

# Donisha Smith

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## EDUCATION

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### 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

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### Postdoctoral Researcher, Johns Hopkins University School of Medicine

Oct 2025-Current

- Developed and deployed [nifti2bids](#), a Python package that automated conversion of the lab's unstructured task-based neuroimaging datasets to Brain Imaging Data Structure (BIDS)-compliant format, enabling integration with modern analysis pipelines
- Migrated computational workflows to HPC clusters and built reproducible preprocessing pipelines using Singularity containers, improving scalability and reproducibility

### Graduate Researcher, Florida International University

Aug 2019-Aug 2025

- Built comprehensive post-processing pipelines using fMRIPrep and MRIQC outputs to extract and denoise timeseries data, minimizing motion artifacts for downstream statistical modeling
- Performed neuroimaging analyses (static and dynamic functional connectivity) and behavioral modeling (linear mixed models, latent profile analysis, structural equation modeling) on longitudinal datasets
- 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 containing utilities to extract and compute MRI acquisition parameters (e.g. single-band 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
- Implemented metadata extraction utilities for single and multi-band slice timing, image acquisition parameters, and image properties from NIfTI headers

**NeuroCAPs** | [Github](#) | [Docs](#) | [Demo](#) | [JOSS Paper](#) | [JHU OSPO Catalog](#)

**Jan 2024-Current**

- Developed an Python package for fMRI brain state identification using k-means, leveraging multiprocessing and memoization to significantly reduce multi-subject computation time
- Incorporated multiple clustering validation metrics, KD-tree based spatial interpolation, temporal dynamic metrics for downstream statistical analyses, and a comprehensive visualization suite
- Deployed via Docker with headless rendering and flexible CLI/Jupyter interfaces; maintained >90% test coverage across multiple OS platforms using pytest and GitHub Actions

**vswift** | [Github](#)

**Apr 2023-Current**

- Created an R package for ML model evaluation with custom stratified sampling, cross-validation, and nested cross-validation, with fold-level multiprocessing
- Designed a unified interface supporting multiple classifiers (Logistic Regression, SVM, XGBoost, Neural Networks) while preserving algorithm-specific parameter flexibility
- Automated missing data imputation and multi-metric assessment (precision, recall, F1) with ROC/Precision-Recall visualizations and AUC computation using trapezoidal rule

## **PROJECTS**

**Introduction to R Workshop** | [Github](#)

**Feb 2023**

- Designed and delivered an interactive workshop for the Diversity, Equity, and Inclusion program at FIU
- Covered several fundamental R programming concepts (data structures, Tidyverse, etc)

**Adolescent Brain Cognitive Development (ABCD) Study Annual Meeting** | [Github](#) **Nov 2022**

- Analyzed ABCD study demographics using R, implementing descriptive statistics, hypothesis testing, and data visualizations

- Presented statistical findings and methodology at the 2022 Annual Meeting to a research task force

## WORKSHOPS

### High Performance Computing Workshop: Machine Learning and Big Data

Jan 2025

- Attended an interactive workshop, hosted by the Pittsburgh Supercomputing Center, focusing on applying big data analytics with Spark and implementing deep learning using TensorFlow.

## PUBLICATIONS

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- [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/10.1101/2022.09.30.508557>
- [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

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- [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

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- [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

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

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Journal of Open Source Software	Aug 2025-Current
npj Science of Learning	Jul 2025 - Current

## FELLOWSHIPS, HONORS, SCHOLARSHIPS

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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

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**Programming Languages:** Python (NumPy, Pandas, Scikit-Learn, Scipy, Matplotlib, Plotly, Spark), R (Tidyverse), Shell Scripting (Bash), SQL

**Computing & Development:** High-Performance Computing, CI/CD (Git, GitHub Actions, Codecov, Docker, Singularity)

**Neuroimaging Tools:** Nibabel, Nilearn, fMRIPrep, AFNI, EPRIME, PsychoPy