

Raúl E. Mojica Soto-Albors

Boston, MA | github.com/ralbso

SUMMARY

Neuroscientist with 6+ years of research experience at MIT, combining rigorous wet-lab proficiency with advanced data science skills. Proven track record of designing end-to-end research pipelines, from experimental design and data acquisition to large-scale signal processing and statistical modeling in Python and MATLAB. Deep domain expertise in neuronal physiology, synaptic plasticity, and circuit dynamics, with a strong publication record. Equally comfortable building analysis workflows and presenting findings to cross-functional audiences.

SKILLS

Data Science & ML: Python (NumPy, SciPy, Pandas, scikit-learn, matplotlib), MATLAB, C++, SQL, R

Analysis Methods: Time series analysis, signal processing, statistical modeling, feature extraction, dimensionality reduction, event detection algorithms

Data Engineering: Automated data pipelines, QC workflows, large-scale dataset management

Experimental: in vivo patch clamp electrophysiology, calcium imaging, stereotaxic surgery, viral delivery, confocal & two-photon microscopy, histology, immunohistochemistry, reproducible research practices

Software & Tools: Git, Adobe Illustrator, AutoCAD, ImageJ/FIJI, Microsoft Office suite

Languages: English (native), Spanish (native)

EXPERIENCE

Massachusetts Institute of Technology, Cambridge, MA

Doctoral & Postdoctoral Researcher, Harnett Lab

2019 – Present

- Discovered plateau potentials in neocortical pyramidal neurons, a cellular mechanism that instructs rapid synaptic plasticity, advancing current models of cortical learning and generating a first-author manuscript
- Designed and executed 300+ in vivo mouse electrophysiology experiments combining whole-cell patch clamp recordings, visual stimulation paradigms, and behavioral monitoring to quantify synaptic integration at the circuit level
- Built and maintained Python/MATLAB analysis pipelines for large-scale physiological datasets, implementing event detection, feature extraction, and statistical modeling algorithms, reducing manual analysis time by ~70%
- Engineered LN-Remote, an open-source remote controller for automated probe insertion, saving ~40 minutes per experiment, freeing researcher attention for real-time data monitoring, and boosting lab-wide experimental throughput
- Integrated histology, immunohistochemistry, and confocal microscopy to validate recording sites and neuronal morphology, connecting structural and functional analyses
- Mentored and trained 9 lab members (3 research technicians, 4 junior scientists, 2 postdocs) in electrophysiology, stereotaxic surgery, microscopy, and quantitative analysis, directly supporting lab research output
- Built a lab-wide protocol database consolidating SOPs, surgical procedures, and analysis guides, reducing onboarding time for new trainees and improving experimental consistency

EDUCATION

Massachusetts Institute of Technology (MIT)

PhD in Neuroscience | GPA: 5.0/5.0

2019 – 2025

Fully funded through fellowships (\$750,000), including a competitive MathWorks Fellowship

University of Puerto Rico at Mayaguez (UPRM)

BS in Biology | GPA: 3.98/4.00

2014 – 2019

Summa Cum Laude, full-ride scholarship recipient, NIH-funded trainee (MARC U-STAR Fellow)

PUBLICATIONS

1. Yaeger, C. E.*, **Mojica Soto-Albors, R.***, et al. (2025). *Plateau potentials are instructive signals for behavioral timescale synaptic plasticity in the neocortex*. Manuscript under review at **Nature**. *equal contribution
2. Fischer, L. F., **Mojica Soto-Albors, R.**, et al. (2022). *Dendritic mechanisms for in vivo neural computations and behavior*. **Journal of Neuroscience**.
3. Fischer, L. F., **Mojica Soto-Albors, R.**, Buck, F. & Harnett, M. T. (2020). *Representation of visual landmarks in retrosplenial cortex*. **eLife**.