 travel stipend and received invitations to the AES 2022 Annual Meeting held December 1-6, 2022 in Nashville, TN.

**Jeffrey Holt**, PhD and **Eliot Shearer**, MD, PhD obtained a consortium grant from the [Institutional Centers for Clinical and Translational Research](#) (ICCTR) in the amount of nearly \$20,000. On December 12, 2022, Drs. Holt and Shearer, along with the [Translational Hearing Genomics Lab](#), utilized these funds to host a Special Symposium at Harvard Medical School called, "[The Last Mile is Always the Hardest: bringing Genetic Therapeutics for Usher Syndrome to the Clinic](#)". The goal of this symposium was to bring scientists, clinicians, patients and others together to discuss some of the final hurdles left to bring genetic therapies for Usher syndrome to clinic. The ICCTR offers [this pilot funding opportunity](#) to facilitate new multi-institutional consortiums led by BCH faculty for early-phase human clinical trials.

## 2022 Anniversary Milestones

### 5 years

**Philippe Morquette**, PhD (Do lab)  
**Dipendra Subedi** (Admin team)  
**Danilo Predes**, PhD (X He lab)  
**Anne Jacobi**, PhD (Z He lab)  
**Feng Tian**, PhD (Z He lab)  
**Miao He**, PhD (Z He lab)  
**Lili Xie**, PhD, (Z. He lab)  
**Ilaria Barone**, PhD (Lipton lab)  
**Anaïs Meziani**, Grad student (Steen lab)  
**Nicole Scott-Hewitt**, PhD (Stevens lab)

### 10 years

**Lindsay Swanson**, MS, CGC (Neurology)  
**Elizabeth Buttermore**, PhD (TNC)  
**Lala Mkhitarian** (Schwarz lab)  
**Mark LaCoursiere** (Poduri lab)

### 20 years

**Alexander Rotenberg**, MD, PhD

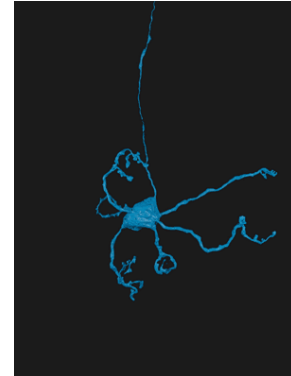
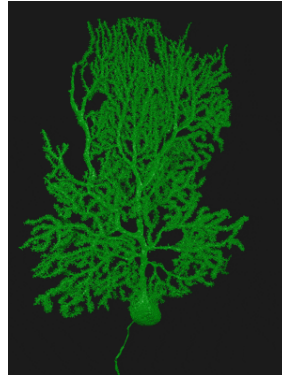
Kevin Mastro, PhD (Stevens lab)

Samuel Marsh, PhD (Stevens lab)

HAPPY  
*Anniversary*

## Research in News & Media

**Wei-Chung Allen Lee**, PhD was interviewed by Catherine Caruso for a Harvard Medical School article that [explored a new field of neuroscience called connectomics](#). According to Lee, connectomics can be defined as "understanding how individual neurons are connected to one another to form functional networks". Each neuron in the brain is connected to thousands of other neurons, so, in Lee's words: "To understand what a single neuron is doing, ideally you study it within the context of the rest of the neural network". (Videos: [Lee lab](#))



[On November 14, 2022, The Gilbert Family Foundation announced \\$23 million in grants to fund research projects](#) as part of their Brain Tumor Initiative and Vision Restoration Initiative (VRI). The Foundation was established to accelerate a cure for neurofibromatosis type one (NF1), a complex disease that affects 1 in 3,000 people worldwide. \$16 million of this funding will be invested in research projects that support the VRI. Kirby faculty member **Zhigang He**, PhD, will be one of the 12 researchers making up the scientific "Dream Team" working to develop novel therapies to restore sight to NF1 patients.



**Larry Benowitz**, PhD, was interviewed by Adam Chodak for RochesterFirst.com regarding his career-long research into optic nerve regeneration. In the article, titled [Researchers advancing optic nerve regeneration](#), Benowitz explains that the optic nerve is a central nervous system pathway that does not typically show the capacity to regenerate. However, recent research in his lab has discovered the so-called genetic "on-switch" in the retinal ganglion cell that triggers the regeneration program. This discovery comes as part of a long-term research collaboration established by the [Adelson Foundation](#) in 2005, a consortium of investigators whose efforts have proven to be enormously successful. While Benowitz admits that we are still a long way away from seeing this finding lead to treatment options for the visually impaired, this is an important and promising discovery for further research in regeneration.

**Michael Do**, PhD was interviewed by Ari Daniel for a segment on All Things Considered from NPR about the [circadian mystery of blind people who are able to tune their body clocks to sunlight despite having no light perception](#). A molecule called melanopsin was first discovered in the pigmented skin of the African clawed frog and was

found to be responsible for light detection. Do explains how melanopsin cells found in the human eye connect with each other to form a mesh that sits over the retina and is sensitive to light. These cells are able to contact "something like 30 brain regions" directly, according to Do, and one of those regions "is the structure at the base of the brain that is our master circadian clock".



## Resources

The [Animal Behavior and Physiology \(AB&P\) Core](#) received funding from the Equipment and Core Resources Allocation Committee (ECRAC) to replace the small animal circadian cabinets located in the AB&P Core space. The new cabinets offer several hardware upgrades that will not only provide significant reductions

in the time investigators have to wait to begin experiments, but will also allow more researchers to acquire higher quality data. Co-directed by Kirby faculty members [Michela Fagiolini](#), PhD and [Alex Rotenberg](#), MD, PhD, the AB&P facilities house a wide range of advanced technologies that acquire data at single cell, network and the behavioral level.



The [Genetic Analysis and Editing Core \(GAEC\)](#) was also awarded funding from the BCH Equipment and Core Resources Allocation Committee (ECRAC) to replace their Eppendorf microinjection setup. The new microinjection setup will include right and left manipulators and will significantly increase the GAEC's microinjection efficiency. This funding will be utilized by the Gene Editing Group, a group of researchers within the GAEC led by Assistant Director [Mantu Bhaumik](#), PhD.

## Lab News

Congratulations to the following **2023 Hearst Fellowship** recipients through Harvard Medical School:

**Charlotte Auth**, MD (Crickmore lab): Development of reproductive capacity under normal and stressful conditions.

**Alissa D’Gama**, MD, PhD (Poduri lab): Molecular Genetic Mechanisms of Unsolved Pediatric Epilepsy.

**Qiufen Jiang**, PhD (Chen lab): Do astrocytes regulate information processing in the visual thalamus?

**Nils Korte**, PhD (Stevens lab): Neonatal Immune Regulation of Cerebrovascular Function in Health and Disease.

**Kellen Winden**, MD, PhD (Sahin lab): FMRP-dependent dysregulation of gene expression and ribosomal binding in Tuberous Sclerosis Complex.

**Chloe Petit**, PhD (Holt/Géléoc lab) was granted a 2-year scholarship from [The Philippe Foundation](#). Founded in 1953, The Phillippe Foundation is an American organization that grants scholarships to doctors and scientists who participate in exchange programs between France and the US. These scholarships aim to encourage and advance medical research and facilitate Franco-American scientific and medical exchanges.

## Postdoc 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. We will convene a 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. I recommend ours because it is a fine way to strengthen ties within Kirby.

This assistance is meant to be highly individualized. If you communicate your particular needs (e.g., "I am a biophysicist with neuroethological leanings for whom English is a second language"), that will help us arrange the appropriate committee.

## Kirby Center Awards & Publications

### Recent Awards

**Elizabeth Buttermore**, PhD, received funding from the Succinic Semialdehyde Dehydrogenase Deficiency (SSADHD) Association for her project titled, SSADHD Biorepository to Children's Hospital Boston.

**Michela Fagiolini**, PhD, was awarded an NIH R01 with the Broad Institute for their project titled, Discover novel CaV3.3 potentiators to treat schizophrenia with distinct neurophysiological deficits. Dr. Fagiolini also received funds through the Associazione Italiana Rett (AIR) for another project titled, Pupillometry as a biomarker for Rett Syndrome: development of an open-source tool to assess pupillary dynamics in Rett Syndrome patients and animal models.

**Brielle Ferguson**, PhD, was awarded funding from an anonymous foundation for her project, Investigating Inhibitory regulation of attention circuits: Implications for neurological and neurodevelopmental disorders.

**Gwenaelle Géléoc**, PhD, received an NIH R01 grant with Louisiana State University for their project titled, Vestibular dysfunction and the development of therapies for Usher syndrome.

**Xi He**, PhD, received funding through the Awards Committee of the Research Executive Council at Boston Children's Hospital for his pilot project titled, Studies of the Skin-Gut Axis in pathogenesis of Atopic March.

**Zhigang He**, PhD, MB, was awarded a three-year renewal from the Adelson Medical Research Foundation for his project titled, Developing novel neural repair strategies after CNS injury.

**Jonathan Lipton**, MD, PhD, received funding from the Awards Committee of the Research Executive Council at Boston Children's Hospital for his pilot project titled, Uncovering a Novel Interface between Serotonin and the Circadian Clock in Synapses.

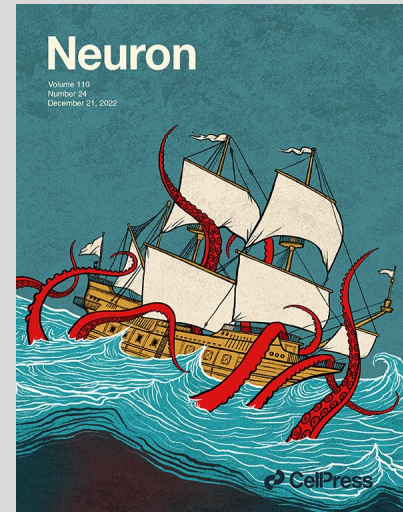
**Annapurna Poduri**, MD, MPH, received an NIH R13 grant for her proposal titled, SYNGAP1: Charting our Rare Disease Treatment Path.

**Alexander Rotenberg**, MD, PhD, was awarded funds through the Boston Children's Hospital Translational Research Program for his project titled, Developing native promoter-directed SSADH restoration gene therapy.

**Judith Steen**, PhD, received funding from the Ellison Foundation for her project titled, Halting the Tau Process in Alzheimer's Disease.

**Beth Stevens**, PhD, was awarded funding through the

### Recent Featured Publications



**Sahin lab.** DEPDC5-dependent mTORC1 signaling mechanisms are critical for the anti-seizure effects of acute fasting. *Cell Reports*. August 2022.

**Woolf lab.** Phenotypic drug screen uncovers the metabolic GCH1/BH4 pathway as key regulator of EGFR/KRAS-mediated neuropathic pain and lung cancer. *Science Translational Medicine*. August 2022.

**Hensch and Rotenberg labs.** N-acetylcysteine treatment mitigates loss of cortical parvalbumin-positive interneuron and perineuronal net integrity resulting from persistent oxidative stress in a rat TBI model. *Cerebral Cortex*. September 2022.

**Rosamund Stone Zander Translational Neuroscience Center (RSZ TNC).** Dynamic 3D Combinatorial Generation of hPSC-Derived Neuromesodermal Organoids With Diverse Regional and Cellular Identities. *Current Protocols*. October 2022.

**Lee lab.** Structured cerebellar connectivity supports resilient pattern separation. *Nature*. November 2022.

**RSZ TNC.** 16p13.11 deletion variants associated with neuropsychiatric

Howard Hughes Medical Institute Emerging Pathogens Initiative for her collaborative project titled, Pathogenic brain states: cells and circuits involved in altered brain function after non-CNS infection.

Multiple-PIs **Hisashi Umemori**, MD, PhD, and **Chinfei Chen**, MD, PhD, were awarded a 5-year NIH R01 for their project titled, How do neurons in the brain decide to refine their synaptic connections in vivo?

**Clifford Woolf**, MB, BCh, PhD, received a three-year renewal from the Adelson Medical Research Foundation for his project titled, Promote regeneration and prevent neuropathy of sensory and motor neurons.

**Gabriela Carrillo**, PhD (Engle lab) was awarded an NIH K00 for her project titled, The development of facial motor neuron subtypes in health and in congenital facial weakness.

**Whitney Gibbs**, PhD (Schwarz lab), was awarded an NIH K99 for her project titled, Investigating the role neuronal SYNJ2 in mRNA transport and mitochondrial function. Whitney also received an administrative supplement to this grant to cover work during her maternity leave.

**Aboozar Monavarfeshani**, PhD (Z. He lab), received an NIH K99 for his project titled, Transcriptional signatures of glaucomatous retinal and optic nerve head cells.

**Nader Morshed**, PhD (Stevens lab), was awarded an NIH F32 for his project titled, Molecular impact of endolysosomal dysfunction on neuron-glia communication pathways.

**Cherish Taylor**, PhD (Stevens lab), was awarded an NIH K00 for her project titled, Cooperation of environmental and genetic risk factors in schizophrenia.

disorders cause morphological and synaptic changes in induced pluripotent stem cell-derived neurons. *Frontiers in Psychiatry*. November 2022.

**Chen lab.** Brainstem serotonin neurons selectively gate retinal information flow to thalamus. *Neuron*. December 2022.

**Géléoc lab.** Loss of Pex1 in Inner Ear Hair Cells Contributes to Cochlear Synaptopathy and Hearing Loss. *Cells*. December 2022.

**Hensch lab.** Rapid synaptic and gamma rhythm signature of mouse critical period plasticity. *Proceedings of the National Academy of Sciences of the United States of America*. January 2023.

**RSZ TNC.** A Robust Pipeline for The Multi-Stage Accelerated Differentiation of Functional 3D Cortical Organoids from Human Pluripotent Stem Cells. *Current Protocols*. January 2023.

**Do lab.** Encoding of environmental illumination by primate melanopsin neurons. *Science*. January 2023.

For a listing of additional recent Kirby Center publications, please visit PubMed:

- last name [A-K](#)
- last name [L-Z](#)



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TEACHING HOSPITAL**

