Donisha Smith

Baltimore, Maryland|donishasmith@outlook.com |donishadsmith.github.io

EDUCATION

Florida International University **Aug 2025**
PhD in Cognitive Neuroscience
Dissertation: **"***Neurobiological Mechanisms of Physics Learning*"
Advisor: Dr. Angela Laird

Florida International University **Aug 2022**
M.Sc. in Cognitive Neuroscience
Thesis**: "***Task-based attentional and default mode connectivity associated with science and math anxiety profiles among university physics students*"
Advisor: Dr. Angela Laird

Florida International University **Apr 2018**
B.Sc. in Biology (Cum Laude), Quantifying Biology in the Classroom (QBIC) track, Honor's College

EXPERIENCE

Postdoctoral Researcher, Johns Hopkins University School of Medicine **Oct 2025-Current**

- Built automated pipelines to convert unstructured neuroimaging and behavioral datasets to BIDS-compliant format for integration with modern analysis tools
- Migrated workflows to HPC clusters and containerized pipelines with Singularity to ensure consistent execution across compute environments

Graduate Researcher, Florida International University **Aug 2019-Aug 2025**

- Developed a k-means clustering pipeline to characterize dynamic brain state changes associated with learning in longitudinal fMRI timeseries data
- Built post-processing pipelines using fMRIPrep and MRIQC to extract and denoise timeseries data, minimizing motion artifacts and increasing signal-to-noise for downstream statistical modeling
- Created statistical models (e.g. Linear Mixed Effects, Structural Equation Modeling, Latent Profile Analysis) to examine brain-behavioral relationships
- Analyzed staff demographic data for the ABCD Study consortium using R, implementing hypothesis testing and data visualization to inform decisions for a multi-site research task force
- Designed and delivered an introductory workshop on R programming and Tidyverse for the Diversity, Equity, and Inclusion program, instructing 10+ graduate students on data manipulation and visualization
- Provided statistical consultation on collaborative projects, applying latent and linear methods to neuroimaging and tabular data

Graduate Teaching Assistant, Florida International University **Jan 2020-May 2022**

- Provided instructional support and targeted tutoring for several undergraduate psychology statistics courses

Medical Laboratory Scientist I, Florida Department of Health **Jan 2019-Jul 2019**

- Conducted confirmatory diagnostic testing for HIV and syphilis for public health surveillance programs

SOFTWARE

nifti2bids | Github | Docs **Oct 2025-Current**

- Developed a Python package to standardize unstructured neuroimaging datasets by creating utilities to create and extract metadata information (e.g. single and multi-band slice timing) from NIfTI headers for BIDS sidecar generation
- Created tools to parse and convert semi-structured behavioral experiment data (including proprietary E-Prime formats) into BIDS-compliant event files

NeuroCAPs | Github | Docs | Demo | JOSS Paper | JHU OSPO Catalog **Jan 2024-Current**

- Developed a Python package for fMRI brain state identification using k-means, achieving 5x faster multi-subject processing via multiprocessing with checkpointing support
- Incorporated clustering validation (e.g. Davies-Bouldin, Silhouette), KD-tree interpolation for volumetric-to-surface mapping, temporal dynamics metrics (e.g. transition probabilities), and an interactive visualization suite
- Deployed via Docker with headless VTK rendering and CLI/Jupyter interfaces; maintained >90% test coverage across OS platforms using pytest and GitHub Actions

vswift | Github **Apr 2023-Current**

- Created an R package for ML model evaluation, implementing custom stratified sampling, cross-validation, and nested cross-validation for hyperparameter tuning, with parallel processing support at the fold-level
- Designed a unified interface supporting classification algorithms (e.g., Regularized Logistic Regression, SVM, XGBoost, Neural Networks) while preserving algorithm-specific parameter tuning
- Incorporated automated missing data imputation and multi-metric performance assessment (precision, recall, F1) with CLI output and visualizations, including ROC and Precision-Recall curves with AUC scores using trapezoidal rule

WORKSHOPS

High Performance Computing Workshop: Machine Learning and Big Data **Jan 2025**

- Attended an interactive workshop focusing on applying big data analytics with Spark and implementing deep learning using TensorFlow.

PUBLICATIONS

[1] **Smith, D. D.**, Bartley, J. E., Peraza, J. A., Bottenhorn, K. L., Nomi, J. S., Uddin, L. Q., Riedel, M. C., Salo, T., Laird, R. W., Pruden, S. M., Sutherland, M. T., Brewe, E., & Laird, A. R. (2025). Dynamic reconfiguration of brain coactivation states associated with active and lecture-based learning of university physics. Npj Science of Learning, 10(1), 55. https://doi.org/10.1038/s41539-025-00348-9

[2] **Smith, D.** (2025). NeuroCAPs: A Python Package for Performing Co-Activation Patterns Analyses on Resting-State and Task-Based fMRI Data. Journal of Open Source Software, 10(112), 8196. https://doi.org/10.21105/joss.08196

[3] Pintos Lobo, R., Peraza, J. A., Salo, T., Meca, A., **Smith, D. D.**, Feeney, K. E., Schmarder, K. M., Sutherland, M. T., Gonzalez, R., Musser, E. D., & Laird, A. R. (2025). Social profiles among youth with attention-deficit/hyperactivity disorder (ADHD): Evidence from the ABCD study. Developmental Cognitive Neuroscience, 75, 101591. https://doi.org/10.1016/j.dcn.2025.101591

[4] **Smith D. D.**, Meca A, Bartley JE, Riedel MC, Salo T, Peraza JA, Bottenhorn KL, Laird RW, Pruden SM, Sutherland MT, Brewe E, Laird AR (2023). Task-based attentional and default mode connectivity associated with science and math anxiety profiles among university physics students. Trends in Neuroscience and Education. https://doi.org/10.1016/j.tine.2023.100204

[5] Lobo, R. P., Bottenhorn, K. L., Riedel, M. C., Toma, A. I., Hare, M. M., **Smith, D. D**., Moor, A. C., Cowan, I. K., Valdes, J. A., Bartley, J. E., Salo, T., Boeving, E. R., Pankey, B., Sutherland, M. T., Musser, E. D., & Laird, A. R. (2022). Neural systems underlying RDoC social constructs: An activation likelihood estimation meta-analysis. Neuroscience & Biobehavioral Reviews. https://doi.org/10.1016/j.neubiorev.2022.104971

PREPRINTS

[1] **Smith D. D.**, Bartley JE, Riedel MC, Salo T, Peraza JA, Bottenhorn KL, Laird RW, Pruden SM, Sutherland MT, Brewe E, Laird AR (2025). Hippocampal functional connectivity changes associated with active and lecture-based physics learning. bioRxiv. https://doi.org/10.1101/2025.09.22.677908

[2] Hampson, C. L., Peraza, J. A., Guerrero, L. M., Bottenhorn, K. L., Riedel, M. C., Almuquin, F., **Smith, D. D.**, Schmarder, K. M., Crooks, K. E., Lobo, R. P., Sutherland, M. T., Musser, E. D., Dai, Y., Agarwal, R., Saeed, F., & Laird, A. R. (2025). Habenula alterations in resting state functional connectivity among autistic individuals. https://doi.org/10.1101/2025.05.14.653992

PRESENTATIONS

[1] Hampson, C.L., Peraza, J.P., Guerrero, L.M., Bottenhorn, K.L., Riedel, M.C., Almuquin, F., **Smith, D.D**., Schmarder, K.M., Musser, E.D., Dai, Y., Agarwal, R., Saeed, F., Sutherland, M.T., Laird, A.R., Habenula alterations in resting state functional connectivity in autism. (Accepted). Poster at the 31th Annual Meeting of the Organization for Human Brain Mapping, Brisbane, Australia.

[2] Hampson, C. L., Peraza, J. A., Guerrero, L. M., Bottenhorn, K. L., Riedel, M. C., Almuqhim, F., Saeed, F., **Smith, D. D.**, Schmarder, K. M., Crooks, K. E., Viera Perez, P. M., Musser, E. D., Dai, Y., Agarwal, R., Sutherland, M. T., & Laird, A. R. (2024). Habenula alterations in resting state functional connectivity in autism spectrum disorder. Poster presented at the University of Miami's 34th Annual Neuroscience Research Day, Miami, FL.

[3] **Smith D. D.**, Bartley JE, Peraza JA, Riedel MC, Salo T, Bottenhorn KL, Laird RW, Pruden SM, Sutherland MT, Brewe E, Laird A.R.. Longitudinal Changes in Dynamic Functional Connectivity Associated with Physics Learning. Presented on May 3, 2024, at the Florida Consortium on the Neurobiology of Cognition; Miami, Florida.

[4] **Smith D. D.**, Bartley JE, Peraza JA, Riedel MC, Salo T, Bottenhorn KL, Laird RW, Pruden SM, Sutherland MT, Brewe E, Laird A.R.. Longitudinal Changes in Dynamic Functional Connectivity Associated with Physics Learning. Accepted at the 2024 Graduate Student Appreciation Week at Florida International University; Miami, Florida.

[5] **Smith D. D.**, Meca A, Bartley JE, Riedel MC, Salo T, Peraza JA, Bottenhorn KL, Laird RW, Pruden SM, Sutherland MT, Brewe E, Laird A.R.. Task-based attention & default mode connectivity linked to STEM anxiety in university students. Presented on July 23, 2023, at the 29th annual meeting of the Organization for Human Brain Mapping; Montréal, Canada.

PROFESSIONAL ASSOCIATIONS

Organization for Human Brain Mapping (OHBM) **Jun 2023-Current**

REVIEWER

Journal of Open Source Software **Aug 2025-Current**

npj Science of Learning **Jul 2025 - Current**

FELLOWSHIPS, HONORS, SCHOLARSHIPS

Dissertation Year Fellowship **Dec 2024-Jun 2025**

Diversity, Equity, and Inclusion Doctoral Fellowship **Aug 2022-Aug 2023**

Recipient of Undergraduate NIGMS RISE Fellowship **Jan 2017**

FIU Ambassador Scholarship **Aug 2014-May 2018**

QBIC Scholarship **Aug 2014-May 2018**

Florida Academic Scholars **Aug 2014-May 2018**

Volunteer Recognition Award, Memorial Hospital West **May 2014**

TECHNICAL SKILLS

Programming Languages: Python, R, Shell Scripting (Bash), SQL
Computing & Development: High-Performance Computing, CI/CD (Git, GitHub Actions, DockerSingularity)
Neuroimaging Tools: Nilearn, fMRIPrep, AFNI, EPRIME, PsychoPy