ARIEL K. FELDMAN

Neuroengineering Graduate Student

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EDUCATION

Ph.D. in Neural Computation
Carnegie Mellon University

- Sept 2020 – present

Advisors: Pulkit Grover & Doug Weber

B.A. in Computer Science and Cognitive Sciences
Rice University

- Aug 2016 – May 2020

Minor in Neuroscience

RESEARCH EXPERIENCE

Graduate Research Assistant
Grover Lab & Neuromechatronics Lab

- Aug 2020 - present
- Carnegie Mellon University

I am currently advised by Dr. Pulkit Grover in the Grover Lab and Dr. Doug Weber in the Neuromechatronics Lab. We are investigating the information contained within grid cells, and the efficiency of this representation using information theoretic methodologies. Additionally, we are investigating multisensory integration in the amygdala, and how this may affect neural representations.

Research Assistant
Realtime Neural Engineering Lab

- Jan 2017 - Jan 2020
- Rice University

I have spent the past four years working under the guidance of Dr. Caleb Kemere in the Realtime Neural Engineering Laboratory. During my time in the RNEL, I have contributed to the design and fabrication of a novel experimental paradigm, developed and trained a convolutional neural network for rodent video tracking, and collaborated with Dr. Jacob Robinson's lab. I most recently led my own project to investigate machine learning methodologies for predicting sharp-wave ripple events in rodent hippocampal LFP, with the goal of improving state-of-the-art detection and disruption algorithms. For these projects specifically, I have developed in Python, C, C++ and MATLAB, using Tensorflow and Keras to build networks, and have worked extensively with animals via behavioral experiments and participating in implantation surgeries.

ACHIEVEMENTS

Cornell NeuroNex REU Program
Selected to recieve a $4600 stipend and conduct machine learning research for neuroscientific problems.

Rice Undergraduate Scholars Program
Selected to receive a $2500 research grant for machine learning & neuroengineering research.

Internal Vice President of the Rice Neuroscience Society
Coordinated campus-wide events to engage students in neuroscience.

Electrical and Computer Engineering Affiliates Day
Author on the first place winning Graduate Project.

Gulf Coast Undergraduate Research Symposium
Rice University representative for Neuroengineering.

TEDxRiceU
Presented a TEDxRiceU talk on Women in Martial Arts and STEM.

SOFTWARE LANGUAGES

Python | Java | C | C++ | MATLAB | HTML | CSS

HARDWARE SKILLS

Embedded Systems | Arduino | Raspberry Pi | CAD Design/3D printing | ARM Cortex-M4 | Electronics prototyping

COMPUTATIONAL SKILLS

Multi-threading | Parallel Processing | Neural Networks | Anomaly Detection

NEUROSCIENCE SKILLS

Behavioral Paradigms | Microdrive Fabrication

Research Assistant

Robinson Lab for Nano-Neurotechnology

📅 Feb 2018 - Jan 2020 📍 Rice University

Design and manufacture of an original implant to test the functionality of a novel material from the Robinson Lab as a wireless stimulator *in vivo*, conducted numerous behavioral experiments (unpublished). Additionally, I analyzed motion data with a slightly modified version of DeepLabCut to determine efficacy of the stimulating material. Paper resulting from this collaboration published in Neuron.

NSF NeuroNex REU Fellow

Sabuncu Lab

📅 Jun 2019 - Aug 2019 📍 Cornell University

I spent the summer of 2019 conducting research under the supervision of Dr. Mert Sabuncu and Dr. Jesse Goldberg at Cornell University regarding machine learning applications to identifying and characterizing budgie behavior using spatio-temporal data mining. While at Cornell, I also mentored several students in the Goldberg lab in computational methods they can apply to their work, which continued after I left.

TEACHING EXPERIENCE

STEM NOLA Course Instructor

MantisEDU

📅 Jan 2021 - present

Taking the course I developed the previous summer, "Internet of Things (IOT) with Machine Learning and Python" with MantisEDU, and teaching middle school & high school students virtually via STEM NOLA's course offerings.

Rice University ELITE Tech Camp Live Instructor

Rice University

📅 Summer 2020

Teaching "Internet of Things (IOT) with Machine Learning and Python" to high school students via Rice Center for Engineering Leadership's ELITE Tech Camp. I created course material, designed programming exercises and tutorials, and wrote lesson plans for the summer course. Students learn how to collect their own data, access datasets on the internet, and apply various machine learning methodologies to analyze this data.

Lovett College Academic Fellow

Rice University

📅 Mar 2018 - May 2020

Selected on behalf of the Rice University Office of Academic Advising on the basis of proven academic achievement and demonstrated willingness to help fellow students. I offer on-call aid in Computer Science, Neuroscience and paper writing (historical/STEM research) through weekly office hours, one-on-one tutoring, review sessions for several classes in my fields, and planning academic outreach events to engage students.

LANGUAGES

English ⬤ ⬤ ⬤ ⬤ ⬤

Spanish ⬤ ⬤ ⬤ ⬤ ◯

German ⬤ ⬤ ◯ ◯ ◯

PAPERS & PRESENTATIONS

📄 Journal Articles

- Singer, A et al. (2020). "Magnetoelectric materials for miniature, wireless neural stimulation at therapeutic frequencies". In: *Neuron*.

👥 Presentations

- Dutta, S., **Feldman, Ariel K.**, and CT. Kemere (2019a). "Selective Disruption of Hippocampal Sharp-Wave Ripples Leads to Impaired Object-Place Recognition Memory". In: *Society for Neuroscience*. Chicago, IL.
- – (2019b). "Selective Disruption of Hippocampal Sharp-Wave Ripples Leads to Impaired Object-Place Recognition Memory". In: *UT Austin Conference on Learning and Memory*. Austin, TX.
- **Feldman, Ariel K.**, S. Dutta, and CT. Kemere (2019). "A Machine Learning Approach to Predicting Occurrence of Sharp-Wave Ripple Complexes". In: *Rice Undergraduate Research Symposium*. Houston, TX.
- **Feldman, Ariel K.**, Eugene Kim, et al. (2019). "Building a Basis for Budgie Behavior". In: *Cornell NeuroNex*. Ithaca, NY.
- **Feldman, Ariel K.**, S. Dutta, ER. Ackermann, et al. (2017). "Development Of The RELevator For Exploring 3 Dimensional Spatial Representations Of Rodent Hippocampal Place Cells". In: *Gulf Coast Undergraduate Research Symposium*. Houston, TX.

ELEC 220 Lab Assistant

Rice University

📅 Spring 2020

Assisted Professor in the Practice Ray Simar in conducting labs and transferring content online via Zoom during the COVID-19 Pandemic for Fundamentals of Computer Engineering. We were regarded by the University as an example for other courses involving computational and hardware components to move online in the future.

COMP 140 Teaching Assistant

Rice University

📅 Fall 2019

Responsibilities include: leading review sessions, creating exam review material, grading exams and projects, and holding weekly office hours to assist students in mastery of material. Check out some of the material I provide here.

NEUR 385/585 Teaching Assistant

Rice University

📅 Fall 2018

Responsibilities include: leading review sessions, creating exam review material, grading exams and projects, and holding weekly office hours to assist students in mastery of material. Check out some of the material I provide here.