Kachi Odoemene

kachi.odoemene@gmail.com | https://kachio.github.io | 347-4702533

TECHNICAL SKILLS

Neuroscience: psychophysics experiment design, visual neuroscience, neural imaging, electrophysiology, histology, neuroanatomy, neurosurgery, optogenetics, chemogenetics.

Quantitative: modeling and analysis of psychophysical behavior, neural data analysis, computational neuroscience, signal processing, image processing.

Machine Learning: dimensionality reduction and feature extraction (PCA, SVD, and ICA), linear regression, classification (logistic regression, SVM), clustering. Introductory exposure to deep learning including reinforcement learning and neural networks (RNN, CNN).

Programming: MATLAB, Python, R. Limited proficiency with C and C++.

Technical Instrumentation & Measurement: electronic circuit design (analog and digital), PCB design, microfabrication/nanofabrication, neurotechnology, microscopy (widefield, 2-photon, fluorescence, confocal, scanning electron), 3D printing, Arduino, Raspberry Pi.

EXPERIENCE

Cold Spring Harbor Laboratory, Cold Spring Harbor, NY 2011 - 2017
PhD Student

- Implemented machine learning analysis for decoding natural images from neural population activity in mouse visual cortex.
- Designed and developed cognitive and perceptual decision making task for studying visual evidence accumulation for rodents.
- Designed and executed on research program to investigate the causal role of rodent visual brain areas to visual decision-making behavior.
- Developed software for running experiments in and analyzing psychophysics, neural imaging, and electrophysiology data.
- Conducted human psychophysics studies to test models of multisensory (audio-visual) integration.
- Designed and conducted neural perturbation experiments (chemogenetics and optogenetics) in behaving animals.
- Supervised and mentored technicians and undergraduate summer students.
- Developed microscope for mapping and identifying rodent visual brain areas.

Purdue University, West Lafayette, IN 2009 - 2011
Graduate Research Associate in Biomedical Engineering

- Designed and developed prototype lab-on-chip platform for simultaneous intracellular electrophysiology recordings from multiple neurons.
- Developed experimental preparation and analysis for estimating electrode-to-nerve fiber distances.
- Designed and characterized performance of microelectrodes for NASA nanosatellite compatible biosensor platform for assessing Cyanobacteria gravitational physiology.

US Naval Research Laboratory, Center for Biomolecular Science and Engineering 2009
Summer Intern in Biochemistry

- Conducted experiments to quantify reactive amine groups on the surface of engineered viral (bacteriophage T4) nanoparticles.

The George Washington University, Washington, DC 2006 - 2008
Research Associate in Biophysics

- Developed gold nanoparticle wire biomechanical sensor platform

EDUCATION

Cold Spring Harbor Laboratory, Cold Spring Harbor, NY 2017
Ph.D. - Systems Neuroscience

Purdue University, West Lafayette, IN 2011
M.S. - Biomedical Engineering

The George Washington University, Washington, DC 2009
B.S. - Biomedical Engineering

- Senior Capstone Projects: Design and implementation of mechanical model of vocal cords. Design and implementation of MATLAB diagnostic software for human vocalization analysis.

PUBLICATIONS AND CONFERENCE PRESENTATIONS

Odoemene O and Churchland AK (in preparation). “Decoding natural scenes from mouse higher visual areas”.

Odoemene O, Nguyen H, and Churchland AK (in preparation). “Photoinhibition of secondary visual area AM in visual evidence accumulation”.

Odoemene O and Churchland AK (2014). “Listening for the right sounds “(Preview). Neuron.

Qiao S, **Odoemene O**, and Yoshida K (2012). “Determination of electrode to nerve fiber distance and nerve conduction velocity through spectral analysis of extracellular action potentials recorded from earthworm giant fibers” Medical and Biological Engineering and Computing 50(8) 867-975.

Robertson KL, Soto CM, Archer MC, **Odoemene O**, Liu JL (2011). “Engineered T4 viral nanoparticles for cellular imaging and flow cytometry” Bioconjugate Chemistry 22 (4) 595-604.

Odoemene O and Churchland AK (2016, talk). “Causal role of mouse visual area AM in visual evidence accumulation”. HHMI Janelia Farm Junior Scientist Workshop on Neural Circuits of Behavior. Ashburn VA.

Odoemene O, Brown AM, Kaufman MT, Churchland AK (2014, poster). Disrupting inhibition in posterior parietal cortex reduces decision accuracy. Society for Neuroscience Meeting. Washington, DC.

Odoemene O, Brown A, Churchland AK (2013, invited poster). Mice: a platform for studying sensory decision-making. Society for Neuroscience, San Diego CA.

Odoemene O, Ul Haque A, Porterfield DM (2010, poster). “Design and Fabrication of a Multi-Patch Recording Unit for Electrophysiological Studies on Neural Networks. Gordon Research Conference on Ion Channels Tilton NH.

Ul Haque A, **Odoemene O**, Porterfield DM (2010, poster). The CHO biochip: A novel nano-satellite compatible lab-on-a-chip for studying Cyanobacteria gravitational physiology. Institute of Biological Engineering Annual Meeting Cambridge, MA.

Robertson KL, Archer M, Soto CM, **Odoemene O**, Liu JL (2009, poster). “Mutant T4 bacteriophage nanoparticles for Imaging and Detection Applications.” 238th American Chemical Society Meeting, Washington, DC.