(917)319-0983
New York, NY
william.mau92@gmail.com

William Mau, PhD

Postdoctoral fellow

GitHub: wmau
LinkedIn: wmau

I am an aspiring data scientist with a PhD in neuroscience and 9+ years of experience in data collection, data cleaning, analysis, visualization, and interpretation of high-dimensional data. I use a wearable miniature fluorescence microscope, called a "Miniscope", to image brain activity in live, behaving animals. Then I use machine learning techniques and statistical approaches to identify patterns in my high-dimensional data. My goal is to translate these skills to make tangible impacts on a data science team.

Education

PhD in Neuroscience, *Boston University. Cumulative GPA: 3.97* MAY 2019
BA in Biological Sciences and Psychology, *Cornell University. Cumulative GPA: 3.79* MAY 2014
Graduated magna cum laude
Dean's list 2011-2014

Skills

Tools and Languages	Python, Jupyter notebooks, Git, SQL, MATLAB, LaTeX, Arduino, Autodesk
Quantitative Skills	Machine learning, inferential and descriptive statistics, data visualization, dimensionality reduction
Python Libraries	numpy, pandas, scikit-learn, scipy, matplotlib, xarray, holoviews

Technical Experience

Postdoctoral fellow **2019 — Present**
Icahn School of Medicine at Mount Sinai *New York, NY*

- Built a SQLite database for querying metadata from experiments encompassing 100 mouse subjects.
- Automated Python-based data cleaning pipelines for imaging and video data.
- Used constrained non-negative matrix factorization (CNMF) to segment neurons and analyze time series in imaging movies.
- Clustered neural activity patterns using principal components analysis (PCA) and independent components analysis (ICA).
- Mentored and managed a research technician running animal behavior experiments.
- To date, produced 1 first-author review article, 2 middle-author review articles, and 1 middle-author preprint, and received a >$190k federal award. Currently preparing 2 first-author research articles.

Consultant **2021 — Present**
MetaCell *Virtual*

- Advised new labs on how to use Miniscope technology and conduct data collection.
- Built Juypter notebooks for analyzing other labs' neural data and presented findings to principal investigators.
- Used a cloud workspace to analyze high-dimensional imaging data.

Graduate researcher **2014 — 2019**
Boston University *Boston, MA*

- Completed courses related to computational neuroscience (probability theory, advanced statistical methods, network theory).
- Led experimental design, data collection, analysis, visualization, and presentation of results.
- Used a naive Bayes classifier and bootstrapping to decode neural activity that encoded the animal's sense of elapsed time.
- Used regression discontinuity analysis to identify state space deviations in neural activity patterns.
- Resulted in 1 first-author publication, 1 co-first-author preprint, 4 middle author publications, and 4 research awards.

Undergraduate researcher **2012 — 2014**
Cornell University *Ithaca, NY*

- Learned basic statistical methods for analyzing high-dimensional neural data, such as multiple linear regression.
- Self-taught MATLAB for plotting and analyzing neural data.
- Conducted and wrote an undergraduate honors thesis, received magna cum laude honors.
- Learned principles of the scientific method and experimental design.
- Resulted in 1 second-author publication, a $1000 research award, and magnua cum laude honors.

Publications

Sweis B.M., **Mau W.**, Rabinowitz S., & Cai D.J. (2021). Dynamic and heterogeneous neural ensembles contribute to a memory engram. *Current Opinion in Neurobiology* 67, 199-206. https://doi.org/10.1016/j.conb.2020.11.017

Levy S.J., Kinsky N.R., **Mau W.**, Sullivan D.W., & Hasselmo M.E. (2021). Hippocampal spatial memory representations in mice are heterogeneously stable. *Hippocampus* 31(3):244-260. https://doi.org/10.1002/hipo.23272

Liu Y., Levy S.J., **Mau W.**, Geva N., Rubin A., Ziv Y., Hasselmo M.E., & Howard M.W. (2021). Consistent population activity on the scale of minutes in the mouse hippocampus. *Hippocampus*, https://doi.org/10.1002/hipo.23409.

Mau W., Hasselmo M.E., & Cai D.J. (2020). The brain in motion: how ensemble fluidity drives memory-updating and flexibility. *eLife* 9:e63550. https://doi.org/10.7554/eLife.63550

Dong Z., **Mau W.**, Feng Y., Pennington Z.T., Chen L., Zaki Y., Rajan K., Shuman T., Aharoni D., & Cai D.J. (2021). Minian: An open-source Miniscope analysis pipeline. *eLife*, under revision.

Chen L., Cummings K.A., **Mau W.**, Zaki Y., Dong Z., Clem R.L., Shuman T., & Cai D.J. (2020). The role of intrinsic excitability in the evolution of memory: significance in memory allocation, stabilization, and updating. *Neurobiol. Learn. Mem.* 73:107266. https://doi.org/10.1016/j.nlm.2020.107266.

Kinsky N.R., **Mau W.**, Sullivan D.W., Levy S.J., Ruesch E.A., & Hasselmo M.E. (2020). Trajectory-modulated hippocampal neurons persist throughout memory-guided navigation. *Nat. Commun.* 11, 2443. doi.org/10.1038/s41467-020-16226-4.

Alexander A.S., Robinson J.C., Dannenberg H., Kinsky N.R., Levy S.J., **Mau W.**, Chapman G.W., Sullivan D.W., & Hasselmo M.E. (2020). Neurophysiological coding of space and time in cortical circuits. *Brain Neurosci. Adv.* 4:2398212820972871. https://doi.org/10.1177/2398212820972871.

Zaki Y.*, **Mau W.***, Cincotta C.*, Doucette E., Grella S.L., Murawski N.J., Merfeld E., Shpokayte M., & Ramirez S. Hippocampal and amygdalar engrams are necessary for contextual fear reinstatement, *Curr. Biol.*, under revision. *equal contributions.

Miller A.M.P., **Mau W.**, & Smith D.M. (2019). Retrosplenial cortical representations of space and future goal locations develop with learning. *Curr. Biol.* 29, 2083-2090.e4. https://doi.org/10.1016/j.cub.2019.05.034

Mau W., Sullivan D.W., Kinsky N.R., Hasselmo M.E., Howard M.W., & Eichenbaum H. (2018). The same hippocampal CA1 population simultaneously codes temporal information over multiple timescales. *Curr. Biol.* 28, 1499-1508. https://doi.org/10.1016/j.cub.2018.03.051

Kinsky N.R., Sullivan D.W., **Mau W.**, Hasselmo M., & Eichenbaum H. (2018). Hippocampal place field maintain a coherent and flexible map across long time scales. *Curr. Biol.* 28, 1-11. https://doi.org/10.1016/j.cub.2018.09.037

Awards

Ruth L. Kirschstein individual postdoctoral fellowship: $194,790 over 3 years	**2020-2023**
Henry I. Russek Day student achievement award, 1st place: $1000	**2019**
F1000Prime featured article, Mau et al. 2018	**2018**
NSF Neurophotonics Research Traineeship travel award: $1000	**2018**
Henry I. Russek Day student achievement award, 3rd place: $300	**2018**
Magna cum laude in Psychology	**2014**
Halpern & Rosevear undergraduate research award: $1000	**2014**
Dean's list	**2011-2014**

Activities

Mount Sinai Neuroscience (MSN) seminar board member **2021 — present**
- Invited, reviewed, and hosted guest speakers for our institutional neuroscience seminar series.

Miniscope workshop instructor **2020 — present**
- Assisted and lectured at hands-on workshops aimed at introducing imaging technology to new labs internationally.

Python for neuroscience instructor **2019 — present**
- Wrote and taught jupyter notebook exercises introducing new programmers to Python with applications in neuroscience research. Link to exercises: https://github.com/wmau/PythonForNeuro

Guest lecturer **2020 — present**
- Lectured at various Mount Sinai graduate-level neuroscience courses.

Peer reviewer **2019 — present**
- Peer reviewed manuscripts to assess readiness for publication at scientific journals.

Research presenter **2014 — present**
- Presented scientific results to audiences of all backgrounds, ranging from layman to field expert.