MARGOT WAGNER

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Machine learning researcher looking for full-time or part-time roles with experience in large and multimodal imaging and time series biomedical datasets. Looking to use deep learning and AI to aid in health and medical applications.

EDUCATION

University of California San Diego   Aug 2023
Ph.D. in Bioengineering with Computational Neuroscience Specialization and ML focus   *La Jolla, CA*
- Thesis: Multiscale spatiotemporal probabilistic graph models in neuropsychiatry applications - Gert Cauwenberghs/Terry Sejnowski
- Select coursework (CSE): Data Systems for ML, Deep Learning, Intro AI: Probabilistic Reasoning, Recommender Systems, Algorithms
- NSF Graduate Research Fellow (awarded 2018)

University of Delaware   2018
B.Ch.E in Chemical and Biomolecular Engineering   (Honors with Distinction)   *Newark, DE*
- Studied at National University of Singapore on exchange, 1 of 2 selected students

RESEARCH AND PROFESSIONAL EXPERIENCE

Postdoctoral Researcher   Oct 2023 – Present
The Institute for Neural Computation, University of California San Diego   *La Jolla, CA*
- Designed, conceptualized and lead ABCDeepLearn research group (2 postdocs, 4 PhD students, 4 undergrads) for improved diagnosis of adolescent mental and neurological health collaborating with Adolescent Brain Cognitive Development study.

Graduate Student Researcher   2019 – 2023
The Computational Neurobiology Lab and Integrated Systems Neuroengineering Lab, UCSD   *La Jolla, CA*
- Developed automated neuroimaging data and machine learning pipeline for structure and directed functional connectivity biomarkers for use in large MRI datasets using deep learning segmentation. Used with ~12k subject ABCD dataset.
- Built and optimized distributed deep learning (3D-CNN and STGCN) models for classification of MRI imaging data and derived functional connectivity subject-wise graphs to predict depression
- Built scalable Monte Carlo Markov graph model of biophysically-based artificial neural networks, decreasing runtime by 93%

Machine Learning Researcher Consultant, OPTT Health   2022 – 2023
- Trained, optimized and deployed transformer NLP large language models applied to therapy text for mental health symptom prediction, achieving clinical performance of 74% F1 – available at HuggingFace [margot-wagner/roberta_psychotherapy_eval]

Co-Director and Co-Founder of Science in Society Seminar Series   Sept 2019 – June 2020
the Collaboratory, Institute for Neural Computation, UCSD
- Conceptualized, designed, and organized expert-run public seminars and student roundtables cover science behind societal issues to the general public (attendance >200 people) with Roger Bingham. Analyzed feedback text trends using NLP techniques.

Graduate Student Researcher (Rotations), *UCSD*   Sept 2018 – June 2019
- Developed ML models to classify attention using 27 patients EEG data (70% acc) for ADHD diagnostics (NEATLabs - psychiatry)
- Applied nonlinear dynamical system embeddings to classify cognitive responses in Parkinson's patients (CNL - neuroscience)

SELECT PROJECTS

- Wrote the backend and logic for an application tracking and monitoring medication usage in polypharmacy patients including reminders and warnings for potential drug interactions (MedHacks Hackathon, 2nd place)
- Implemented variational autoencoder sentence generator for 3 conditions & classified sentences with BERT classifier
- Analyzed 7k gene RNA-seq dataset from Allen Brain Atlas using ICA, PCA, clustering, and classification to predict brain regions (98.7% accuracy for 3 regions, 67.1% accuracy for 10 regions)
- Predicted collision severity (66.25% acc, 5 classes) using 5.78 GB traffic records with ~100 features from 2001-2020

SELECT PUBLICATIONS AND PRESENTATIONS

- **M Wagner**, B Liu, A Camassa, G Cauwenberghs, T Sejnowski, "Automated Neuroimaging Pipeline to Identify Structural Biomarkers using Deep Learning Segmentation Applied to Adolescent Mental Disorders," *NeurIPS Medical Imaging Meets NeurIPS Workshop.* Dec 2023.
- **M Wagner**, A Camassa, Y Chen, B Liu, T Sejnowski, " Altered Functional Connectivity in Depressed Adolescents: Using Deep Learning for Neuroimaging Insights," *Society for Neuroscience.* [Press Conference & Poster]. Nov 2023.
- **M Wagner**, J Jagayat, A Kumar, A Shirazi, N Alavi, M Omrani, "Psychotherapy sentiment analysis using natural language processing," *Technology in Psychiatry Summit*, Oct 2022.
- **M Wagner**, T Bartol, T Sejnowski, and G Cauwenberghs, "Markov abstractions of electrochemical reaction-diffusion in synaptic transmission for neuromorphic computing," *Front Neurosci*, vol 15, no 698635, Nov 2021.

SKILLS

Programming Languages	Python · Java · C++ · MATLAB · SQL · Bash
Software Tools	Git · Linux · PyTorch · scikit-learn · HuggingFace · WandB · Ray Tune
Domain Knowledge	image and signal processing · graph theory · data science · neuropsychiatry · precision medicine