

DEREK PISNER

MACHINE LEARNING ENGINEER & NEUROSCIENTIST

SUMMARY

I am a data scientist with over a decade of experience tackling problems at the intersection of machine-learning, connectomics, and precision psychiatry. My most recent research leveraged graph neural networks, NLP, transfer learning, and supercomputing in pursuit of turnkey biomedical software for deep-phenotyping, brain-computer interfacing, and computer-assisted clinical recommendation systems.

SKILLS

Backend Development

Python R BASH MATLAB

Frontend Development

HTML-CSS Jupyter Knitr LaTeX

Database

Pandas Tidyverse Dask RedCap SQL ETL Hadoop

Git/Version Control

Anaconda PyEnv aptitude yum homebrew pypi

DevOps

CircleCI Pytest Unit-testing, CI/CD

Supercomputing

SLURM PBS SGE joblib openMP MPI GPU TPU

Cloud

AWS GoogleCloud Azure

Neuroimaging & Biometrics

MRI fMRI dMRI EEG fNIRS ECG HRV iOS Android

ML

Scikit-Learn Keras Torch TensorFlow DeepGraph

GraphNets StellarGraph h2o GFlow AirFlow

Visualization

ggplot2 matplotlib plotly D3.js AdobeCC

NLP

OCR ASR BERT GPT SpaCy Gensim NLTK

Containerization & Emulation

Docker Singularity Kubernetes ECR WSL2 VBox

Probabilistic Programming

Stan PyMC3 TFP

EDUCATION

PhD, Neuroscience, Minor in Applied Statistical Modeling

University of Texas Austin (2018-2021)

Dissertation: “Predicting Depression Persistence with Connectome Statistical Learning”

MA, Clinical Behavioral Science

University of Texas Austin (2016-2018)

Post-Baccalaureate, Psychology

University of California Berkeley (2012-2014)

BA, Philosophy and Mathematics

University of Virginia (2007-2011)

EXPERIENCE

TECHNICAL LEAD, ML ENGINEER, VISITING FELLOW

Kavli Neuroscience Discovery Institute & Center for Imaging Science

Johns Hopkins University | January 2019 – August 2019

- Invent and implement individualized nerve tract image modeling and registration techniques for brain network (‘Connectome’) analysis.
- Collaborate and oversee team to repackage and deploy high-throughput connectome sampler that upscales analytic capacity by 3x orders of magnitude.
- Fuzz-test graph feature engineering, achieving global test-retest reliability > 0.90.
- Innovate graph ensemble representation methods for multi-species connectomes.

NLP RESEARCH SCIENTIST, MOBILE DATA ARCHITECT

Cognitive Neuroscience and Mood Labs

University of Texas at Austin | July 2016 – August 2018

- Train brain network Variational Graph Autoencoders to boost 3-year depression prognosis by 20-30% above established benchmarks out-of-sample.
- Program census-based web crawlers and geolocation data-mining workflows.
- Learn tree ensembles to match patients to an internet intervention for depression.
- Discover temporal dynamics of mood disorders using longitudinal SEM.
- Pioneer AWS cloud-based Linux-Apache-MySQL-PHP server using EC2/S3/RDS/ELB/Lambda to achieve scalable and contextually aware mobile sensing.
- Develop prosody-informed conversational NLP for deep sentiment mining.

PROJECT MANAGER, RESEARCH SOFTWARE ENGINEER

Social Cognitive Affective Neuroscience Lab

University of Arizona | July 2014 – July 2016

- Coordinate two DARPA-funded studies investigating novel “sleep entrainment” therapies for Traumatic Brain Injury and PTSD.
- Forge relationships with >73 organizations, while dispatching SEO and social media targeted recruitment campaigns.
- Establish research lab from the “ground-up” by automating analytic systems and drafting standard operation procedures for multimodal data capture.
- Construct and administrate 18-node beowulf cluster from scratch, including network filesystem, scheduler, access controls, shell scripting, and Cron.
- Compile suite of bleeding-edge scientific applications enabled with varieties of CPU and GPU distributed processing.

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FEATURED SOFTWARE AND OPEN-SOURCE CONTRIBUTIONS

- Creator of **PyNets®** (github.com/dPys/PyNets - 40 forks, 109 stars), a reproducible connectome ensemble learning pipeline.
- Co-creator and core developer of **dMRIprep** (github.com/nipreps/dmriprep - 19 forks, 108 stars), an open source platform for reproducible preprocessing of diffusion MRI, and its primary dependency – **EddyMotion** (github.com/nipreps/eddyemotion) eddy-current correction for multiple diffusion models.
- Core developer of **NDMG/M2G** (github.com/neurodata/m2g - 31 forks, 56 stars), a fast, reliable, and scalable pipeline for structural connectome estimation.
- Ongoing contributor to Scikit-Learn (github.com/scikit-learn/scikit-learn), Dipy (github.com/dipy/dipy), and Nilearn (github.com/nilearn/nilearn).

PATENTS

- Automated Feature Engineering of Hierarchical Ensemble Connectomes, [11,188,850](#) (US & PCT, 2018 - Issued)

AWARDS AND RECOGNITION

- Trained a 2nd place algorithm in the 2017 Stratified Medicine Approaches for Treatment Selection tournament.
- Top-100 for the “NLP with Disaster Tweets” competition on Kaggle.

COLLOQUIUM AND LECTURES

- Hosted PyNets 1.0 code sprint. University of Texas at Austin. Austin, TX. 2021.
- Keynote speaker. “Ensemble Connectomics.” SDS Colloquium, University of Texas at Austin, TX. 2020.
- Invited developer dMRIprep code sprint. University of Washington eScience Institute. Seattle, WA. 2019.
- Co-hosted full-day workshop on structural connectomics. Johns Hopkins University (JHU). Baltimore, MD. 2019.
- Invited developer Nipype 2.0 code sprint. Massachusetts Institute of Technology (MIT). Boston, MA. 2018.
- Guest Lecturer. “Spatiotemporal Dynamics of Attention Networks Revealed by Representational Similarity of Simultaneous EEG-fMRI.” Methods For Real-Time Neuroimaging (MERLIN). Austin, TX. 2018.
- Featured developer at Neurohackacademy. University of Washington eScience Institute. Seattle, WA. 2017.
- Guest lecturer. “Automated Global Probabilistic Tractography.” Brain Mapping Workshop (BMW). Arizona, 2016.
- Guest lecturer. “Parallel Computing and Neuroimaging.” Brain Mapping Workshop (BMW). Arizona, 2015.

FEATURED PUBLICATIONS

- Pisner, D., Shumake, J., (2021). Predicting Depression Persistence with Connectome Ensemble Transfer Learning. In review.
- Pisner, D., Shumake, J. (2021). Mining the Multiverse of the Ensemble Connectome. In review.
- Pisner, D., Schnyer, D. (2019). Chapter 6: Support Vector Machine (SVM). In A. Machelli, S. Vieira (Eds.), Machine Learning: Methods and Applications to Brain Disorders (pp. 101-122). London, UK: Elsevier Science.
- Pisner, D., Shumake, J., Beevers, C., Schnyer D. (2019). The Superior Longitudinal Fasciculus and its Functional Triple-Network Mechanisms in Brooding. *Neuroimage: Clinical*, 24 (10), 1935.
- Pisner, D., Smith, R., Klimova, A., Alkozei, A., Killgore, W. D. (2016). Highways of the Emotional Intellect: White Matter Correlates of an Ability-Based Measure of Emotional Intelligence. *Social Neuroscience*, 11, 1-15.
- Pisner, D., Pearson, R., Meyer, B., Shumake, J., Beevers, C. (2019). A Machine Learning Ensemble to Predict Treatment Outcomes Following an Internet Intervention for Depression. *Psychological medicine* 49 (14), 2330-2341.
- Pisner, D., Papini, S., ... Shumake, J. (2018). Ensemble Machine Learning Prediction of PTSD Screening Status After Emergency Room Hospitalization.
- Pisner, D., Pearson, R., Beevers, C. (2017). Translational Research in Mental Health: Challenges and Opportunities. *The Behavior Therapist*.
- Alkozei, A. Pisner, D., ... Killgore, W. D. (2015) Emotional Intelligence and Subliminal Presentations of Social Threat. *Biological Psychiatry* 77(9).