Joshua Brendan Melander

Contact Information

Baccus Lab, D209
Department of Neurobiology
Fairchild Science Building
Stanford University, Stanford, CA 94305

cell: +1-669-666-4440
email: melander@stanford.edu
website: jbmelander.com
github: jbmelander

Scientific Training

PhD Stanford University, California *2017 - present*

Neuroscience Graduate Program
Advisor: Dr. Stephen Baccus
Rotations: Dr. Daniel Yamins, Dr. Karl Deisseroth, Dr. Stephen Baccus

Post-Bac Vollum Institute, Oregon *2014 - 2017*

Research Assistant
Advisors: Dr. Haining Zhong and Dr. Tianyi Mao

B.S. Whitman College, Washington *2010 - 2014*

Biochemistry, Biophysics, and Molecular Biology
Magna Cum Laude, Honors Thesis
Advisors: Dr. Christopher Wallace and Dr. Ginger Withers

Select Publications

Ding, X., Lee, D., **Melander, J.B.**, Sivulka, G., Ganguli, S., Baccus, S. (2024) Information Geometry of the Retinal Representation Manifold. *Advances in Neural Information Processing Systems (NeurIPS)*

Maheswaranathan, N., Mcintosh, L., ..., **Melander, J.B.**, Nayebi, A., Brezovec, L., Wang, J., Ganguli, S., Baccus, S. (2024) Interpreting the retinal neural code for natural scenes: From computations to neurons. *Neuron* 111, 2742-2755

Melander, J.B.*, Nayebi, A.*, Jongbloets, B., Fortin, D., Qin, M., Ganguli, S., Mao, T., Zhong, H. (2021) Distinct *in vivo* dynamics of excitatory synapses onto cortical pyramidal neurons and parvalbumin-positive interneurons. *Cell Reports* 37 (6), 109972

Ma, L., Jongbloets, B., Xiong, W., **Melander, J.B.**, Qin, M., Lameyer, T., Harrison, M., Zemelman, B., Mao, T., Zhong, H. (2018) A highly sensitive A-kinase activity reporter for imaging neuromodulatory events in awake mice. *Neuron* 109 (13), 2202

Fortin, D., Tillo, S., Yang, G., Rah, J., **Melander, J.B.**, Bai, S., Solar-Cedeno, O., Qin, M., Zemelman, B., Guo, C., Mao, T., Zhong, H. (2014). Live imaging of endogenous PSD-95 using ENABLED: a conditional strategy to fluorescently label endogenous proteins. *Journal of Neuroscience* 34 (50), 16698-16712

Maheswaranathan, N., Mcintosh, L., Tanaka, H., Grant, S., Kastner, D., **Melander, J.B.**, Brezovec, L., Nayebi, A., Wang, J., Ganguli, S., Baccus, S. (2019). The dynamic neural code of the retina for natural scenes *BioRxiv* 430943

Fortin, D., **Melander, J.B.**, Jongbloets, B., Xiong, W., Guo, C., Mao, T., Zhong, H. (2019) High-Contrast Visualization of Endogenous Proteins for Live Imaging *Microscopy and Microanalysis* 25 (S2), 1250-1251

Select Conference Presentations

Melander, J.B., Jolley, H., Miller, T., Withers, G., Wallace C. (2012) Coordinaed cellular responses to experience-dependent plasticity. Murdock College Science Research Conference, Walla Walla, WA (Poster)

Melander, J.B., Withers, G., Wallace C. (2013) Quantitative analysis of immunohistochemical markers of the induction of plasticity at the synapse and nucleus. Undergraduate poster sesion, Society for Neuroscience Annual Meeting, San Diego, CA (Poster)

Melander, J.B., Joengbloets, B., Qin, M., Zhong, H., Mao, T. (2016) Imaging neuromodulation *in vivo*. BRAIN Initiative Investigators Meeting, Bethesda, MD (Poster)

Melander, J.B., Qin, M., Zhong, H., Mao, T. (2017) Chronic *in vivo* imaging of excitatory shaft synapses onto cortical interneurons. Dendrite Gordon Research Conference, Lucca, Italy (Poster)

Melander, J.B., Nayebi, A., Jongbloets, B., Fortin, D., Qin, M., Ganguli, S., Mao, T., Zhong, H. (2018) Chronic *in vivo* imaging of excitatory synapses onto pyramidal and interneurons. Society for Neuroscience Conference, San Diego, CA (Poster)

Nayebi, A.*, **Melander, J.B.***, Jongbloets, B., Mao, T., Zhong, H., Ganguli, S. (2019) Measuring and modeling the weight dynamics of many synapses onto diverse cell-types *in vivo*. COSYNE, Lisbon, Portugal (Talk)

Awards

Alfed D. Abshire Scholar Research Award (2012)

Walter Brattain Academic Scholarship Award (2010-2014)

Oregon Developmental Biology Collaboration Award (2017)

Stanford Mind, Brain, Computation and Technology (Admittance, 2020)

Admitted to "Methods in Computational Neuroscience" summer session at Marine Biological Laboratory (2023)

Teaching

Neurobiology (Biology 325), Whitman College (2013)

Laboratory TA: Organized staining, microscopy and electrophysiology exercises for students enrolled in Neurobiology labs

Genetics (Biology 303), Whitman College (2014)

Writing Fellow: Mentored other students taking Genetics in basic skills of scientific writing and figure preparation

Biophysics (BBMB 335), Whitman College (2014)

Laboratory TA: Organized computational exercises in protein folding simulation and visualization (Coot, QtMG), as well as wet-lab exercises including denaturation and biofilm assays

MATLAB and Microscopy Study Group, Vollum Institute (2016)

Lecturer: Taught general principles of classic machine-learning algorithms and implemented them in custom MATLAB scripts for a small study group of neurobiologists

CNJCx: Practical Python, Stanford, University (2020)

Organizer, Director: A six-week long curated virtual course designed to overcome the hurdles often faced by new programmers when approaching Python. Included numerous guest speakers, including professors and professional game designers. Supported by the Stanford Computational Neuroscience Journal Club and Stanford Mind, Brain, Comutation, and Technology.

Mentorship

Prachi Shah

Then: community-college intern in Baccus Lab
Now: undergraduate at UCI

Srindihi Naidu

Then: high-school student in Baccus Lab
Now: Undergraduate, University of Washington Neuroscience, Tuthill Lab

Programming Languages

Python (expert)

MATLAB (fluent)

C (moderate)

C++ (moderate)

R (moderate)

Java (moderate)

HTML/CSS (moderate)