# DAVID BRAUN, Ph.D.

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## PROFESSIONAL SUMMARY

**Predictive analytics and machine learning modeler** with PhD + 5 years postdoc experience developing and validating models of complex human behavior, including decision-making, attention, and risk preferences. Skilled in supervised learning, classification (tree-based models, logistic regression), and object-oriented programming, with a growing focus on model interpretability and real-world deployment. Passionate about applying machine learning to socially impactful domains.

## SKILLS

**Programming**: R (10 yrs, *tidyverse, ggplot*), Python (9 yrs; *scikit-learn, PyTorch*), Git/GitHub, Stan, SQL

**Statistical & Machine Learning**: Linear / logistic / hierarchical / ridge regression, random forest, clustering, PCA, deep learning, predictive modeling, hypothesis testing, hierarchical Bayesian computational modeling

**Collaboration:** Co-led and published research with cognitive scientists, neuroscientists, epidemiologists, computer scientists, material scientists, engineers, and economists

**Communication:** Published 10+ papers in scientific, peer-reviewed journals. Presented research orally at 25+ conferences and colloquia to technical and non-technical audiences

## PROFESSIONAL EXPERIENCE

**Senior Researcher | Neuroscience**, *Drexel University, Philadelphia, PA* *Oct 2023 – Present*

- Leveraged **unsupervised machine learning** (cluster-based permutation testing) to identify biomarkers of anxiety-related interoceptive dysfunction in 174GB of multimodal EEG/ECG (first-authored paper; poster; blog post).
- Applied **novel individual-level PCA and hierarchical clustering method** to uncover unique patterns in spontaneous thinking, advancing personalized diagnostics in mental health and precision medicine (GitHub; poster).
- **Independently developed a Bayesian model** investigating neural and cognitive mechanisms underlying adaptive vs. maladaptive forms of off-task thinking for NIH early-career grant proposal (see Specific Aims).
- **Built and maintained automated Python ETL pipeline** (1,500+ LOC) to convert raw EEG, fMRI, and behavioral data from multiple lab experiments into an industry-standardized format, significantly enhancing reproducibility and cutting manual processing time (GitHub).

**Senior Researcher | Cognition**, *Lehigh University, Bethlehem, PA* *Sept 2020 – Aug 2023*

- Led evaluation of COVID-19 non-pharmaceutical interventions (NPIs) **using Bayesian timeseries modeling, random forest** and 10,000+ crowdsourced responses, providing evidence that perceived public compliance with NPIs can improve forecasts 3 weeks ahead (first-authored paper; data/code on OSF; poster).
- Built an **object detection model using transfer learning** to automate labeling of eye-tracking data in an observational study comparing expert vs. novice performance across traditional and novel apparatuses (paper).
- Validated a public concern scale for cyber-physical technologies (N > 1,000) using **factor analysis and SEM**; developed a **computational model of public concern,** aiding engineers' simulations in an NSF-funded project.
- **Mentored** 3 undergraduates in independent research projects (example student poster).

**Graduate Researcher**, *Lehigh University, Bethlehem, PA* *Sept 2014 – May 2020*

- **Developed hierarchical logistic models to quantify individual-level risk preferences** in effort-based decision contexts, uncovering systematic variation in risk tolerance across real and hypothetical scenarios, with implications for behavioral modeling and decision support (example analysis).
- Published a novel paradigm quantifying effort-based **decision making** (first-authored paper; 35+ citations; poster).
- **Taught R programming** as lead instructor in both undergraduate and graduate courses / seminars, fostering technical proficiency and data literacy across diverse skill levels (graduate syllabus).

## EDUCATION

**Ph.D. Cognitive Neuroscience** | Lehigh University | May 2020
**M.S. Cognitive Neuroscience** | Lehigh University | Dec 2016
**B.A. Psychology** | Stockton University | May 2013