Jonathan Huml

jrhuml@gmail.com | jonhuml.com | github.com/jonathanhuml | linkedin.com/in/jonhuml

Education

- **Columbia University** 2024-present
  Statistics (Ph.D.)
- **Harvard University** 2021-2023
  Master's in Computational Science and Engineering (M.E.)
  Thesis (supervised by Dr. Demba Ba): Geometry-Aware Sparse Coding
- **University of North Carolina-Chapel Hill** 2016-2020
  Mathematics (B.A.), Statistics (B.S.)
  Thesis (supervised by Dr. Michael Aguilar): Nonparametric Markowitz Optimization

Experience

- **Zuckerman Mind-Brain Behavior Institute** 2024-2025
  Research Staff Assistant
  - **Research**: State-space models with uncertainty quantification for large-scale neural datasets
  - **Outcome**: Our algorithm achieves an order of magnitude increase in memory efficiency and a two-order increase in time acceleration over competing Bayesian methods like Gaussian Processes
- **Computation, Representation, and Inference in Signal Processing Group @ Harvard** 2021-2023
  Research Assistant
  - **Research**: Incorporating biological constraints into recurrent autoencoders to improve models of the visual cortex
  - **Outcome**: Our computational receptive fields were statistically indistinguishable from real receptive fields. Work presented at NeurIPS and COSYNE
- **Drug Information Association Adaptive Design Scientific Working Group** 2020-2021
  Research Associate
  - **Research**: Patient-centered framework for dynamically designing adaptive clinical trials using reinforcement learning and Bayesian methods
  - **Outcome**: Work published in a book chapter (see publications)
- **IQVIA** 2019
  Data Science Intern
  - **Project**: Text analysis program to automate quality report classification
  - **Tasks**: Built an internal web application to allow users to upload documents and route quality assurance reports to the correct departments with machine learning
- **Grant Lab @ North Carolina State University** 2019-2020
  Undergraduate Researcher
  - **Project**: Built an autonomous wheelchair
  - **Tasks**: Programming a Raspberry Pi for computer vision tasks using Simultaneous Localization and Mapping algorithms to allow our prototype to process new data in real time
- **UNC Makerspace and Machine Shop** 2017 - 2019
  Engineer
  - **Project**: Led a 5-person team to build a high performance, low-cost wheelchair at 10% of the cost of an average motorized wheelchair
  - **Tasks**: Built and integrated hardware systems (motors, boards, etc.), wrote software for microcontrollers, implemented computer vision algorithms to make the wheelchair capable of detecting and avoiding objects

Workshop and Conference Papers

1. **JR Huml**, Jonathan Wenger, JP Cunningham. "Computation-Aware State-Space Models." *Statistical Analysis of Neural Data (SAND)*. 2025.
2. **JR Huml**, A. Tasissa, D. Ba. "Clustering Inductive Biases with Unrolled Networks." *Computational and Systems Neuroscience (COSYNE)*. 2023.
3. **JR Huml**, W. Pan, F. Doshi-Velez. "Which Off-Policy Evaluation (OPE) Method, and When?" *Reinforcement Learning at Harvard*. 2022.
4. **JR Huml**, A. Tasissa, D. Ba. "Local Geometry Constraints in V1 with Deep Recurrent Autoencoders." *Shared Visual Representations in Human & Machine Intelligence (NeurIPS)*. 2022.
5. **JR Huml**, A. Tasissa, D. Ba. "Sparse, Geometric Autoencoder Models of V1." *Symmetry and Geometry in Neural Representations (NeurIPS)*. 2022.

Journal Publications

1. Z. Antonijevic, RA Beckman, **JR Huml**, Y. Liu, C. Mayer, G. McMillan, RS Tang. "Patient Benefits from Innovative Designs in Rare Diseases." *Rare Disease Drug Development*. Springer. 2021.

2. RA Huml, J. Dawson, M. Bailey, N. Nakas, J. Williams, M. Kolochavina, **JR Huml**. "Accelerating Rare Disease Drug Development: Lessons Learned from Muscular Dystrophy Patient Advocacy Groups." *Therapeutic Innovation & Regulatory Science*. 2021.

3. RA Huml, J. Dawson, K. Lipworth, L. Rojas, EJ Warren, C. Manaktala, **JR Huml**. "Use of Big Data to Aid Patient Recruitment for Clinical Trials Involving Biosimilars and Rare Diseases." *Therapeutic Innovation & Regulatory Science*. 2020.

Invited Talks

1. "The Ripple Effect." *Kempner Institute for the Study of Artificial and Natural Intelligence Launch Event.* Harvard University. Cambridge, MA. 2022.

2. "Topography of the Primary Visual Cortex." *Kanwisher Lab.* Massachusetts Institute of Technology. Cambridge, MA. 2022.

3. "Scalable Uncertainty Quantification in State-Space Frameworks." *Meta PhD Symposium.* Meta Headquarters. Menlo Park, CA. 2025.

Teaching

- **Applied Data Science**: Columbia University, Fall 2025
- **Interpretable Machine Learning**: Columbia University, Spring 2025
- **Advanced Machine Learning**: Columbia University, Fall 2024

Academic Service

- **Reviewer**: Shared Visual Representations in Human & Machine Intelligence (NeurIPS Workshop)
- **Reviewer**: Symmetry and Geometry in Neural Representations (NeurIPS Workshop)

Honors and Awards

- **Harvard IACS Student Scholarship (2022)**: Awarded for top master's thesis proposals in the Harvard School of Engineering
- **NC Summer Scholarship (2020)**: Awarded for mathematics studies and exemplary research at UNC-CH
- **Eagle Scout**: Earned the highest Boy Scouts of America rank at age 13, the youngest out of the 80 Eagles awarded in Troop 424's 30-year history

Skills Summary

- **Languages**: `Python` (NumPy, SciPy, pandas, `PyTorch`), `SQL`, `MATLAB`, `Bash`, `R`
- **MLOps**: MLflow, Weights & Biases, experiment tracking, model registry, reproducibility, CI/CD for ML, monitoring
- **Data Engineering**: Spark/PySpark, Dask/Ray
- **Cloud & Deployment**: AWS (S3, EC2), Docker
- **Databases**: Postgres, MySQL
- **Systems & Performance**: CUDA, profiling, memory optimization, parallel/distributed training, HPC
- **Domains**: neuroscience, computer vision, NLP, reinforcement learning