# Ajay Subramanian

Department of Psychology
New York University
6 Washington Place, New York 10003

Email: ajay.subramanian@nyu.edu
Website: ajaysubramanian.com
Last updated: October, 2022

## EDUCATION

**Ph.D.:** **New York University, USA** 2021 - 2026 (expected)
Cognition & Perception, Department of Psychology
Advisor: Dr. Denis Pelli

**B.E.:** **Birla Institute of Technology and Science Pilani, India** 2017 - 2021
Electronics and Communication Engineering

## PUBLICATIONS & PREPRINTS

PREPRINTS

1. **Subramanian, A.**, Price, S., Sizikova, E., Kumbhar, O., Majaj, N. J., Pelli, D. G. (2022). SATBench: Benchmarking the speed-accuracy tradeoff in object recognition by humans and dynamic neural networks. *arXiv*. [Paper]

PUBLICATIONS

2. Turner, J. P., Knight, J. C., **Subramanian, A.**, Nowotny, T. (2022). mlGeNN: accelerating SNN inference using GPU-enabled neural networks. *Neuromorphic Computing and Engineering*, *2*(2), 024002. [Paper]
3. **Subramanian, A.**, Chitlangia, S., & Baths, V. (2022). Reinforcement learning and its connections with neuroscience and psychology. *Neural Networks*, *145*, 271-287. [Paper]

## POSTER PRESENTATIONS

1. **Subramanian, A.**, Price, S., Sizikova, E., Kumbhar, O., Majaj, N., Pelli, D. G. (2022). Benchmarking dynamic neural-network models of the human speed-accuracy tradeoff. *Vision Science Society (VSS) Meeting*, St. Pete Beach, USA. [Poster]
2. **Subramanian, A.**, Patil, R., Baths, V. (2019). Word2Brain2Image. Visual Reconstruction from Spoken Word Representations. *Annual Conference of the Association for Cognitive Science in India (ACCS)*, Goa, India. [Poster]

## TALKS

1. **Subramanian, A.** (2022). Benchmarking the speed-accuracy tradeoff in object recognition by humans and dynamic neural networks. *First year talk, Program in Cognition & Perception 43rd Annual Miniconvention*, New York University, USA. [Video]
2. **Subramanian, A.** (2022). The temporal dimension of object recognition. *Guest talk: Introduction to Cognitive Neuroscience,* BITS Pilani, Goa, India. Virtual.
3. **Subramanian, A.** (2020). Word2Brain2Image: A data-driven approach towards understanding representations in the brain. *Round table track: Data issues in Cognitive Neuroscience*, International CCCP Symposium. Virtual.
4. **Subramanian, A.** (2019). Open Source Development and Google Summer of Code. *Technology Incubator Programme Seminar*, BITS Pilani, Goa, India.

## RESEARCH AND WORK EXPERIENCE

**2021 - present:** **New York University**
Graduate Student Researcher. Supervisor: Denis Pelli
*Benchmarking the speed-accuracy tradeoff in object recognition by humans and dynamic neural networks*

**2020 - 2021:** **Harvard University & Massachusetts Institute of Technology**
Research Intern. Supervisors: Samuel Gershman, Pedro Tsividis
*Human-level reinforcement learning through theory-based modeling, exploration and planning*

**2020:** **Center for Computational Brain Research (CCBR), Indian Institute of Technology Madras**
Senior Thesis. Supervisor: Partha Mitra, Jaikishan Jayakumar
*Automated detection of neuroanatomical features in gigapixel histological images using deep learning*

**2019 - 2020:** **Cognitive Neuroscience Lab, BITS Pilani**
Undergraduate Researcher. Supervisor: Veeky Baths
*Deep learning for visual reconstruction from spoken word representations;*
*Review on reinforcement learning and its connections with neuroscience and psychology*

**2019:** **Biologically Inspired Neural Network (BINN) Labs, BITS Pilani**
Undergraduate Researcher. Supervisor: Basabdatta Sen Bhattacharya

*Simulating LGN response to background irradiance using spiking neural networks on SpiNNaker*

**2019:** **GeNN Team, University of Sussex & International Neuroinformatics Coordinating Facility (INCF)**
Google Summer of Code Intern. Supervisors: James Knight, Thomas Nowotny
*Deep learning in spiking neural networks using GPU-enabled neural networks (GeNN)*

**2019:** **LetsTransport**
Summer Intern. Supervisor: Nilay Sahu
*Optimizing database querying and file upload speeds from a native Android application*

## AWARDS

**2021:** MacCracken Fellowship for doctoral studies, New York University.
**2019:** Matic Bounty Prize, InOut Hackathon, Bangalore, India.
**2018:** Literacy and Cognition Project research award, Max Planck Institute for Psycholinguistics.
**2015:** National Talent Search Scholarship, Government of India.

## TEACHING AND OPEN-SOURCE

**2020:** **Co-creator,** *GenRL*
*Open-source library for reproducible, generalizable reinforcement learning (github.com/SforAiDl/genrl)*
**2019:** **Project Mentor**, *Learning to play games with deep reinforcement learning*
*Technology Incubator Programme, BITS Pilani Goa, India*
**2018:** **Course Instructor**, *Deep Learning*
*Technology Incubator Programme, BITS Pilani Goa, India*
**2018:** **Teaching Assistant,** *Computer Programming (CS F111)*
*BITS Pilani, Goa, India*

## ACADEMIC SERVICE

**2022:** Reviewer, NeurIPS SVRHM Workshop
Reviewer, IOPScience Journal of Neural Engineering
Reviewer, NeurIPS Datasets and Benchmarks Track
External Reviewer, ECML-PKDD
**2020:** Co-organizer, Summer Symposium on AI Research (SAiDL and APPCAIR, BITS Pilani Goa)

## MEMBERSHIP

**2021 - present** Member, Vision Science Society
**2018 - present** Core Member, Society for Artificial Intelligence and Deep Learning (SAiDL)

## TECHNICAL SKILLS

**Programming:** **Advanced**: Python, C++, Java, C, MATLAB
**Basic:** JavaScript, HTML
**DL Frameworks:** **Advanced:** PyTorch, Keras
**Intermediate:** TensorFlow
**Tools:** GCP, Travis CI, Docker, Slurm, LaTeX, Git, DialogFlow, Android Studio, MongoDB, LabJS, MTurk etc.
**Operating Systems:** Mac OS, Linux, Windows

## RELEVANT COURSEWORK

**Formal coursework:**
**At New York University:** Mathematical Tools for Cognitive and Neural Science, Perception, Computer Vision, Computational Cognitive Modeling, Motion & Depth Perception (in progress), Neuroeconomics & Decision Making (in progress)
**At BITS Pilani:** Calculus, Probability & Statistics, Computer Programming, Linear Algebra, Differential Equations, Foundations of Data Science, Control Systems, Signals & Systems, Introduction to Cognitive Neuroscience, Digital Signal Processing, Information Theory & Coding, Digital Image Processing

**Summer courses:** Google Research India AI Summer School - Computer Vision track (2020)
Reinforcement Learning, Indian Institute of Technology Madras (2018)
**Online courses:** Machine Learning (Stanford, Coursera)
Deep Learning for Computer Vision (Stanford)
Deep Learning Specialization (deeplearning.ai, Coursera)