

Carlos Xavier Hernández

Senior Research Scientist

 [github](#) |  [linkedin](#) |  [website](#) |  [email](#)

I am a Senior Research Scientist at [Meta Reality Labs](#), working on machine learning to enable [neuromotor interfaces](#). Prior to that, I worked with [Vijay Pande](#) at Stanford on statistical modeling of biomolecular dynamics.

EXPERIENCE

Meta Platforms, Inc.

Senior Research Scientist · New York, NY, USA · 2019 – Present

- Served as technical lead for development of gesture recognition models for the [Meta Neural Band](#)
- Led accessibility research [demonstrating the viability of EMG-based control for hand tremor](#)
- Contributed to Nature paper demonstrating a generic, non-invasive neuromotor interface for human-computer interaction

CTRL-labs

Research Scientist · New York, NY, USA · 2018 – 2019

- Conducted early R&D on EMG signal decoding for wrist-based neural interfaces
- Built ML training and inference pipelines for real-time gesture recognition and personalization

Stanford University

NSF Graduate Research Fellow · Stanford, CA, USA · 2013 – 2018

- Developed statistical models for representation learning of biomolecular dynamics
- Developed and maintained open-source tools for molecular dynamics analysis (MDTraj, MSMBuilder, MDEntropy) and machine learning (Osprey)

EDUCATION

Stanford University

Ph.D. in Biophysics · Stanford, CA, USA · 2013 – 2018

Advisor: [Vijay Pande](#)

Columbia University in the City of New York

B.S. in Applied Mathematics · New York, NY, USA · 2009 – 2013

SKILLS

Languages & Frameworks: Python, PyTorch, NumPy, SciPy, Pandas

Domains: Time-series modeling, signal processing (DSP), causal inference

Methods: Deep learning (RNNs, Transformers), Markov state models, information theory

SELECTED PUBLICATIONS

A Generic Non-Invasive Neuromotor Interface for Human-Computer Interaction

P Kaifosh, TR Reardon, and CTRL-Labs *Nature* · [DOI](#) · 2025

Variational Encoding of Complex Dynamics

CX Hernández*, HK Wayment-Steele*, MM Sultan*, BE Husic, and VS Pande *Phys. Rev. E* · [DOI](#) · 2018

Using Deep Learning for Segmentation and Counting within Microscopy Data

CX Hernández, MM Sultan, and VS Pande *arXiv* · [arXiv](#) · 2018

SELECTED SOFTWARE

MDTraj: A Modern, Open Library for the Analysis of Molecular Dynamics Trajectories

RT McGibbon, KA Beauchamp, MP Harrigan, C Klein, JM Swails, **CX Hernández**, CR Schwantes, LP Wang, TJ Lane, and VS Pande
Biophysical Journal · [DOI](#) · [Python](#) · ⭐ 683 ¶ 290

VDE: Variational Dynamical Encoder for Complex Dynamics

CX Hernández, HK Wayment-Steele, MM Sultan, BE Husic, and VS Pande *GitHub* · [msmbuilder/vde](#) · [Python](#) · ⭐ 189 ¶ 42

MSMBuilder: Statistical Models for Biomolecular Dynamics

MP Harrigan, MM Sultan, **CX Hernández**, BE Husic, P Eastman, CR Schwantes, KA Beauchamp, RT McGibbon, and VS Pande
Biophysical Journal · [DOI](#) · [Python](#) · ⭐ 161 ¶ 94

MolEncoder: Molecular Autoencoder in PyTorch

CX Hernández *GitHub* · [cxhernandez/molencoder](#) · [Python](#) · ⭐ 92 ¶ 18

Osprey: Hyperparameter Optimization for Machine Learning

RT McGibbon, **CX Hernández**, MP Harrigan, S Kearnes, MM Sultan, S Jastrzebski, BE Husic, and VS Pande *JOSS* · [DOI](#) · [Python](#) · ⭐ 73 ¶ 26

POSTERS & PRESENTATIONS

Neural Control of Movement Society Meeting

Poster · Panama City, PAN · 2025 “Stable Control through sEMG Input: Hand Gesture Recognition on a Population with Hand Tremor”

Convolutional Neural Networks for Visual Recognition (CS231N)

Invited Presentation · Stanford, CA, USA · 2017 “Using Deep Learning for Segmentation and Counting within Microscopy Data”

Biophysical Society Meeting

Poster · Los Angeles, CA, USA · 2016 “Intrinsic Disorder in the P53 C-Terminal Regulatory Domain Yields Multiple Pathways for Folding-Up-on-Binding”

Workshop on Molecular and Chemical Kinetics

Poster · Berlin, DEU · 2015 “Inferring Causality Along Transition State Pathways”

HONORS & AWARDS

- Graduate Research Fellowship · National Science Foundation · 2013
- ADVANCE Summer Research Fellowship · Stanford University · 2013
- EXROP Undergraduate Research Fellowship · Howard Hughes Medical Institute · 2012
- Genentech Summer Undergraduate Research Fellowship · Columbia University · 2011

PRESS

- [A Look at Our Surface EMG Research Focused on Equity and Accessibility](#) · *Meta* · 2024
- [Move Objects With Your Mind? We’re Getting There, With The Help Of An Armband](#) · *NPR* · 2019
- [Pandemic Flu Risk Raised by Lax Hog-Farm Surveillance](#) · *Wired* · 2012