Madeleine C Snyder

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Education

† *Indicates expected*

2019–2024 †	Ph.D., Bioengineering, UC Berkeley – UCSF
	Supervisor: Michael Yartsev
2013–2017	B.A., Neurobiology, Harvard College
	Honors Thesis: Resting-state and stimulus-state functional connectivity in infant macaques.
	Supervisor: Dr. Margaret Livingstone & Dr. Michael Arcaro

Research

2019–	Bioengineering PhD Candidate, UC Berkeley NeuroBat Lab, UC Berkeley, UCSF
2017–2019	Computational Methods Research Assistant, Stanford Cognitive and Systems Neuroscience Lab, Stanford University
2015–2017	Undergraduate Researcher, Livingstone Lab, Harvard Medical School
2016–2017	Undergraduate Collaborator, Gershman Lab, Psychology Dept. Harvard University
2014–2015	Undergraduate Researcher, Hensch Lab, Neuroscience Dept. Harvard University
2013–2014	Summer Student Researcher, Zhao Lab, Molecular Biology Dept. Jiao Tong University, Shanghai China

Publications

Journals

[1] **Snyder, M.C.**, Qi, K. K., Yartsev, M.M. Neural representation of human experimenters in the bat hippocampus (in press, Nature Neuroscience, 2024).

[2] Liberti, W.A., Schmid, T.A., Forli, A., **Snyder, M.C.**, Yartsev, M.M. A stable hippocampal code in freely flying bats. Nature 604, 98–103 (2022)

[3] Esteban O, Markiewicz C,Blair RW, Moodie C,Isik AI,Aliaga QE, Kent J, Goncalves M, DuPre E, **Snyder, M.C.**, Oya H, Ghosh S, Wright J, Durnez J, Poldrack R, Gorgolewski KJ. (2018). FMRIPrep: a robust preprocessing pipeline for functional MRI. Nature Methods.

Posters

[1] **Snyder, M.C.**, Qi, K. K., Yartsev, M.M. (2023). Representation of human experimenters in the bat hippocampus. Poster session presented at the Society for Neuroscience conference, Washington D.C.

[2] **Snyder, M.C.**, Padmanabhan A, Cai W, Duberg K, Bradley T, Altamirano O, Marin YA, Carrion V, Menon V (2019). Loss Sensitivity and predictors of risky choice reveal immature reward-related decision making in children. Poster session presented at the Organization for Human Brain Mapping meeting, Rome, Italy.

[3] **Snyder, M.C.**, (2017). What to do when your baby monkey falls asleep in the scanner: A study on resting-state and stimulus-state functional connectivity in infant macaques. Poster session presented at the Harvard Northwest Labs Senior Thesis Session, Cambridge MA.

Selected Honors and Fellowships

2024	Heiligenberg Travel Award Recipient, International Society for Neuroethology
2024	UC Berkeley Outstanding Graduate Student Instructor Award
2020	NSF GRFP Award (> $150,000 total funding)
2019	NSF GRFP Honorable Mention
2016	HCRP Harvard College Semester Research Fellow
2016	PRISE Harvard College Summer Research Program Assistant
2015	PRISE Harvard College Summer Research Fellow
2015	Harvard Extension School Teaching Fellow, Psychology of Memory
2014	Genome to Biome Summer Fellowship, Jiao Tong University, Shanghai China

Professional Activities and Teaching Experience

- Art Director for Berkeley Science Review Design Team (2024). Contributing illustrator (2021-2024).
- Graduate Student Mentor for two undergraduates currently participating in highly selective summer programs in bioengineering and animal cognition, and one who graduated to pursue a PhD at University of California, San Francisco.
- UC Berkeley Graduate Student Instructor, BioE 171 Neuroethology and Neural Engineering (2023)

- Harvard Extension School Teaching Fellow, Psychology of Memory (2015)
- Course Assistant, Calculus 1A, Harvard University, (2015)
- Graduate Student Mentor, Be A Scientist Program, Berkeley, CA (2019)
- Classical Piano Tutor (young ages), Longy School of Music

Research Projects

2021–2024	Investigation of the neural representation of multi-agent navigation leveraging recordings from hippocampus CA1 of freely flying female Egyptian fruit bats using wireless electrophysiology and high-speed positional tracking.
2022–2023	Development of 3D mesh of an Egyptian fruit bat for high-fidelity posture tracking and development of automated position and postural tracking from video data.
2020	Pioneering use of miniaturized wireless single photon calcium imaging in free-flying Egyptian fruit bats to examine stability of hippocampal code over days.
2019	Developing novel biologically-inspired sub-goal partitioning algorithm within hierarchical reinforcement learning framework (based on Kulkarni et al. 2016; Hierarchical Deep Reinforcement Learning: Integrating Temporal Abstraction and Intrinsic Motivation).
2017–2019	Development of high-throughput fMRI processing pipeline on high-performance computing platform in collaboration with Poldrack lab at Stanford.
2017-2019	Maintained, developed, and contributed to collaborative code base and pipeline for preprocessing, anonymyzing, and analyzing fMRI data from sensitive patient populations.
2019	Lead computational modeling project using drift diffusion model to capture neural representation of risky decision-making in children from fMRI data. In collaboration with members of SCSNL at Stanford.
2017	Collaborative computational cognitive modeling project to investigate the effectiveness of ”restorative justice” on adolescent reward response behavior using a Q-learning model.
2015–2017	Harvard college honors senior thesis in neurobiology: preprocessed and analyzed resting and stimulus state fMRI data from infant macaques to investigate functional connectivity present soon after birth (Matlab, AFNI, Freesurfer). Manuscript published in Harvard College Undergraduate Thesis library, poster presented at Northwest Thesis Labs Poster Session and Pforzheimer House Thesis Session.

Relevant Technical Skills

- **Coding | Version control:** Matlab, Python (pytorch, cuda, luigi, pandas, NumPy, scikit-learn, matplotlib, seaborn, gym, mujoco), Shell scripting, LATEX, Git, High-performance cluster computing, Collaborative coding, In-house data preprocessing pipeline maintenance and development.
- **Hardware Engineering:** AUTOCAD, 3D printing, Laser cutting, Arduino, Raspberry Pi, Basic optical design, Custom hardware housing design, Solar power system design.
- **Neural Systems:** Electrophysiology (wireless, tetrode-based, NeuraLynx, Deuteron), Neuroimaging (miniaturized 1P calcium imaging, fMRI), Neural device implantation, In-house neural recording systems engineering.
- **Data Processing:** Multi-stream data alignment, Multi-modal data preprocessing (video, audio, neural, tactile), High-volume video and image stack processing and signal extraction (CNMF-e, AFNI, Image-J).
- **Statistical Analysis | Machine Learning:** Machine learning, Deep learning for 3D positional tracking, body position, and dexterous movement (DeepLabCut, Anipose), Statistical analysis of experimental data (bayesian and inferential), Modeling of multivariate timeseries data and neural data, Reinforcement learning, CNNs.
- **Scientific Communication:** Grant writing, Accelerated learning in novel domains, Data visualisation and graphic design, Art director and contributing illustrator for science communication publication (Berkeley Science Review). Experience leading and participating on closely collaborative teams, training other lab members, mentoring undergraduate students, and teaching undergraduates