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Anthony Romyn

ML Engineer (EEG Brain Biosignals)

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Neuroscience ML engineer focused on performance, robustness, and reproducibility in brain-biosignal modeling. I convert high-dimensional EEG and other biological time-series into calibrated, deployable models through rigorous DSP, expert PyTorch/tabular modeling, and proven experience building and managing large-scale pipelines.

Skills

- **Machine Learning:** PyTorch; scikit-learn/XGBoost; representation learning (CNN/Transformer/JEPA); ensembling
- **Signal Processing (EEG & biosignals):** Filtering, artifact/line-noise removal, epoching, PSD/FOOOFs, time–frequency analysis, static & dynamic functional connectivity, connectome predictive modeling, filter-bank Riemann, source localization
- **Model Evaluation:** Nested CV, stratified splits; shift/stability checks; Brier/reliability calibration, ROC-AUC/PR-AUC
- **Data Engineering & Pipelines:** SQL; data versioning; ETL/ELT (batch/stream); reproducible training pipelines
- **MLOps & Deployment:** Packaging, inference APIs; monitoring (drift/reliability); containerization
- **Cloud & Tools:** Linux/WSL; Git/GitHub; VS Code; Azure; MNE, Braindecode

Quick Links

2022 NeuroTechX Competition 2nd place Repo	Python pipeline ensembling EEG models including a deep learning timeseries CNN (Deep4Net) and tabular features (e.g. power spectrum & fooofs aperiodic, filterbank riemann).
ECG ResNet pipeline repo	Production-style example repo with PyTorch RNN training on ECG data, Optuna tuning, MLflow tracking, and a FastAPI inference service in a Cookiecutter Data Science layout.
fMRI modeling repo · masters thesis	fMRI statistical modeling in R and write-ups.

Technical Experience

Machine Learning Engineer (EEG Brain Biosignals) **Jan 2022 — Present**
State++ (Neuro-tech startup)

- **Built & owned the end-to-end ML platform** for EEG timeseries & tabular modeling: ingestion → preprocessing → tabular feature generation → classical/tabular and deep learning model fitting and ensembling with generalization and robustness testing → reporting; standardized configs/seeds for full reproducibility and decision-ready reporting for internal product studies.
- **Authored a Python internal library** of reusable ML/DL components for EEG, including transformer embedding adapters, JEPA-inspired pretraining, CNN architecture/HPO search, and utilities for processing, feature generation & selection, model search, validation, and deployment.
- **State-of-the-art therapeutic outcome prediction**: predicting depression rTMS treatment efficacy from EEG recordings; precision 0.72, bACC 0.68 — rivaling benchmarks from leading neuro-tech firms. [GitHub on request]
- **Placed 2nd of 150+ global teams** in the 2022 NeuroTechX Hackathon, utilizing deep learning and classical tabular models to predict user brain age at **MAE = 1.60 years**. [GitHub]

Graduate Work in Masters & PhD Computational Neuroscience **Sept 2019 — Jan 2022**
University of Toronto

- **Specialized in modeling fMRI data with the latest machine learning and statistical methods**, with applications primarily to human decision-making research.
- **Revealed a key moderating effect** of a previously undocumented fMRI brain signal using multilevel modeling of linear and logistic regressions during human decision-making. [Masters Thesis]
- **Uncovered a new, previously undocumented pathway** of fMRI-based information flow between brain regions during human decision-making with probabilistic graph modeling. [Write-up and R code]
- **Explored emerging brain modeling techniques** combining RSA (representational similarity analysis) and dimensionality reduction techniques to quantify the complexity of brain activity as a predictive feature. [See More]
- **Analyst for a large international team** investigating the statistical replicability of neuroimaging research. [Publication]

Education

Masters in Computational Neuroscience, *University of Toronto*

Honours BA (First-class) in Psychology, *Brock University*

References

- Dr. Craig Alan Friedman, Founder & CEO, State++
- Dr. William A. Cunnigham, Professor of Psychology, University of Toronto & Research Scientist, Google DeepMind.