Emma Susi

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EDUCATION

Florida Atlantic University, Boca Raton, FL — ***December 2023***
Bachelor of Science in Neuroscience and Behavior
GPA: 3.75 / 4.0 (*magna cum laude*)

Kansai Gaidai University, Osaka-Shi, Japan — ***December 2022***
Asian Studies Program

RESEARCH EXPERIENCE

National Science Foundation I-Corps — Boca Raton, Florida
Entrepreneurial Lead — January 2024 - Present
Advisor: Regina Thompson
Project: Market Analysis for Low-cost Assistive Communication Brain-Computer Interfaces

- Conducting extensive market research and customer discovery to identify potential applications and market opportunities for EEG-based assistive communication
- Honing effective communication and pitching skills through presentations to industry experts, investors, and potential customers
- Developing a business model canvas, outlining key value propositions, customer segments, revenue streams, and cost structures for the commercialization of EEG-based assistive communication

Machine Perception and Cognitive Robotics Lab (MPCR) — Boca Raton, Florida
Undergraduate Student Researcher — March 2023 - Present
Advisor: William Hahn, Ph.D.
Project: Low-cost Assistive Communication Brain-Computer Interface

- At the intersection of neuroscience and technology, employed EEG and EMG recording systems, biofeedback devices, and Python programming (SciPy, NumPy, Matplotlib, and Pyaudio) to develop innovative solutions for complex challenges in conjunction with machine learning algorithms to design, develop, and optimize novel neuromuscular interfaces and communication devices
- Initiated a project to develop a low-cost brain-computer interface for individuals affected by ALS or stroke, utilizing biofeedback, Python for visualization and analysis of EMG data, and an HTML-based interface to facilitate patient communication
- Developed a Python-based program to decode biosignal data streams by identifying threshold-passing spikes in motor neuron activity, translating these spikes by differentiation based on impulse duration above the threshold
- Awarded the FAU Wave grant to fund the further development of an EEG-based assistive communication device using event-related potentials

Neuroscience Institute at FAU Wilkes Honors College — Jupiter, Florida
Undergraduate Student Researcher — August 2021 - Present
Advisor: Robert Stackman, Ph.D.

- Investigated head direction cells' role in spatial navigation and dopaminergic influences on memory consolidation through execution of behavioral tasks using the Morris Water Maze, tissue extraction and processing, as well as mounting and staining of brain slices for neuronal activity analysis via fluorescent histology
- Used laboratory techniques, including mouse handling (scruffing, injections, and euthanasia), ensuring adherence to ethical and safety protocols

Project: DeepEthogram Machine Learning Behavior Analysis

- Leading the effort to introduce and train the "Deep Ethogram" machine learning algorithm for the analysis of mouse behavior patterns to integrate artificial intelligence technologies into the lab to enhance research capabilities
- Conducting evaluations by comparing the performance of the machine learning algorithm against traditional manual scoring methods for tracking mouse behavior
- Documenting methodologies and results to contribute to the neuroscience community's understanding of AI applications in behavioral research

Barb Schmidt Fellowship Boca Raton, Florida
Fellow July 2021 - June 2022

- Enrolled in Barb Schmidt Fellowship for 6 university credits, participating in bi-weekly workshops to develop the skills and knowledge needed to initiate, execute, and sustain a social movement
- Co-founded a student-led organization focusing on providing students impacted by income inequality with creative outlets and cultural experiences
- Presented organization to potential donors and awarded a $1000 grant to fund the organization’s first event

Veterans Affairs Hospital Bedford, Massachusetts
Research Intern and Hospital Volunteer July 2021 - August 2021
Advisor: Joan Clifford, Ph.D.
Project: Internal Analysis of VA Vaccination Response

- Conducted internal analysis of VA hospitals to ensure efficient vaccine response to prevent hospital overcrowding
- Systematically organized and coded data, information, and procedures into spreadsheets to develop a versatile toolkit, optimizing vaccine response strategies for states and communities with varying resource availability
- Program successfully contributed to VA vaccination rates by ensuring a safe and efficient vaccine response system through comprehensive data collection and analysis on diverse global COVID-19 vaccine response systems to identify best practices

PRESENTATIONS

Susi, E. *Enhancing Communication Accessibility: EEG-Based Neuro-Interfaces*. Florida Atlantic University Wave Competition, Boca Raton, FL, poster presentation: March, 2024.

INSTRUCTIONAL ACTIVITY AND MENTORING

MarcoLearning Remote
Student Grader February 2023 - Sep 2023

- Assisted teachers by efficiently grading academic assignments, contributing to students' educational success
- Demonstrated subject matter expertise and attention to detail, collaborating effectively with the Marco Learning team to ensure accurate, fair evaluations and timely feedback
- Maintained a solid commitment to professional development, staying current with pedagogical best practices and enhancing grading techniques to better serve students and educators

KidsPass Remote
Tutor March 2023 - Sep 2023

- Tutored students unable to attend in-person sessions, creating personalized learning plans and assignments to cater to individual student needs and promote academic growth
- Conducted engaging one-on-one sessions with students, adapting teaching strategies to optimize learning outcomes and foster a supportive educational environment

FAU High School Peer Mentoring Program Boca Raton, Florida
Mentor May 2022 - May 2023

- Enrolled in a bi-weekly 3-credit peer mentoring course to develop leadership, teaching, and communication abilities to ensure an effective and comfortable environment for students
- Coordinated weekly sessions with a group of five dual-enrolled sophomore students, acting as an advisor and mentor to help ease their transition from high school to university, socially and academically
- Created and conducted activities and lessons tailored to the student's needs, such as lessons regarding learning styles, goal-setting, and stress management, as well as Socratic seminars pertaining to reasons behind procrastination

INVOLVEMENT

Neuroscience Club - *Member* April 2022 - Present

Kansai Gaidai Outdoors Club - *Member* August 2022 - December 2022

Arts4Hearts - *Co-Founder* August 2021 - June 2022

Student-Athlete Leadership Team (SALT) - *Board Member* December 2021 - May 2022

Student Government - *Senior Class Representative* August 2021 - May 2022

American Medical Student Association - *Member* August 2019 - May 2022

FAU High School Varsity Track and Field - *Athlete* November 2018 - May 2022

SKILLS

Wet Lab Skills

- Clearing and Staining Tissue
- Morris Water Maze
- Novel Object Recognition
- Fluorescent Histology
- Confocal Microscopy
- Mounting Brain Slices
- Brain Extractions
- Mouse Euthanasia
- Scruffing and Injecting Mice
- Mixing Chemicals

Technical Skills

- Python (pandas, scipy, matplotlib, numpy, tkinter, object-oriented programming)
- Manual Behavior Analysis and Scoring
- Electromyography and Electroencephalography Analysis
- SPSS
- Machine Learning Model Organism Behavior Analysis (DeepEthogram, DeepLabCut)
- Currently Learning: Wolfram Alpha, TensorFlow

Languages

English - Fluent

Spanish - B1 Proficiency

Japanese - N5 Proficiency

Laboratory Training

Environmental Health and Safety Training (EH&S) - Laboratory Safety, Fire Safety and Prevention, Fire Extinguisher Training, Hazard Communication, Hazardous Material Handling and Storage, Hazardous Waste Generator, Bloodborne Pathogens Training, Biosafety Hazardous Waste Handling and Disposal

CITI - Mandatory General Training for All Animal Users, Reducing Pain and Distress in Laboratory Mice and Rats, Responsible Conduct of Research, Working with Mice in Research

IACUC - Rat/Mouse and Ethics Certification

AWARDS AND HONORS

FAU Wave Competition - 1st Place

Dr. Eric H Shaw Florida Atlantic Excellence in Innovation Award

FAU Wave Competition Grant Recipient

Barb Schmidt Fellowship Grant Recipient

President's List - 2020

Dean's List - 2020, 2022, 2023

FAU Education Abroad Scholarship

Spirit of the Atlantic Scholarship

FAU Foundation Scholarship

National Hispanic Recognition Program

FHSAA Track and Field District Champion - 2019, 2022

FHSAA Track and Field Regional Champion - 2022