

Suresh Kumar Jetti

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EDUCATION AND TRAINING

- 2016-Present **Postdoctoral Fellow & Research Scientist**
Massachusetts Institute of Technology
The Picower Institute for Learning and Memory | Advisor : Dr. J. Troy Littleton
- 2011-2015 **Ph.D. in Neuroscience**
Katholieke Universiteit Leuven, Belgium
Neuro-Electronics Research Flanders (*NERF*) | Advisor : Dr. Emre Yaksi
- 2006-2010 **Research Assistant**
Indian Institute of Technology, Madras
Ion Channel Lab, Department of Biotechnology | Advisor : Dr. Amal Kanti Bera
- 2004-2006 **M.Sc in Biochemistry and Molecular Biology**, Pondicherry University, India.

RESEARCH EXPERIENCE

2016-present | Post-Doctoral Fellow and Research Scientist, Littleton lab, The Picower Institute for Learning and Memory, Massachusetts Institute of Technology

- Established a research program to investigate mechanisms of biophysical and synaptic diversity between motor neurons using single-cell RNA-seq (Patchseq profiling), STED nanoscopy, optogenetics, synaptic Ca^{2+} imaging, whole-cell patch-clamp electrophysiology, and behavioral assays.
- Conducted genetic screens to identify key molecular players driving synapse diversity and excitability.
- Developed machine learning tools to automate the analysis of synaptic Ca^{2+} imaging data.
- Established internal and external collaborations to analyze RNAseq and splice isoform datasets.

2011- 2015 | Graduate Student, Yaksi lab, Neuro-Electronics Research Flanders & KU-Leuven, Belgium

- Applied *in vivo* two-photon Ca^{2+} imaging and whole-cell patch-clamp electrophysiology to study olfactory coding and functional connectivity of habenula microcircuits in zebrafish.
- Collaborated with colleagues to analyze large-scale neural Ca^{2+} imaging data in MATLAB.
- Actively participated in establishing the lab, protocols, equipment set-up in collaboration with my advisor and colleagues.

2006-2009 | Research Assistant, Ion Channel Lab, Dept of Biotechnology, IIT-Madras, India

- Established primary mouse cortical neuronal cultures in collaboration with colleagues.
- Optimized cell-culture assays and fluorescence-based assays to screen for novel natural plant products that provide neuroprotection.
- Used cell culture assays, electrophysiology, and 96 well plate assays to investigate the role of acid-sensing ion channels and voltage-dependent anion channel in neuronal injury.

TECHNICAL SKILLS AND EXPERTISE

- Proficient in primary hippocampal neuronal cultures, Neuro2a, CHO and HeLa cell cultures, and transfection.
- Proficient in whole-cell patch-clamp, sharp electrode physiology, and optogenetics. Built patch-clamp rig with a confocal microscope and optogenetics system. Proficient in synaptic physiology, ion channel currents, and intrinsic excitability measurements.
- Proficient in two-photon Ca^{2+} imaging, synaptic Ca^{2+} imaging and data analysis in MATLAB
- Proficient in basic molecular biology techniques, RT-PCR, cell viability assays, enzyme assays, and assay development to screen natural plant products.
- Proficient in model animal genetics, genetic screens (RNAi, CRISPR and mutant animal screens)
- Proficient in super resolution STED imaging, image analysis, and immunohistochemistry.
- Experience in RNA-seq library preparation, Patch-Seq sample collection, FACS sorting, and some expertise in RNA-seq analysis.
- Graphpad Prism, ImageJ, Adobe illustrator, MATLAB and Python software to analyse Ca^{2+} imaging, microscopy, electrophysiology, and RNAseq large scale datasets.

FELLOWSHIPS AND AWARDS

2012-2014	Boehringer Ingelheim Fonds (BIF) Ph.D. Fellowship
2013	BIF Travel Grant to attend the 2013 Society For Neuroscience Meeting, San Diego, CA
2014	BIF Travel Grant to attend the 2014 Society For Neuroscience Meeting, Washington, DC
2017-2021	The JBP Foundation Postdoctoral Fellowship

SCIENTIFIC MENTORSHIP AND LEADERSHIP

Undergraduate Mentorship

2020-2022 | Junyi Hi—Biology Undergraduate at MIT
2019-2020 | Shreya Kochar—Computer Science Undergraduate at Wellesley College
2019-2021 | Grace Tang—Computer Science Undergraduate at MIT
2019-2020 | Phyllis Wei—Bioinformatics Undergraduate at Wellesley College
2018-2019 | Stephen Losster—Biology Undergraduate at MIT
2018-2019 | Arianna Adam—Biology Undergraduate at MIT
2017-2018 | Clara Sorensen—Computer Science Undergraduate at Wellesley College
2017-2018 | Yuhuan Wu—Biology Undergraduate at Wellesley College
2017-2018 | David Li—Computer Science Undergraduate at MIT
2017 | Roberto Bolli Jr—Biology Undergraduate at MIT

Master's and Undergraduate Thesis Projects

2019-2021 | Daniela Castro Perez—Biology Undergraduate at Wellesley College
Thesis title: *Role of Cyclic Nucleotide Gated Ion Channel Signaling in Synaptic Transmission*
2018-2020 | Yasmin Siahposh—BCS and Computer Science Master Student at MIT
Thesis title: *Mechanisms of Biophysical Diversity Between Drosophila Motoneuronal Subtypes*

PEER REVIEW AND PROFESSIONAL SERVICE

- 2019-ongoing Associate Faculty member, Faculty of 1000
- 2020-2022 Co-Organizer, Simons Foundation Boston Area Neuroscience Talks
- Peer review: Frontiers in Synaptic Neurosciences, Arthritis Research & Therapy, STAR protocols (Cell Press), Journal of Cell Physiology, Molecular Neurobiology.

PUBLICATIONS

Research Articles:

Jetti SK*, Swain SM*, Majumder S, Chatterjee S, Poornima V, Bera AK (2010). Evaluation of the role of nitric oxide in acid sensing ion channel mediated cell death. *Nitric oxide: Biology and Chemistry* 22(3):213-9.

Jetti SK*, Vendrell Llopis N*, Yaksi E. (2014) Spontaneous activity governs olfactory representations in spatially organized habenular microcircuits. *Current biology* 24(4): 434-9

- **Commentary:** Okamoto H, (2014) Neurobiology: sensory lateralization in the fish brain. *Current Biology*. 24(7) 285-287.

Tewari D, Madhav NS, Mukhopadhyay M, Sahu G, **Jetti SK**, Preethidan DS, Bera AK. (2016) Cytoprotective effect of *Centella asiatica* is mediated through the modulation of mitochondrial voltage dependent anion channel (VDAC) and scavenging of free radicals. *Journal of Functional Foods*, 21:301-311

Bartoszek EM, Ostenrath OM*, **Jetti SK***, Serneels B, Mutlu AK, Chau k, and Yaksi E. (2021) Ongoing habenular activity is driven by forebrain networks and modulated by olfactory stimuli *Current biology* 31: 3861–3874

Jetti SK[#], Crane AB, Akbergenova Y, Aponte-Santiago NA, Cunningham KL, Whittaker CA, Littleton JT[#] (2023). Molecular Logic of Synaptic Diversity Between *Drosophila* Tonic and Phasic Motoneurons. *Neuron* 111, 1–16 ^{#co-corresponding author}

- **Commentary:** Medeiros AT and O'Connor-Giles K, (2023) To Ib or not to Transcriptional regulation of tonic type Ib vs. phasic type Is motor neurons. *Neuron* 111(22):3497-3499.

Brija E, Guan Z, **Jetti SK**, Littleton, JT (2023). Stochastic RNA editing of the Complexin C-terminus within single neurons regulates neurotransmitter release. *Cell Reports*, 42(9):113152.

Jetti SK, and Littleton JT (2024). Differential sialylation specifies intrinsic biophysical diversity between motoneuronal subtypes (*in preparation*).

Crane AB, **Jetti SK**, Littleton JT (2024). Genome-wide analysis of RNA editing and splicing diversity across *Drosophila* tonic and phasic larval motoneurons (*in preparation*).

Jetti SK, and Littleton JT (2024). Characterization of structural and functional synaptic properties of hindgut neurons. (*in preparation*)

Conference Article:

Tang G*, Kochar S*, Jetti SK*, Castro Perez DL, Chakravarty S, Akbergenova Y, Weiss A, Sorensen C, Brown EN, Littleton JT (2020). Probabilistic Analysis of Confocally Imaged Synaptic Calcium Activity (PACISCA). 2020 IEEE MIT Undergraduate Research Technology Conference (URTC). ([direct mentee](#))

*Equal contribution

UNPUBLISHED DATASETS

- **Functional connectivity datasets** to map local functional connectivity between habenula neurons in zebrafish using optogenetics and whole-cell patch-clamp electrophysiology (n=~120 habenula neurons; data collected and analyzed during grad school)
- **Isoform-Patchseq datasets** to compare transcriptomic and splice isoform profiles of dHb9 tonic motoneurons (n=~75 neurons; data analyzed during postdoc in collaboration with MIT core facilities)
- **Isoform-Patchseq datasets** to compare transcriptomic and splice isoform profiles of 5 days (young) and 55 days old samples to study neuromuscular aging (n=~20 samples; data collected and analyzed during postdoc in collaboration with MIT core facilities)

CONFERENCE TALKS

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| 2023 | <i>Functional Diversity in Synapse Transmission Between Motor and Gut Neurons.</i> Marine Biological Laboratory, Woods Hole, MA |
| 2023 | <i>Molecular Mechanisms of Synapse Diversity Between Drosophila Motoneuronal Subtypes.</i> Beyond the connectome meeting, HHMI Janelia Research Campus, Ashburn, VA (poster blitz talk) |
| 2023 | <i>Molecular Logic of Functional Synaptic Diversity Between Drosophila Tonic and Phasic Larval Motoneurons,</i> Boston area <i>Drosophila</i> Meeting, Brandeis University, Waltham, MA. |
| 2022 | <i>Molecular Mechanisms of Functional Synaptic Diversity.</i> BIF Meeting, Woods Hole, MA |
| 2021 | <i>Molecular Mechanisms of Functional Synaptic Diversity in Drosophila Tonic and Phasic Larval Motoneurons,</i> Neurogenetics of the Larva <i>Drosophila</i> meeting, Indiana University, Bloomington, IN |
| 2021 | <i>Molecular Logic of Functional Synaptic Diversity in Drosophila Tonic and Phasic Larval Motoneurons,</i> Neurobiology of <i>Drosophila</i> Meeting, Cold Spring Harbor, NY |
| 2020 | <i>Investigating Cell-Type-Specific Mechanisms of Functional Synapse Diversity,</i> Picower Fellows Meeting, The Picower Institute, MIT, Cambridge, MA |
| 2020 | <i>Molecular Mechanisms of Neuronal Diversity.</i> Lovely University, India |
| 2019 | <i>Molecular Mechanisms of Intrinsic Biophysical and Functional Synapse Diversity between Tonic and Phasic Motor Neurons.</i> Picower Retreat talk, The Picower Institute, MIT |
| 2014 | <i>Olfactory Computations in Habenula Microcircuits.</i> IMEC PhD Days Seminar, Leuven, Belgium |
| 2013 | <i>Transformation of Olfactory Representations in Habenula Circuits.</i> NERF and Katholieke University, Leuven, Belgium. |
| 2012 | <i>Mechanisms of Olfactory Coding in Habenula Circuits.</i> BIF Fondation Summer Seminars at Hirschegg, Austria. |