Jefferey S. **Mentch**

Applied Scientist | Multimodal, Speech, & Perception Systems
Cambridge, MA
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Experience

MIT, Senseable Intelligence Group | Harvard, SHBT — *Cambridge, MA*

Doctoral Researcher: Applied ML, Computational Neuroscience — *Sep. 2019 - Sep. 2025*

- Fit and evaluated 280M grayordinate-wise ridge and stacked encoding models across 171 participants (15-min movie fMRI), quantifying audiovisual feature representations in the brain under cross-validation, permutation testing, and FDR control.
- Engineered and curated a large-scale pediatric speech dataset, building preprocessing and feature extraction pipelines that powered a public ML challenge focused on improving automated speech recognition for early literacy assessment.
- Co-developed an end-to-end CNN generating acoustic impulse responses from RGB images of spaces enabling flexible and geometry-aware reverb synthesis (ICCV 2021).
- Deployed scalable multimodal feature extraction pipelines for naturalistic movies using state-of-the-art computer vision and audio models (e.g., vision transformers and audio embeddings), supporting large-scale neural encoding analyses.
- Quantified hierarchy-specific audiovisual encoding differences in the brain in clinical populations (including autism), identifying representational shifts across cortical levels.
- Developed a web-based annotation platform to flexibly label audiovisual movie stimuli for downstream neuroimaging, behavioral, and ML research projects.
- Effectively collaborated, coordinated, and communicated research across international, multidisciplinary and multi-institutional teams, including the supervision and mentorship of research assistants.

MIT, Kanwisher Lab | Dartmouth College, Robertson Lab — *Cambridge, MA*

Lab Manager: VR, Eye-tracking, Pharma, Autism — *Sep. 2017 - July 2019*

- Designed an end-to-end VR eye-tracking data collection and analysis pipeline, integrating 360° images, high-resolution gaze tracking, and ML-based salience modeling, to identify potential behavioral biomarkers of autism.
- Led nationwide multi-site data collection efforts, standardizing acquisition protocols and ensuring cross-site data quality.
- Coordinated a pharmaceutical study investigating the role of GABA modulation in binocular rivalry, with implications for autism.

Dartmouth College, Bregman Media Labs — *Hanover, NH*

Graduate Researcher: Computational Auditory Neuroscience, Music — *Sep. 2015 - Sep. 2017*

- Built a ridge-regularized stimulus encoding/decoding framework to reconstruct naturalistic music from 7T fMRI brain data using a large-scale musical corpus prior (8k+ audio clips).

Abington Neurological Associates, Clinical Trial Center — *Willow Grove, PA*

Clinical Research Coordinator: Phase II and III Alzheimer's Disease Trials — *Sep. 2014 - Aug. 2015*

The Pennsylvania State University, Deep Sea Lab — *University Park, PA*

Research Assistant: Deep Sea Coral Marine Biology — *Jan. 2013 – Aug. 2014*

QuantTera, R&D Microelectronics — *Scottsdale, AZ*

NSF REU intern, Technician: Novel Semiconductor Devices — *Apr. 2011 - Jan. 2013*

Children's Hospital of Philadelphia, Center for Applied Genomics — *Philadelphia, PA*

Research Intern: Proteomics of IBD — *Summer 2011*

Education

Harvard University — *Cambridge, MA*

PhD, Speech & Hearing Bioscience and Technology (SHBT) — *February 2026*

Dartmouth College — *Hanover, NH*

MA, Digital Musics — *June 2017*

The Pennsylvania State University — *University Park, PA*

BS, Biology; Minor, Music Technology — *May 2014*

Skills

Programming	Python (primary), MATLAB, bash, p5.js, Unity/C#
ML Frameworks	PyTorch, scikit-learn, NumPy, SciPy
Modeling	Multimodal modeling and feature extraction, encoding/decoding models, stimulus reconstruction
Data	Large-scale speech, music, audiovisual movie, and neuroimaging datasets
Tools	Git, Linux, Slurm, LaTeX