# Gabriel Sarch

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## Education

**Carnegie Mellon University**, Pittsburgh, USA
Ph.D. Program in Machine Learning and Neural Computation — 2020 – present
Advisors: Dr. Katerina Fragkiadaki and Dr. Michael Tarr

**Carnegie Mellon University**, Pittsburgh, USA
Masters of Science in Machine Learning — 2023

**University of Rochester**, Rochester, USA
Bachelor of Science in Biomedical Engineering, *magna cum laude* — 2016 – 2020

## Publications

**Sarch, G.**, Tung, H., Wang, A., Prince, J., Tarr, M. (in submission). 3-D View Prediction Models of the Dorsal Visual Stream.

Yates, J., Coop, S., **Sarch, G.**, Wu, R., Butts, D., Rucci, M., Mitchell, J. (2023). Beyond Fixation: detailed characterization of neural selectivity in free-viewing primates. *Nature Communications.* 2023.

**Sarch, G.,** Fang, Z., Harley, A. W., Schydlo, P., Tarr, M., Gupta, S., & Fragkiadaki, K. (2022). TIDEE: Tidying Up Novel Rooms using Visuo-Semantic Common Sense Priors. *European Conference on Computer Vision (ECCV) 2022*. [Project Page]

**Sarch, G.*,** Fang, Z.*, Jain, A.*, Harley, A. W., & Fragkiadaki, K. (2021). Move to See Better: Self-Improving Embodied Object Detection. *British Machine Vision Conference 2021. (*equal contribution).* [Project Page]

## Presentations

Coop SH, **Sarch GH**, Bucklaew A, Yates JL, Mitchell JF (2022). Laminar Organization of Pre-Saccadic Attention in Marmoset Area MT. Journal of Vision 2022. Poster.

**Sarch GH**, Yates JL, Coop SH, Mitchell JF (2019) Identification of cortical layers from current source density (CSD) analysis and two local field potential (LFP) band-power measures in marmoset V1. Society for Neuroscience. Chicago, IL, 2019. Poster.

**Sarch GH,** Pavindra PH, Smith JC (2018) Computational Modeling of Respiratory Neural Circuits. NIH Bethesda, MD, 2018.

## Selected Grants & Awards

**National Science Foundation Graduate Research Fellowship** — 2020 – 2025
Funding three years of interdisciplinary graduate research in machine learning and neuroscience

**Runner-Up** in Amazon Alexa Prize SimBot Embodied Dialogue Challenge — 2022

Developed multimodal instruction following agent as a member of CMU Symbiote Team

**2020 Biomedical Engineering Outstanding Award for Academic Excellence** 2022
Awarded to the top student in the Biomedical Engineering class for academic excellence

**Tau Beta Pi Engineering Honor Society** 2020
Awarded to undergraduate students in the top eighth of their engineering class

**University of Rochester Center for Visual Science (CVS) Research Fellowship** 2019
Funded neural recording and analysis research at the Active Vision Laboratory

**National Institutes of Health Ruth L. Kirschstein National Research Service Award** 2019
Funded neural modeling research at the Computational Neurobiology Laboratory, NIH

## Experience

**Carnegie Mellon University** Aug 2020 - present
PIs: Dr. Katerina Fragkiadaki and Dr. Michael Tarr
*PhD Student*
- Serving on the MLD PhD Peers Committee to help guide new MLD students

**Active Vision Laboratory**, University of Rochester Aug 2018 - Aug 2020
PI: Prof. Jude Mitchell
*Research Assistant*
- Studied cortical laminar differences in pre-saccadic attention
- Assisted with primate electrophysiology recordings and neural data analysis

**Neurobiology Laboratory**, National Institutes of Health May 2018 - Aug 2018
PI: Dr. Jeffrey Smith
*Internship Program*
- Researched computational models of the pre-Bötzinger respiratory generator

**Cognitive Neurophysiology Laboratory**, University of Rochester Jan 2018 - May 2018
PI: Prof. Edmund Lalor
*Research Assistant*
- Researched contextualized semantics for speech comprehension decoding in EEG

## Skills

**Computer Languages and Other Tools:** Python, Matlab, Unix shell/bash, Git, common cluster computing tools, HTML/CSS

**ML/AI Tools & Simulation Environments:** Pytorch, TensorFlow, PyCortex, Ai2thor, Habitat AI, Carla, Open AI Gym

**General laboratory methods:** self-supervised learning, reinforcement learning, multiple view geometry, convex optimization, search, probabilistic inference, statistical machine learning, density estimation, learning theory, signal processing, electrophysiology

**Relevant coursework:** Deep Reinforcement Learning (CMU 10-703), Advanced Machine Learning (CMU 10-715 & 10-716), Intermediate Statistics (CMU 36-705), Graduate Artificial Intelligence (CMU 15-780), Statistical Models of the Brain (CMU 36-759), Cognitive Neuroscience (CMU 85-0765 & 03-763)

**Teaching Assistantships:** Deep Reinforcement Learning (CMU 10-403)

Last updated: March 2023