

Benjamin Lahner

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EDUCATION

Massachusetts Institute of Technology , Cambridge, MA PhD Student, Electrical Engineering and Computer Science Department Minor: Medical Device Design and Manufacturing Expected graduation date: May 2025	2019-Present
Massachusetts Institute of Technology , Cambridge, MA Master of Science in Electrical Engineering and Computer Science	2019-2022
Boston University , Boston, MA Bachelor of Science in Biomedical Engineering, Magna Cum Laude	2015-2019

SELECTED WORK EXPERIENCE

Computer Science and A.I. Lab (CSAIL) , MIT, Cambridge, MA <i>Computational Neuroscience Researcher with Dr. Aude Oliva</i> <ul style="list-style-type: none">Thesis: Characterizing human vision through large-scale brain imaging and computational models.Leverage interdisciplinary expertise in cognitive neuroscience, computer vision, and machine learning to understand how the human visual system recognizes actions, understands complex scenes, and remembers images.Train end-to-end computer vision systems directly on brain data and regularly perform feature extraction from deep neural networks and large language models to systematically compare artificial and human intelligence.Collect and analyze experimental fMRI data on human subjects.	Fall 2019-Present
Amazon , Seattle, WA <i>Design Technologist Intern, Futures Design Group</i> <ul style="list-style-type: none">Built a product-focused conversational AI system by combining agentic teams of large language models (from OpenAI, Anthropic, and open source) with personalizable knowledge graphs and vector databases.Developed and implemented comprehensive evaluation frameworks for LLMs, improving the system's multi-hop retrieval recall score by 15% and temporal reasoning accuracy by 10% on large-scale benchmark datasets.Prioritized scalability to massive amounts of data and flexibility to easily incorporate future releases of LLMs.	Winter 2024 and Summer 2024
Microsoft Corporation , Redmond, WA <i>Computer Vision Research Intern, Azure Cognitive AI</i> <ul style="list-style-type: none">Trained large transformer models to unite vision and language tasks.Integrated in a future deployment to Microsoft's Azure AI platform.	Summer 2022
Regeneron Pharmaceuticals , Tarrytown, NY <i>Machine Learning PhD Intern, Early Clinical Development Team</i> <ul style="list-style-type: none">Developed machine learning models to predict clinically relevant outcomes (e.g., pain) from wearable sensor data.Presented results to senior management, which heavily influenced critical investment decisions in the emerging field of wearable healthcare technologies.	Summer 2021

SELECTED PUBLICATIONS

- Modeling short visual events through the BOLD moments video fMRI dataset and metadata.** [Benjamin Lahner](#), Kshitij Dwivedi, ..., Aude Oliva, Radoslaw Cichy. *Nature Communications*, 2024
- Brain Netflix: Scaling Data to Reconstruct Videos from Brain Signals.** Camilo Fosco*, [Benjamin Lahner*](#), Bowen Pan, Alex Andonian, Emilie Josephs, Alex Lascelles, and Aude Oliva. *ECCV*, 2024
- Visual perception of highly memorable images is mediated by a distributed network of ventral visual regions that enable a late memorability response.** [Benjamin Lahner*](#), Caitlin Mullin*, Yalda Mohsenzadeh*, and Aude Oliva. *PLOS Biology*, 2024
- A mechanical device for precise self-administration of ocular drugs.** Jesse George-Akpenyi*, [Benjamin Lahner*](#), Seung Hyeon Shim*, Carly Smith*, Nakul Singh, Matt Murphy, Leroy Sibanda, Giovanni Traverso, and Nevan C. Hanumara. *Human Factors in Healthcare*, 2024
- Machine learning analysis of a digital insole versus clinical standard gait assessments for digital endpoint development.** Matthew F. Wiperman*, Allen Z. Lin*, Kaitlyn Gayvert*, [Benjamin Lahner](#), ..., Olivier Harari. *eLife*, 2024
- Theta-phase-specific modulation of dentate gyrus memory neurons.** Bahar Rahsepar, Jad Noueihed, Jacob F. Norman, [Benjamin Lahner](#), ..., John A. White. *eLife*, 2023

- **Emergence of visual center-periphery spatial organization in deep convolutional neural networks.** Yalda Mohsenzadeh, Caitlin Mullin, Benjamin Lahner, Aude Oliva. Scientific Reports, 2020

PATENTS

Inventor: Eye drop positioning device with haptic feedback May 2023

Publication number: WO/2024/238546

- Designed a mechanical eye drop assist device for elderly glaucoma patients.
- Published results in the journal *Human Factors in Healthcare*.

Inventor: Systems and methods for test device analysis August 2022

Non-provisional application in progress

- Created a framework for testing machine learning models used to predict clinical outcomes from wearable devices.
- Worked in collaboration with Regeneron Pharmaceuticals and published results in the journal *eLife*.

SKILLS

Human Behavior and Neuroscience: MEG and fMRI neuroimaging, clinical applications, physiological time-series analysis, human factors engineering

Artificial Intelligence: Deep Learning, Large Language Models, Large Vision Models, classical machine learning

Programming: Python (PyTorch, scikit-learn, Pandas, SciPy, HuggingFace), git, Matlab, C++, html/css/javascript

Large-scale Computing: SLURM, Azure, multi-gpu computing

Cross-functional Communication: Publications (journal and conference), industry talks, teaching, personal blog

HONORS AND INVOLVEMENT

Peer Review 2020-Present

- Peer review original articles from the journals *Advanced Science*, *Brain and Cognition*, *PLOS One*, *Scientific Reports*, and *Expert Systems With Applications*.

The Algonauts Project Summer 2019-Summer 2023

- Core contributor for the organization and data analysis behind The Algonauts Project series (2019, 2021, and 2023 editions), an open challenge for vision researchers to build the best predictive model of human visual cortex.

Prison Education Instructor Fall 2020-Fall 2023

- Taught MIT's "Introduction to Programming and Computer Science" course to incarcerated individuals throughout New England. Assisted facilities with updating their technology restrictions for educational purposes.

MIT Open Data Competition – Runner Up Fall 2022

- Runner up (out of 70 projects across MIT) in the Open Data competition that recognizes open and publicly accessible data with strong potential for large scientific impact.

EECS Mathworks Fellowship Fall 2022

- Awarded full financial support for one academic year (\$70,000) for using MATLAB in novel and impactful scientific research.

Best Biomedical Engineering Senior Design Project Spring 2019

- Developed and deployed a real-time algorithm (latency of ~20ms) in C++ that interfaced with neural signals from a mouse's hippocampus to manipulate memory encoding and retrieval. Work published in the journal *eLife*.
- Awarded best project out of 42 other projects in biomedical engineering by engineering faculty.

SELECTED PERSONAL PROJECTS

Personal Blog Summer 2022-Present

- Write an informal blog detailing my personal projects and hobbies to a general audience. Source code for personal technical projects is available on GitHub.

Neural Network Tutorial Series | PyTorch, calculus, linear algebra Spring 2023

- Designed a comprehensive neural network (NN) tutorial curriculum for students with no GPU or internet access, specifically intended for incarcerated students. Details NN training, mathematics of back-propagation, coding of a multi-layer perceptron (MLP) in NumPy, coding of a MLP in PyTorch, and coding of a convolutional NN in PyTorch.