Ryan A. Senne

Research Interests

Learning and Memory, Decision-making, Computational Modeling, Optical Imaging

Education

Boston University, Boston, Massachusetts USA

Ph.D. Student, Graduate Program in Neuroscience, expected graduation May 2027
Thesis Advisor: Dr. Benjamin Scott and Dr. Brian DePasquale

B.A., Neuroscience *with Honors*, graduated May 2021
Senior Thesis: Network Dynamics Governing Defensive and Social Memory Systems
Thesis Committee: Dr. Benjamin Scott, Dr. Mark Howe, Dr. Steve Ramirez*

Awards and Honors

Hariri Computing and Computational Science Graduate Student Fellow, $5,000
Ludwig Family Foundation Research Grant, $155,000
BioFrontiers NSF Data Science Fellowship $3,000
Arvand Kilichand Honors Scholar
B.A. Honors in Neuroscience
UROP Funding Award: (Summer 2019, Fall 2019, Spring 2020)
Dean's List: (Spring 2019, Spring 2020, Fall 2021, Spring 2021)

Academic Experience

Boston University, Boston, Massachusetts USA

RISE Practicum Morning Lecturer **July-August 2024**

Human 2.0 Guest Lecture: *Memory Prostheses.* MIT. **April, 2024**

RISE Practicum Teaching Fellow **July-August 2023**

RISE Practicum Guest Lecture:
Machine Learning in Neuroscience and Network Science **August, 2023**

RISE Practicum Guest Lecture: Network Science **August, 2022**

PyClub *Instructor* **May 2021 - August, 2021**
Taught, created lesson-plans, and created coursework for a Python-based programming and computation course for graduate students and post-docs for the Ramirez Group. Course Materials: https://github.com/rsenne/PyClub

Publications and Preprints

Sucheta Chakravarty* and Cristina Delgado-Sallent*, Gary A. Kane, Hongjie Xia, Quan H. Do, **Ryan A. Senne**, Benjamin B. Scott. A cross-species framework for investigating perceptual evidence accumulation. *eLife*, 2025.

Gary E. Kane*, **Ryan A. Senne***, and Benjamin B. Scott. Rat movements reflect internal decision dynamics in an evidence accumulation task. *Journal of Neurophysiology*, 2024.

Ryan A. Senne* and Rebecca L. Suthard*, Rui Cao, Amy H. Monasterio, Evan A. Reusch, Michelle D. Buzharsky, Marc W. Howard, Steve Ramirez. A Hippocampal Astrocytic Sequence Emerges During Learning and Memory. *biorxiv*, 2024.

Rebecca L. Suthard.* and **Ryan. A Senne***, Michelle D. Buzharsky, Anh H. Diep, Angela Y. Pyo, Steve Ramirez. Engram Reactivation Mimics Cellular Signatures of Fear. *Cell Reports*, 2024.

Kaitlin E Dorst* and **Ryan A. Senne***, Anh H. Diep, Antje R. de Boer, Rebecca L. Suthard, Heloise Leblanc, Evan A. Ruesch, Angela Y. Pyo, Sara Skelton, Lucas C. Carstensen, Samantha Malmberg, Olivia P. McKissick, John H. Bladon and Steve Ramirez. Hippocampal Engrams Generate Variable Behavioral Responses and Brain-Wide Network States. *The Journal of Neuroscience*, 2024.

Rebecca L. Suthard* and **Ryan A. Senne***, Michelle Buzharsky, Angela Pyo, Kaitlyn E. Dorst, Anh H. Diep, Rebecca H. Cole, Steve Ramirez. Basolateral amygdalar astrocytes are engaged by the acquisition and expression of a contextual fear memory. *The Journal of Neuroscience*, 2023.

Rebecca L. Suthard*, Alex Jellinger, Michelle Surets, Monika ShpokyateAngela Pyo, Michelle Buzharsky, **Ryan A. Senne**, Kaitlyn Dorst, Heloise Leblanc, Steve Ramirez. Chronic Gq activation of ventral hippocampal neurons and astrocytes deferentially affects memory and behavior. *Neurobiology of Aging*, 2023.

Christine Cincotta* and Evan Ruesch*, **Ryan A. Senne**, Steve Ramirez. Hippocampal fear engrams modulate ethanol-induced maladaptive contextual generalization. *Hippocampus*, 2022.

Poster Presentations

Ryan A. Senne*, Rebecca L Suthard*, Michelle Buzharsky, Steve Ramirez. Society for Neuroscience Conference, Washington D.C., November, 2023.

Ryan A. Senne*, Rebecca L Suthard*, Michelle Buzharsky, Steve Ramirez. Society for Neuroscience Conference, San Diego, CA, November, 2022.

Kaitlyn E. Dorst*, **Ryan A. Senne**, Olivia P. Mckissick, Sara Skelton, John H. Bladon, Steve Ramirez. Driving Differential Defensive-like Behaviors with the Same Activated Fear Engram. Society for Neuroscience Conference, Chicago, Illinois, October, 2019.

Software

StateSpaceDynamics.jl: A julia package for probabilistic inference and learning of state-space models. Repo: https://github.com/depasquale-lab/StateSpaceDynamics.jl

Mentorship and Training

Amithi Tadigadapa Undergraduate Research Assistant. **November 2024-Pres.**

James Fourie Undergraduate Research Assistant. **September 2024-Pres.**

Carson Loughridge Undergraduate Research Assistant. **January 2024-August 2024.**

Helene Duebel Undergraduate Research Assistant. **September 2023-August 2024.**