DEREK PISNER

MACHINE LEARNING ENGINEER AND NETWORK NEUROSCIENTIST

https://github.com/dPys

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ABOUT

I am a data scientist with over a decade of research experience at the intersection of network neuroscience, precision psychiatry, and artificial intelligence. To improve care for complex psychiatric disorders like depression, my past work involved developing and streamlining myriad statistical learning algorithms and software for predicting health trajectories from diverse human subjects.

SKILLS

Backend Programming Python (expert), R (expert), UNIX Shell (expert), MATLAB (proficient), C/C++ (intermed.)

Frontend Programming Jupyter/(r)markdown/ LaTex (expert), Javascript (intermed.), HTML/CSS (intermed.)

Database pandas (expert), tidyverse (expert), Dask (proficient), SQL (proficient - sharding, API's), VBA (intermed.)

Version Control Git/bitbucket/Github (proficient), anaconda/aptitude/yum/homebrew/pypi (expert)

Containerization Docker/Singularity (expert)

CI/CD pytest (expert-fixtures, parameterization), CircleCI/Travis (expert-parallelism, multi-context)

Graphic Design and Visualization Photoshop, Illustrator, Indesign, Premiere (proficient), D3.js (intermed.), plotly (proficient), ggplot (expert), matplotlib (expert)

Supercomputing (HPC schedulers - SLURM/PBS/SGE), openMP/MPI (proficient), joblib (expert), GPU (intermed.)

Cloud Computing Amazon Web Services (expert - S3, Batch, RDS, CloudWatch, EC2, awscli), Azure (intermed.)

Biometric Analysis MRI / fMRI / dMRI / EEG / ECG (expert), Mobile Sensing (proficient - HealthKit, Fit, HRV)

Bayesian Analysis Stan (expert), PyMC3 (proficient)

Natural Language Processing OCR (expert), ASR (proficient), sentiment (expert), GPT-3 (expert), topic modeling (proficient), embedding (proficient - NLTK, Gensim,

Machine-Learning Scikit-Learn (expert), TensorFlow (proficient), PyTorch (intermed.), H2O (intermed.)

EXPERIENCE

SOFTWARE ENGINEER AND PROJECT MANAGER

Center for Imaging Science Institute for Data Intensive Engineering and Sciences | Johns Hopkins University, January 2019 – August 2019

- Build, test, document, deploy, and maintain high-throughput brain network ('Connectome') mining and analysis pipelines.
- Supervise and perform code reviews for teams of engineers and research scientists.
- Develop and employ methods of graph machine learning based on connectome data, including multiplex graph neural networks, and multiple embedding with omnibus and hypergraphs.

GRADUATE RESEARCH SCIENTIST

Mood Disorders and CogNeuro Labs | University of Texas at Austin, July 2016 – August 2018

- Build methods and software for using multimodal fMRI and dMRI data to characterize network neurophenotypes of individuals with depression.
- Devise biostatistical ensemble and deep-learning models for precision psychiatry.
- Conduct MRI scanning for NIMH-funded research on attention bias modification for depression.
- Develop suite of NLP-based psychiatric data mining tools.
- Engineer cloud-based Linux-Apache-SQL server for large-scale iOS/Android data collection (GPS time-series, social network dynamics, ambient noise, and activity/health data) with real-time feedback on mood symptom dynamics.

NEUROENGINEER AND RESEARCH SYSTEMS ADMINISTRATOR

Social Cognitive Affective Neuroscience Lab | University of Arizona, July 2014 – July 2016

- Streamline all data acquisition, feature extraction, and analysis with end-to-end automation.
- Coordinate and manage teams for two DARPA-funded studies investigating neural entrainment for Traumatic Brain Injury and PTSD.
- Engineer and maintain multimodal neuroimaging data preprocessing and analysis pipelines.
- Design and implement RedCap databases, export API's, storage, and data integrity validators.
- Independently construct and maintain 14-node Beowulf HPC system (hardware, scheduler, and maintainence protocols).
- Acquire and analyze EEG, ECG, and HRV data for waking and polysomnographic assessment.
- Establish recruitment relationships with over 73 organizations and medical facilities.

EDUCATION

PHD, COGNITIVE NEUROSCIENCE AND APPLIED STATISTICAL MODELING

University of Texas Austin | Austin, Texas, 2021

Dissertation: "Predicting Depression Persistence with Connectome Statistical Learning"

MASTER OF ARTS, CLINICAL PSYCHOLOGY

University of Texas Austin | Austin, Texas, 2018

POST-BACCALAUREATE, PSYCHOLOGY

University of California Berkeley | Berkeley, California, 2013

BACHELOR OF ARTS, PHILOSOPHY AND MATHEMATICS

University of Virginia | Charlottesville, Virginia, 2011

INTERNATIONAL BACCALAUREATE (IB) DIPLOMA, VALEDICTORIAN

Robinson Secondary School | Fairfax, Virginia, 2007

PATENTS

Automated Feature Engineering of Hierarchical Ensemble Connectomes, 11,188,850, (US & PCT, 2018 - Issued)
Generative Connectome Sentiment Modeling, 63/251,723 (US - Provisional)

FEATURED SOFTWARE

• Creator and lead developer of **PyNets** (**https://github.com/dPys/PyNets**), a reproducible workflow for connectome ensemble learning.
• Creator and maintainer of **EddyMotion** (**https://github.com/nipreps/eddymotion**), an open source implementation of eddy-current correction for multiple diffusion models.
• Co-creator of **dMRIprep** (**https://github.com/nipreps/dmriprep**), an open source platform for preprocessing of diffusion MRI.
• Contributor to Nipy (**https://github.com/nipy**), Dipy (**https://github.com/dipy/dipy**), Nilearn (**https://github.com/nilearn/nilearn**), Scipy (**https://github.com/scipy/scipy**), and Scikit-Learn (**https://github.com/scikit-learn/scikit-learn**).

COLLOQUIUM, TEACHING, AND INVITED LECTURES

• Hosted PyNets 1.0 code sprint. University of Texas at Austin.. Austin, TX. 2021.
• Keynote Speaker. "Ensemble Connectomics." Statistical and Data Sciences Colloqium, University of Texas at Austin, TX. 2020.
• Teaching assistant for Introduction to Cognitive Neuroscience. Austin, TX. 2020.
• Hosted full-day workshop on structural connectomics. Johns Hopkins University (JHU). Baltimore, MD. 2019.
• Co-hosted Nipype 2.0 code sprint. Massachusetts Institute of Technology (MIT). Boston, MA. 2018.
• Recipient of a visiting scholar grant to attend the Neurostorm Hackathon. Woods Hole, MA. 2017.
• Regularly invited attendee of Brainhack sponsored by the Organization for Human Brain Mapping (OHBM).
• 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., Schnyer D., Beevers, C. (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. 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, 101935.
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.

FEATURED CONFERENCE PRESENTATIONS

Pisner, D., Joseph M., Richie-Halford A., Lerma-Usabiag, G., Mansour S., Kent JD, Keshavan A., Cieslak M., Dickie, E., Tourbier, S., Voineskos, A., Satterthwaite, T., Poldrack, RA., Veraart, J., Rokem A., and Esteban, O... dMRIPrep: A Robust Preprocessing Pipeline for Diffusion MRI. ISMRM 2021 Annual Meeting.
Pisner, D., Hammonds, R. PyNets: A Reproducible Workflow for Structural and Functional Connectome Ensemble Learning. Organization for Human Brain Mapping (OHBM) 2020 Annual Meeting. Montreal, CA.
Pisner, D., Shumake J., Beevers, C., Schnyer D. Measuring Negative Attention Bias in Depression Using Differential Brain Decoding. Organization for Human Brain Mapping (OHBM) 2019 Annual Meeting. Rome, IT.
Pisner, D., Shumake J., Beevers, C., Schnyer D. Depressive Rumination as a Microstructural-Functional Failure of Network of Networks. Organization for Human Brain Mapping (OHBM) 2018 Annual Meeting. Singapore.
Pisner, D., Beevers, C., Schnyer D. Resting-state functional connectivity of the Cognitive Control Network in Major Depressive Disorder. Organization for Human Brain Mapping (OHBM) 2017 Annual Meeting. Vancouver, BC.
Pisner, D., Singh, P., Fridman, A., Killgore. W.D. Resilience Following Mild Traumatic Brain Injury is associated with Gray Matter Volume in the Left Precentral Gyrus. Presented at the International Neuropsychological Society's 44th Annual Meeting, Boston, MA.
Pisner, D., Alkozei, A., Killgore. W.D. (2015, May) Trait emotional suppression is associated with decreased activation of the insula and thalamus in response to masked angry faces. Presented at the Society of Biological Psychiatry's 70th Annual Meeting. Toronto, ON.
Pisner, D., Alkozei, A., Killgore. W.D. (2015, February) Visuospatial reasoning mediates the relationship between emotion recognition and emotional intelligence. Presented at the International Neuropsychological Society's 43rd Annual Meeting, Denver, CO.
Pisner, D., Bickford D., Crothers R., Kivowitz A., Mackin R., Nelson, J., Tegenkamp K. (2014, May). Self-reported sleep disturbance as a risk factor for memory deficits in late life depression. Presented at the American Psychiatric Association's 167th Annual Meeting. New York, NY.