BRIAN KIM

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Education

Ph.D in Neuroscience *September 2019 – Current*

Brown university – National Institutes of Health Graduate Partnership Program Bethesda, Maryland

Thesis title: *Gustatory and Olfactory information integration in single cell and network (on going)*

B.S. in Biomedical Engineering *August 2013 – May 2017*

Georgia Institute of Technology, Atlanta, Georgia

Thesis title: *Characterization of Electrodes for Kilohertz Electrical Stimulation*

Research Experience

Graduate Student Research *September 2019 – Current*

Sensory Coding and Neural Ensembles section, National Institutes of Health

Mentor: Dr. Mark Stopfer

- Study the 3rd order chemosensory neurons and see how taste and smell information is integrated
- Perform *in vivo* extracellular tetrode, intracellular sharp, and intracellular patch recordings in locusts
- Trace recorded neurons stained with immunohistochemistry and image with confocal imaging
- Design and create an odorant and tastant delivery system with fast response times (>5ms), accurate odor concentration (0-100%), and accurate timing of delivery for both stimulants simultaneously (<20ms)
- Analyze spike rate and membrane potential changes and visualize data using MATLAB

Postbaccalaureate Fellowship *July 2017 – August 2019*

Sensory Coding and Neural Ensembles section, National Institutes of Health

Mentor: Dr. Mark Stopfer

- Study the olfactory receptor neurons (ORNs) and their temporal dynamics with dynamic plume stimuli
- Use in vivo single sensillum extracellular for recording and MATLAB for spike sorting and data analysis
- Create ORN model based on in vivo data to quantify the significance of response and adaptation types

Undergraduate Research Assistant *August 2015– December 2016*

Department of Biomedical Engineering, Georgia Institute of Technology

Mentor: Dr. Robert Butera

- Characterized optimal geometries and materials affecting Kilohertz Electrical Stimulation (KES)
- Fabricated chronic and acute micro nerve cuff electrodes for in vivo experiments on the sciatic nerve
- Analyzed data and ran statistical analyses using MATLAB

Mentoring and Teaching

Brown-NIH GPP Student Representative *October 2021 – October 2023*

Brown University-National institutes of Health Graduate Partnership Program (GPP), National Institutes of Health

- Organize and facilitate Interviews and in-person visits for yearly admissions events
- Organize bi-weekly student seminars, social events, and town halls
- Help students transition moving to and from Brown University to NIH for classes during their first year
- Address any concerns and advocate for students to the program director and NIH administrators

NIH Special Volunteer *September 2018 – August 2019*

Sensory Coding and Neural Ensembles section, National Institutes of Health

- Introduced and taught extra cellular electrophysiology, immunohistochemistry, confocal imaging
  - Single sensillum recording with staining lead revealed ORN projection morphology

National Institutes of Health Summer Internship Program *May 2018 – August 2018*

Sensory Coding and Neural Ensembles section, National Institutes of Health

- Taught ORN single sensillum extracellular recording for characterizing ORN adaptation
  - Introduced electrophysiology techniques with the related hardware and tools

Undergraduate Teaching Assistant *August 2016 – May 2017*

Department of Biomedical Engineering, Georgia Institute of Technology
Biotransport with Dr. Linda Harley

- Assisted students in class and during office hours with fluid statics and dynamics, mass transfer, and thermodynamics

Undergraduate Research Option Students *January 2016 – May 2017*

Department of Biomedical Engineering, Georgia Institute of Technology

- Introduced students to electrophysiology, animal handling, and cuff electrode fabrication

Fellowships and Awards

NIH Fellows Award for Research Excellence *July 2022*

Office of Intramural Training and Education (OITE), National Institutes of Health

- Title: Olfactory receptor neurons generate multiple response motifs, increasing coding space dimensionality
  - Annual award given to graduate and postdoc fellows who authored abstracts in the top 25%

Outstanding Postbaccalaureate Poster Award *May 2018*

National Institute of Child Health and Human Development, National Institutes of Health

- Title: Characterizing Response Heterogeneity and Adaptation in Olfactory Receptor Neurons
  - Prestigious annual award given to the most outstanding postbaccalaureate student

FAES Graduate School Student Scholarship *Jan 2018 – May 2018*

Foundation for Advanced Education in the Sciences (FAES), National Institutes of Health

- Scholarship award for enrolling in 'Human Neuroscience' graduate course

President's Undergraduate Research Award *May 2016 – August 2016*

Department of Biomedical Engineering, Georgia Institute of Technology

- Title: A Study of Constant Current Versus Constant Voltage Stimulation
  - Awarded to students with outstanding summer research proposals

Poster Presentations (*Mentee in italics*)

Kim B, Aldworth Z.N, Stopfer M.A, Characterizing Response Heterogeneity and Adaptation in Olfactory Receptor Neurons. Poster presented at 17th Annual National Institutes of Health Graduate Student Research Symposium, 2021 Feb 17-18; Bethesda, MD.

Kim B, *Kim A*, Aldworth Z.N, Stopfer M.A, Characterizing Response Heterogeneity and Adaptation in Olfactory Receptor Neurons. Poster presented at 48th Annual Conference of the Society for Neuroscience, 2018 Nov 3-7; San Diego, CA.

Carter W, **Kim B**, Stopfer M.A, Characterizing Adaptation in Olfactory Receptor Neurons. Poster presented at 2018 Summer Poster day of the National Institutes of Health, 2018 August 9; Bethesda, MD.

Stevens M, **Kim B**, Boronat-Garcia A, Stopfer M.A, Developing a Standardized Brain Atlas for an Insect Model System, the Locust. Poster presented at 2018 Summer Poster day of the National Institutes of Health, 2018 August 9; Bethesda, MD

Kim B, *Kim A*, Aldworth Z.N, Stopfer M.A, Characterizing Response Heterogeneity and Adaptation in Olfactory Receptor Neurons. Poster presented at 2018 Postbac Poster day of the National Institutes of Health, 2018 May 2; Bethesda, MD.

Patel Y.A, Modi R, **Kim B.S**, *Rountree W.S*, Butera R.J, Voit W, Microneedle Cuff Electrode for Extrafasicular Peripheral Nerve interfacing. Poster presented at 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, 2016 Aug 17-20; Orlando, FL.

Publications (*Mentee in italics*) *§ Equal contributions

Kim B*, Haney S*, Millan A.P, Shurti Joshi, Aldworth Z.N, Rulkov, N., *Kim, A.T.*, Bazhenov M§, Stopfer M.A§ (2023), *Olfactory receptor neurons generate multiple response motifs, increasing coding space dimensionality.* eLife 12, e79152. 10.7554/eLife.79152.

Patel Y.A, **Kim B.S**, *Rountree W.S*, Butera R.J (2017), Kilohertz Electrical Stimulation Nerve Conduction Block: Effects of electrode surface area. IEEE Transactions on Neural Systems and Rehabilitation Engineering.

Patel Y.A, **Kim B.S**, Butera R.J (2017), Kilohertz Electrical Stimulation Nerve Conduction Block: Effects of electrode material. IEEE Transactions on Neural Systems and Rehabilitation Engineering.