

# Neurobiology News



**Boston  
Children's  
Hospital**

Until every child is well™

**FM Kirby  
Neurobiology  
Center**

**Fall 2019**



## Announcements

The [National Academy of Medicine](#) welcomed **Elizabeth Engle, MD**, and **Beth Stevens, PhD**, as [new members](#) this fall. Read more at [BCH](#), [Discoveries](#), and [EurekAlert!](#) Congratulations to Elizabeth and Beth! (logo credit [NAM](#))

**Recent Promotions** include **Chinfei Chen, MD, PhD**, promoted to Professor of Neurology, Harvard Medical School; **Mike Do, PhD**, promoted to Associate Professor of Neurology, Harvard Medical School; and **Long Cheng, PhD**, (Steen lab) promoted to Principal Associate in Neurology, Harvard Medical School. Congratulations to Chinfei, Mike, and Long!

Congratulations to **Zhigang He, PhD, BM**, recipient of the [Reeve-Irvine Medal!](#) Dr. He presented his talk entitled, "Viral vectors for gene modifications to enable re generation after spinal cord injury" at the 2019 Reeve-Irvine Medal Symposium in November.

The [Fondation Pour l'Audition](#) awarded **Jeff Holt, PhD**, the 2019 [Scientific Grand Prize](#) for the discovery of the function of TMC1, the pore-forming subunit of the hair cell transduction channel that converts sound into electrical signals. Congratulations, Jeff! [Here is a link](#) to a video about Jeff and his work and play!

Congratulations to **Gwen Géléoc, PhD**, who has accepted the position of Director of Student Affairs for the graduate program in Speech and Hearing Bioscience and Technology (SHBT) at Harvard University!

### [2019 Boston Children's Hospital Milestone Service Awards:](#)

**Alessia Di Nardo, PhD** (Sahin lab): 15 years; **Rajna Filip-Dhima** (Sahin lab): 15 years; **Clifford Woolf, MB, BCh, PhD**: 10 years; **Lee Barrett, PhD** (Woolf lab): 10 years; **Nathalie Picard, PhD** (Fagiolini lab): 10 years; **Benedikt Brommer, PhD** (Z. He lab): 5 years; **Yi Li, PhD** (Z. He): 5 years; **Maria Sundberg, PhD** (Sahin lab): 5 years; **Nathaniel Hodgson, PhD** (Hensch lab): 5 years; **Nina Makhortova** (TNC): 5 years; **Lacey Smith** (Poduri lab): 5 years; **Todd Anthony, PhD**: 5 years; **Denise McGinnis, PhD** (TNC): 5 years; **Liang Liang, PhD** (Chen): 5 years; **Michael Crickmore, PhD**: 5 years; **Ivan Tochitsky, PhD** (Woolf lab): 5 years.

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## New Kirby Faculty

This Fall, newest Kirby faculty member **Karl Koehler, PhD**, joined BCH as Assistant Professor in the Department of



Otolaryngology. He holds an appointment in the Department of Plastic Surgery, and his lab is affiliated with the Harvard Stem Cell Institute. His research focuses on using the organoid culture system as a platform to develop regenerative therapies for the inner ear and various craniofacial tissues. Welcome, Karl!



## Research News

*Medical Life Sciences* discusses the work of **Michela Fagiolini**, PhD, in the article [Measuring pupil dilation and heart rate using AI could enable earlier diagnosis of autism](#). This story is also covered in [Medical Xpress](#) and [Spectrum News](#).

The *Boston Globe* features the epilepsy research of **Ann Poduri**, MD, MPH, in [Meet the researchers working to curb childhood cancer, repair your ACL, stop epileptic seizures, and more](#) (photo credit: [Boston Globe](#)). *The Wall Street Journal* quotes **Dr. Poduri** in [The Unfulfilled Promise of DNA Testing](#).

**Alex Rotenberg**, MD, PhD, speaks to the *John Hopkins University Arts & Sciences Magazine* about [Halting Epilepsy in Its Tracks](#).

**Mustafa Sahin**, MD, PhD, provides expert perspective on recent Pten research in *The New York Times* article [A Rare Genetic Mutation Leads to Cancer. The Fix May Already Be in the Drugstore](#). *Genetics in Medicine* discusses the work of **Dr. Sahin** and the TNC in [Meta-analysis and multidisciplinary consensus statement: exome sequencing is a first-tier clinical diagnostic test for individuals with neurodevelopmental disorders](#) (story also covered in [Discoveries](#).)

The Alzheimer's research of **Beth Stevens** is highlighted in *Boston Globe* article [Four health projects at Boston Children's Hospital that could help adults](#).

The *a16z Podcast* interviews **Clifford Woolf** in [The Biology of Pain](#). *The Washington Post* also consults **Dr. Woolf's** pain expertise in [For some with chronic pain, the problem is not in their backs or knees but their brains](#).



## Recent Awards

**Todd Anthony** received a Boston Children's Hospital Tommy Fuss grant for his project entitled, A Noninvasive and Inexpensive Approach for Predicting Anxious Psychopathology and Stress Vulnerability.

**Chinfei Chen** was awarded a Boston Children's Hospital Tommy Fuss grant for her project entitled, The Role of Thalamocortical Interactions in Development of the Limbic System.

Dr. Chen and the Imaging Core received funding from the Boston Children's Hospital Equipment and Core Resources Allocation Committee (ECRAC) toward the purchase of IMARIS FL (with CellSense package) v 9.3 software.

**Mike Crickmore** was awarded an NIH/NIGMS R01 for his project entitled, Mechanisms of interval timing.

Dr. Crickmore also received an NIH/NINDS R01 for his project entitled, Circuit principles of demotivation in the decision to switch behaviors.

**Mike Do** received an NIH/NEI R01 grant to support his project entitled, Neurophysiology of the Fovea.

**Michela Fagiolini** received funding from Autism Speaks in conjunction with Takeda for the project entitled, Testing TAK-041 (GPR139 agonist) in PACT Behavioral Phenotyping Battery.

Dr. Fagiolini and the Neurobehavioral Core (NBC) were awarded funding from ECRAC toward the purchase of a Microperfusion Pump (MPP102 PC) and accessories and a Return movement response cage.

**Gwen Geleoc**, together with Dr. Muna Naash of the University of Houston, were awarded an NIH/NIDCD R56 grant for their project entitled, Gene Therapy of Usher Syndrome.

**Xi He**, PhD, received an NIH/NIGMS R01 grant for his project entitled, Wnt Signaling in intestinal stem cells, homeostasis, and cancer.

**Zhigang He**, together with Dr. Kuan Hong Wang of the University of Rochester Medical Center, were awarded an NIH/NCCIH grant for their project entitled, Mechanism and Optimization of CBD-mediated analgesic effects.

Dr. He also received the following funding:

Commonwealth of Massachusetts; project: Developing strategies of promoting the anatomical regeneration and functional recovery of reticulospinal axons after spinal cord injury

Adelson Medical Research Foundation; project: Developing new strategies of restoring functions after CNS injury

Harvard Medical School; project: In vivo epigenetic reprogramming for restoring age-related visual impairment

**Jeff Holt** was awarded a competing continuation of his NIH/NIDCD R01 project entitled, TMC gene function in sensory hair cells.

**Scott Pomeroy**, MD, PhD, together with Dr. Clifford Saper of Beth Israel Deaconess Medical Center, was awarded a competing renewal of the NIH/NINDS R25 project entitled, CH/BIDMC/Harvard Medical School Neurology Resident Research Education, Program Competing Renewal.

**Alex Rotenberg**, together with Cremedical Corporation, received an NIH/NINDS R43 Small Business Innovation Research Grant for the project entitled, Noninvasive Functional Cortical Mapping with Innovative tEEG.

Dr. Rotenberg also was awarded a grant from the Epilepsy Research Foundation for his project entitled, ECV - Epihunter Clinical Validation.

Drs. Alex Rotenberg and Michela Fagiolini and the iB&P Core received funding from ECRAC toward the purchase of equipment for the Core.

**Mustafa Sahin** was awarded an NIH/NINDS R01 for his project entitled, Disrupted ciliary signaling in the brain pathology of Tuberous Sclerosis Complex.

Dr. Sahin and the Human Neuron Core were awarded funding from ECRAC toward a Thermo Fisher Stericult double-stacked relative humidity-controlled incubator.

Dr. Sahin also received the following funding:

NIH U54; project: Developmental Synaptopathies Associated with TSC, PTEN, and SHANK3 Mutations

CURE-SPG47-2127; project: To administer the AP-4 Natural History Study and Patient Registry

Tuberous Sclerosis Alliance; project: TS Alliance: Clinical Research Consortium

**Tom Schwarz**, PhD, was awarded an NIH/NINDS R37 grant for his project entitled, Kinetochore Protein Functions in Synaptogenesis.

Dr. Schwarz also received funding from Harvard Medical School to support his project entitled, Microtubule Cytoskeletal Events in Synaptogenesis.

**Judith Steen**, PhD, together with colleagues at the University of California Los Angeles, received an NIH UG3/UH3 Exploratory/Developmental Cooperative Agreement Phase I for the project entitled, Impact of coding and non-coding variation in progressive supranuclear palsy.

**Beth Stevens** received funding from an anonymous foundation to support her project entitled, Neuronal Retrometer and Microglia.

**Hisashi Umemori**, MD, PhD, together with colleagues at the University of California San Francisco, received an NIH/NINDS grant for the project entitled, Glial Mechanisms of Developmental Synapse Refinement.

**Clifford Woolf** and collaborators, including Drs. Peter Sorger and Bruce Bean of Harvard Medical School, were awarded a grant from the Defense Advanced Research Projects Agency

(DARPA) for their project entitled, STOP PAIN: Safe Therapeutic Options for Pain and Inflammation.

Dr. Woolf also received the following funding:

Harvard Medical School Q-FASTR; project: (with Dr. Bruce Bean of Harvard Medical School) Targeting Kv2 channels to prevent neuronal apoptosis.

Adelson Medical Research Foundation; project: Regeneration, neuropathy and degeneration of sensory and motor neurons

Dr. Woolf and **Mantu Bhaumik**, PhD, and the Mouse Gene Manipulation Core were awarded funding from ECRAC toward equipment for the core.

**Nick Andrews**, PhD, (NBC) received funding from the University of Rochester for his project entitled, Assessment of Inter-Lab Reliability in Pre-clinical Chronic Pain Treatment Studies.

**Darius Ebrahimi-Fakhari**, PhD, (Sahin) was awarded a grant from the Spastic Paraplegia Foundation, Inc. for his project entitled, Development Of iPSC-Derived Neurons From Patients with AP4-Associated Hereditary Spastic Paraplegia To Support An Unbiased Phenotypic Screening For Novel Therapeutic Targets.

**Chris Elitt**, MD, (Rosenberg), together with Paul Rosenberg, PhD, and colleagues at Brigham and Women's Hospital, received funding from The Gerber Foundation to support their project entitled, Zinc nutritional status in preterm infants: exosomes as a novel, non-invasive biomarker and associations with growth, brain development, and injury.

**Tammy Szu-Yu Ho**, PhD (Woolf) was named an Ellen R. and Melvin J. Gordon Fellow in Neurobiology for her project entitled, Identify molecular determinants of regeneration and screen for novel therapies to promote axon regeneration after injury.

**Christopher McGraw**, MD, PhD, (Poduri) received funding from the American Epilepsy Society for his project entitled, Zebrafish models of refractory epilepsy for novel anti-epileptic drug discovery.

**Carl Nist-Lund** (Holt/Géléc) received a prize at the 18th annual Folkman Research Day for his presentation entitled, Improved Gene Therapy Restores Hearing, Balance, and Secondary Measures in Mice with Genetic Inner Ear Disorders.

**Nivanthika Wimalasena** (Woolf) was awarded a Harvard Brain Institute Young Scientist Travel Award to present at the 10th World Congress of Itch in Sydney, Australia in November.

**Kellen Winden**, MD, PhD, (Sahin) received funding from the American Academy of Neurology Foundation for his project entitled, Investigating the effects of loss of TSC on gene expression within specific neuronal subtypes.

**Zicong Zhang**, PhD, (Z. He) was awarded a Wings for Life grant for his project entitled, Promoting anatomical regeneration and functional recovery of reticulospinal axons after spinal cord injury.



## Postdoc News

### Support for Fellows Entering the Job Market

The postdoctoral community has requested assistance with the search for academic positions, and faculty of the Kirby Center will offer guidance tailored to each fellow and stage of the process.

If you are preparing to enter the job market, please email [Lynn Bruning](#) and [Michael Do](#). Please contact us well in advance of your first deadline.

We will convene a committee of Kirby faculty members who have appropriate expertise. This committee will

1. Review a draft of your application within 2 weeks of receiving it.
2. Provide coaching on preliminary screenings (e.g., video interviews), if applicable.
3. Offer feedback on your job talk.
4. Take you through a mock chalk talk.

5. Provide advice on closing the deal.

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 would help us arrange the appropriate committee.

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## Graduate Student News

*Recent Dissertation Defense: Congratulations, PhD!*

**Stephen Thornquist** (Crickmore): *Representation of time and motivation in the nervous system*

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## Recent Featured Publications

**Chen lab.** Heterogeneity of retinogeniculate axon arbors. *European Journal of Neuroscience*. April 2019.

**Fagiolini lab.** Accelerated Hyper-Maturation of Parvalbumin Circuits in the Absence of MeCP2. *Cerebral Cortex*. April 2019.

**Schwarz lab.** The light-sensitive dimerizer zapalog reveals distinct modes of immobilization for axonal mitochondria. *Nature Cell Biology*. June 2019.

**Rosenberg, Hensch, and Lipton labs.** Deletion of Neuronal GLT-1 in Mice Reveals Its Role in Synaptic Glutamate Homeostasis and Mitochondrial Function. *Journal of Neuroscience*. June 2019.

**Woolf lab.** Diltiazem Promotes Regenerative Axon Growth. *Molecular Neurobiology*. June 2019.

**Hensch/Fagiolini lab.** Deep learning of spontaneous arousal fluctuations detects early cholinergic defects across neurodevelopmental mouse models and patients. *Proceedings of the National Academy of Sciences of the United States of America*. July 2019.

**Rotenberg lab.** Maturation of Corticospinal Tracts in Children With Hemiplegic Cerebral Palsy Assessed by Diffusion Tensor Imaging and Transcranial Magnetic Stimulation. *Frontiers in Human Neuroscience*. July 2019.

**Z. He lab.** Elevating Growth Factor Responsiveness and Axon Regeneration by Modulating Presynaptic Inputs. *Neuron*. July 2019.

**Engle lab.** Decreased ACKR3 (CXCR7) function causes oculomotor synkinesis in mice and humans. *Molecular Genetics*. September 2019.

**Sahin lab.** Chronic mTORC1 inhibition rescues behavioral and biochemical deficits resulting from neuronal *Depdc5* loss in mice. *Human Molecular Genetics*. September 2019.

**Schwarz lab.** A High-Content Screen Identifies TPP1 and Aurora B as Regulators of Axonal Mitochondrial Transport. *Cell Reports*. September 2019.

**Crickmore lab.** Recurrent Circuitry Sustains *Drosophila* Courtship Drive While Priming Itself for Satiety. *Current Biology*. October 2019.

**Sahin lab.** Biallelic mutations in *TSC2* lead to abnormalities associated with cortical tubers in human iPSC-derived neurons. *Journal of Neuroscience*. October 2019.

For a listing of additional recent Kirby Center publications, please visit PubMed (last name [A-K](#), last name [L-Z](#)).



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