MADELEINE DWORTZ-SCHAEFFER, Ph.D.

mfdwortz@gmail.com • 617-281-6987 • linkedin.com/in/madeleine-dwortz • Austin, TX

EDUCATION

Ph.D. in Neuroscience | The University of Texas at Austin **December 2024**
Dissertation: Social Perception and Sociochemical Signaling in Mouse Dominance Hierarchies

B.S. in Biology | University of Michigan **May 2017**
Minor in Writing

RESEARCH EXPERIENCE

Research Engineering Scientist Associate **September 2025–Present**
Genomic Sequencing & Analysis Facility, The University of Texas at Austin

- Perform and troubleshoot single-cell and spatial transcriptomics workflows, including cell/nuclei suspension QC, tissue sectioning, H&E staining, microscopy, and library preparation; train researchers in sample preparation techniques for challenging tissues.
- Onboarded the Illumina PIP-seq workflow following training with an Illumina field applications scientist; collaborated with researchers to compare its performance with 10x Genomics single-cell technologies.
- Execute standard DNA and RNA NGS library preparation, including manual and Hamilton-assisted high-throughput workflows.
- Assess sample and library quality using fluorometric quantification and fragment analysis; evaluate sequencing, alignment, and gene-expression metrics to troubleshoot assays and guide experimental decisions.
- Consult with investigators on experimental design, assay selection, sample requirements, and technical challenges.
- Evaluated bead-based versus gel size selection for Tag-seq library preparation, supporting adoption of a workflow that reduced preparation time by approximately 25%.

Postdoctoral Research Associate **March–September 2025**
Lab of Dr. Mbemba Jabbi, Dell Medical School, The University of Texas at Austin

- Designed and evaluated single-nucleus isolation workflows using fresh and frozen mouse brain, human postmortem brain, and blood-derived samples for translational studies of affective disorders, assessing nuclei recovery, sample quality, and sequencing data.
- Coordinated with investigators and brain tissue repositories regarding human tissue and data sharing.

Ph.D. Student Researcher **September 2018–January 2025**
Lab of Dr. James Curley, The University of Texas at Austin

- Led independent molecular and transcriptomic research projects from experimental design through data analysis and peer-reviewed publication, investigating how social experience shapes neuronal activity and gene expression.
- Analyzed single-nucleus RNA-seq data in R to characterize neuronal responses to social cues in the amygdala; developed reusable analysis pipelines adopted by lab members.
- Initiated a collaboration to adapt Vocus PTR-TOF mass spectrometry for real-time measurement of volatile emissions from mice and scent marks; adapted genomics-inspired analyses to create novel ways of analyzing and representing chemical data.
- Integrated transcriptomic, hormonal, metabolomic, microbiome and behavioral data; used RNAscope, in situ hybridization, microscopy and quantitative image analysis.

Student Contractor, U.S. Geological Survey **September 2017–September 2018**
Ann Arbor, Michigan

- Managed field sampling, biological specimen processing and inventories for a multidisciplinary project; performed DNA extraction and QC.

Evolutionary Biology Research Assistant **May–September 2017**
University of Michigan

- Conducted behavioral and field-based studies of animal communication and cognition.

Oncology Research Assistant **October 2013–September 2017**
University of Michigan

- Supported preclinical glioblastoma research through tumor neurosphere culture, drug-treatment experiments, immunohistochemistry, immunofluorescence and quantitative image analysis.

CORE EXPERTISE

Molecular Biology & NGS

- NGS library preparation for standard DNA and RNA workflows, as well as single-cell and spatial applications, including 10x Genomics Single Cell 3′ GEX, Illumina PIP-seq, and Visium HD.
- Nucleic acid extraction and purification, PCR/qPCR, size selection, and sample/library QC using fluorometric quantification and fragment analysis.
- Tissue cryosectioning, H&E staining, in situ hybridization, and fluorescence microscopy.
- Illumina sequencing instrumentation, including NextSeq 2000 and MiSeq.

Bioinformatics & Data Analysis

- RNA-seq analysis across bulk, tag-based and single-cell/nucleus datasets using R, Seurat and Linux/command-line tools.
- Single-cell/nucleus RNA-seq analysis, including quality control, normalization, dimensionality reduction and clustering, cell-type annotation, differential expression, pathway analysis, co-expression network analysis and visualization.
- Spatial transcriptomics and quantitative image analysis, including Visium HD segmentation evaluation, data exploration and visualization, and RNAscope image analysis.
- FASTQ quality control, read mapping/alignment, and sequencing-performance assessment.

Scientific Leadership & Communication

- Investigator consultation, collaborative experimental planning and researcher training/mentorship.
- SOP and protocol development; scientific presentations, manuscript preparation and grant writing.

PEER-REVIEWED PUBLICATIONS

Dwortz, M. F., Hofmann, H. A., & Curley, J. P. (2026). Social processing in the amygdala: Single-nucleus RNA-sequencing reveals distinct neuronal responses to dominant and subordinate cues. *Scientific Reports, 16*, 25200. https://doi.org/10.1038/s41598-026-52921-w

Dwortz, M. F., & Curley, J. P. (2025). Capturing dynamic neuronal responses to dominant and subordinate social hierarchy members with catFISH. *Neuroscience, 579*, 105–119. https://doi.org/10.1016/j.neuroscience.2025.05.025

Dwortz, M. F., Curley, J. P., Tye, K. M., & Padilla-Coreano, N. (2022). Neural systems that facilitate the representation of social rank. Philosophical Transactions of the Royal Society B: Biological Sciences, 377(1845), 20200444. https://doi.org/10.1098/rstb.2020.0444

Lee, W., **Dwortz, M. F.**, Milewski, T. M., Champagne, F. A., & Curley, J. P. (2022). Social status mediated variation in hypothalamic transcriptional profiles of male mice. *Hormones and Behavior, 142*, 105176. https://doi.org/10.1016/j.yhbeh.2022.105176

Lee, W., Milewski, T. M., **Dwortz, M. F.**, Young, R. L., Gaudet, A. D., Fonken, L. K., Champagne, F. A., & Curley, J. P. (2022). Distinct immune and transcriptomic profiles in dominant versus subordinate males in mouse social hierarchies. *Brain, Behavior, and Immunity, 103*, 130–144. https://doi.org/10.1016/j.bbi.2022.04.015

Lee, W., Dowd, H. N., Nikain, C., **Dwortz, M. F.**, Yang, E. D., & Curley, J. P. (2021). Effect of relative social rank within a social hierarchy on neural activation in response to familiar or unfamiliar social signals. *Scientific Reports, 11*, 2864. https://doi.org/10.1038/s41598-021-82255-8

Tibbetts, E. A., Den Uyl, J., **Dwortz, M. F.**, & McLean, C. (2019). The development and evolution of specialized face learning in paper wasps. *Animal Behaviour, 147*, 1–7. https://doi.org/10.1016/j.anbehav.2018.10.016

PREPRINT

Wylie, D., Arasappan, D., Khatri, U., **Dwortz, M. F.**, & Jabbi, M. (2025). Brain network and blood transcriptomic correlations underpin psychopathological phenotypes: A preliminary study. *medRxiv*. https://doi.org/10.1101/2025.07.08.25331132

FELLOWSHIPS, GRANTS & AWARDS

NIH T32 Predoctoral Training Fellowship, Institute for Neuroscience, UT Austin (2018–2020)

Co-author, NIH R21 grant, "Neural processing of status signals in social hierarchies" (5R21MH132981-02)

Most Innovative Methods Poster Award, Psychology Research Showcase, UT Austin (2023)

Institute for Neuroscience Professional Development Award (2022)

Institute for Neuroscience Leadership Scholarship (2021)

University of Michigan Biological Station Scholarship (2016)

SELECTED RESEARCH TALKS

"Social Processing in the Amygdala: Single-Nucleus RNA-Sequencing Reveals Distinct Neuronal Responses to Dominant and Subordinate Cues" 10x Genomics Journal Club, UT Austin *[Invited]* | August 2025

"Social Perception and Sociochemical Signaling in Mouse Dominance Hierarchies" Ph.D. dissertation defense, UT Austin | November 2024

"Real-time Assessment of Social Olfactory Signaling in Mice" Brain, Behavior and Evolution Seminar, UT Austin | September 2024

"The Nose Knows Who's Boss: Sociochemical Signaling in House Mice (Mus musculus)" Behavioral Neuroscience Seminar, UT Austin *[Invited]* | December 2023

"The Nose Knows Who's Boss: Olfactory Signaling and Social Perception in Mouse Dominance Hierarchies" INS Dialogues, UT Austin | April 2023

"Social Chemosignaling in Mouse Dominance Hierarchies" Hofmann Lab Guest Speaker, UT Austin *[Invited]* | March 2023

"The Neural Representation of Social Context in Dominance Hierarchies" Brain, Behavior and Evolution Seminar, UT Austin | April 2022

SELECTED POSTER PRESENTATIONS

"A novel method to assess volatile chemical signaling in social mice (Mus musculus)" Psychology Research Showcase, UT Austin | October 2023

"Real-time assessment of volatile organic compound emissions from freely behaving mice in dominance hierarchies" Society for Behavioral Neuroendocrinology, Tours, France | June 2023

"Imaging neural representations of social rank using catFISH" Society for Behavioral Neuroendocrinology, Atlanta, GA | June 2022

MENTORSHIP, OUTREACH & LEADERSHIP

Neuroscience Graduate Student Association, Recruitment Coordinator (2020–2021) and K–12 School Outreach Volunteer (2018–2023)

Teaching Assistant, Neural Systems II, UT Austin (Fall 2022)

Austin Nature & Science Center, Exhibit Volunteer (2019–2020)

Explore UT, Institute for Neuroscience Representative (2019)

Mentor, Neuroscience Undergraduate Reading Program, UT Austin (2019)

Study Group Facilitator, Science Learning Center, University of Michigan (2014–2016)

President & Instructor, Wolverine Health Sciences Program, University of Michigan (2013–2017)

Museum of Science, Boston, STEM education program administrative support (2012–2014)

PROFESSIONAL SERVICE & AFFILIATIONS

Society of Biological Psychiatry, Communications Task Force (2025)

Association of Biomolecular Resource Facilities, member (2026)

Society for Behavioral Neuroendocrinology, member (2020–2024)

Society for Neuroscience and Society for Social Neuroscience, member (2018–2021)