Miles Martinez

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https://mdmarti.github.io/

Education

2020 – 2026 **Ph.D. Electrical and Computer Engineering**
Thesis advisor: Professor John Pearson

M.Sc. Electrical & Computer Engineering, Duke University

Certificate in Cognitive Neuroscience

Certificate in College Teaching

2016-2020 **Sc.B. Cognitive Neuroscience**
Thesis advisor: Professor Joo-Hyun Song
Thesis title: *The Effects of Observation on Visuomotor Adaptation*

Honors, Awards,& Fellowships

May 2024 **Outstanding Graduate Teaching Assistant**, Probabilistic Machine Learning

June 2023 **Ruth L. Kirschstein Predoctoral Individual National Research Service Award (F31)**

May 2020 **Muriel Fain Sher Premium in Psychology**

May 2020,2019 **Research at Brown Award**

August 2019 **NINDS Exceptional Student Award**

Publications

J. Qi, D. C. Schreiner, **M. Martinez**, J. Pearson, and R. Mooney, "Dual neuromodulatory dynamics underlie birdsong learning," *Nature*, vol. 641, pp. 690–698, 2025.

L. M. Koponen, **M. Martinez**, E. Wood, *et al.*, "Transcranial magnetic stimulation input-output curve slope differences suggest variation in recruitment across muscle representations in primary motor cortex," *Frontiers in Human Neuroscience*, vol. 18, 2024.

T. S. L. Wang, **M. Martinez**, E. K. Festa, W. C. Heindel, and J. H. Song, "Age-related enhancement in visuomotor learning by a dual-task," *Scientific Reports*, vol. 12, 1 2022.

M. Martinez and J. Pearson, "Reproducible, incremental representation learning with the rosetta vae," in *Bayesian Deep Learning Workshop, NeurIPS 2021*, 2021.

Under Review/In Prep

M. Martinez and J. Pearson, "Flexible modeling of animal vocal communication," [in prep].

M. Martinez and A. H. Williams, "Quasi-monte carlo methods enable extremely low-dimensional deep generative models," [under review].

Posters and Presentations

M. Martinez and J. Pearson, "Inferring structure in acoustic variability," in *Duke Department of Neurobiology Research in Progress Seminar Series*, [talk], 2025.

M. Martinez, J. Qi, R. Mooney, and J. Pearson, "Song variability coding in the zebra finch basal ganglia," in *Neural Mechanisms of Acoustic Communication GRC*, [poster], 2024.

M. Martinez, S. Brudner, R. Mooney, and J. Pearson, "Moduling tutor-directed dynamics in zebra finch song learning," in *CoSyNe*, [poster], 2022.

M. Martinez, J. Qi, R. Mooney, and J. Pearson, "Data-driven exploration of natural song learning in the juvenile zebra finch," in *Neural Mechanisms of Acoustic Communication GRC*, [poster], 2022.

M. Martinez, I. Osuarah, D. S. Reich, I. S. M. Cortese, and G. Nair, "Atlas-free brain segmentation by Classification using DErivative-based Features (C-DEF) in profressive multifocal leukoencephalopathy," in *NINDS Awards Ceremony*, [talk,poster], 2019.

M. Martinez, M. Broderick, A. Anderson, and E. Lalor, "Recent and distant semantic information make distinct contributions to processing of natural, ongoing speech," in *University of Rochester Center for Visual Science Research Symposium*, [poster], 2018.

Teaching

CNRI: Python and Concepts (Fall 2021 – Spring 2025)

- Designed Python for Psychology class aimed at students with no prior research or programming experience
- Co-taught weekly Python lectures, advised students on experiment programming projects
- Taught systems neuroscience conceptual lectures aimed at exposing students to research in songbirds

DIBS Methods Meetings (Spring 2021 – Spring 2024)

- Taught workshops for Duke's Intitute of Brain Sciences on machine learning and statistical analyses, aimed at exposing cognitive neuroscientists to analysis techniques
- Organized and coordinated speakers and funding (Fall 2023)

Probabilistic Machine Learning (Spring 2024)

- Taught weekly workshop on topics covered in lecture, designed multiple workshops
- Organized and coordinated 7 graduate TAs in homework grading, office hours, and problem set support
- Awarded ECE Department Outstanding Graduate TA award

Vector Space Methods with Applications (Fall 2022)

- Coordinated weekly office hours, graded homeworks and tests
- Designed problem set around developing intuition for optimization through alternating projections

Mentoring

Pearson Lab (Fall 2024 –)

- Managed two undergraduate students in analyzing complex neural and behavioral data
- Taught big data management and statistical analyses in multiple programming languages

Cognitive Neuroscience Research Internship: Mentoring (Spring 2022 – Spring 2025)

- Mentored 8 undergraduate students with no prior research experience
- Introduced basic concepts in systems neuroscience, statistics, and data science

Skills

Coding languages	Python, PyTorch, Jax, R, MATLAB,C++
Coding skills	Generative modeling, image processing, audio analysis, representation learning, big data, high-dimensional datasets, data visualization