

EDUCATION

UNIVERSITY OF CALIFORNIA, SAN DIEGO

Bachelor of Science, Cognitive Science (Machine Learning & Neural Computation)

Expected Graduation: June 2025

- Minor, Data Science

INDEPENDENT RESEARCH

MindGPT | Personal Project

06/24 – Present

- Developing a Cognitive Neural Language Technology that integrates biological learning principles into AI architectures, moving away from traditional transformer models
- Designing adaptive neural networks that simulate cognitive processes, merging computational neuroscience and machine learning for real-time learning from environmental interactions
- Potential collaborations with Neuroscience Gateway for cross-disciplinary input from UCSD, University College London, and Yale

RESEARCH LABS & PROGRAMS

Brain Organoid Interfaces & Growing Complex Neural Tissue | Muotri Lab, UCSD

12/21 – Present

- Led research on brain organoid interfaces, focusing on bidirectional interactions with robots
- Applied reinforcement learning to enhance robot adaptability based on neural activity feedback from organoids
- Modeled neural system adaptability in dynamic environments, advancing neural interface technologies

New Llm Principles Development | Mukamel Lab, UCSD

04/23 – Present

- Developing Computational-BiologicalGPT for neural dataset analysis
- Focused on sequencing the human genome and exploring the genetic implications in neurological disorders

Optogenetic Patterning in Cortical Organoids | UCLEADS Symposium, Berkeley

12/24

- Researched optogenetic systems and nano-electrode arrays to analyze neural activity related to learning and memory
- Developed methods for electrical stimulation and patterning in cortical organoids for neural tissue engineering

Pyramidal Neuron Cell Marker Prediction | UCLEADS Program, UCSD

06/23 - 08/23

- Created predictive model to identify pyramidal neuron cell markers in the prefrontal cortex using gene expression data
- Advanced the understanding of cognitive processes through neuron-type mapping in human and rodent brain samples

EEG-Based Machine Learning for Predicting Brain Dynamics | McNair Program, UCSD

06/22 - 08/22

- Built an EEG-based machine learning model predicting organoid age to study brain development
- Analyzed neural dynamics data to improve techniques for studying brain maturation and cognitive functions

Neuromatch Academy

- **Computational Neuroscience Program** 06/22 – 08/22
Analyzed neuronal spiking patterns related to decision-making, along global experts in neuroscience and AI
- **Deep Learning Program** 06/23 – 08/23
Applied reinforcement learning to adaptive agents in virtual environments, refining expertise in AI neural simulations
- **NeuroAI Program** 06/24 – 08/24
Conducted multifaceted projects, including modeling goal-directed navigation and analyzing motor neuron recordings, using principles from neuroscience, AI, and cognitive science to study adaptive systems

EXPERIENCE

- Lab Technician, Researcher, and Data Manager** | *UCSD Muotri Lab (Stem Cell Program)* 12/21 – Present
- Developing lab's database for organizing and accessing research data, enhancing collaboration and data-driven analysis
 - Developing lab's website to streamline information sharing and external collaborations
 - Constructing biocomputing programs and analysis tools for Brain Research
- Operations Lead & Software Engineer** | *UCSD IT Services* 07/23 – Present
- Lead development of TritonGPT & TritonGPT Academic Assistant to support instructional task and student learning
 - Managed team of twenty students, overseeing over ten campus wide projects
 - Lead UCSD IT Internship Apprenticeship Initiative to raise funding & provide students with IT industry experience
- Blackstone LaunchPad** | *UCSD the Basement* 09/22 – 12/23
- Gained hands-on experience developing virtual reality environments for embodied agents and AI simulations
 - Led a team in developing VR-based systems that integrate cognitive models, enhancing user interaction research
 - Acquired software development, data management, and cloud computing knowledge
- Warehouse Manager** | *Yusen Logistics Co., LTD.*, Los Angeles, CA 01/09 – 01/14
- Cultivated and mentored 50+ warehouse employees, driving a 150% revenue increase over 3 years
 - Streamlined inventory control systems and troubleshooting processes for data accuracy and operational efficiency

ACADEMIC COURSES & RELEVANT PROJECTS

- COGS 188: Artificial Intelligence Algorithms** 03/24 – 06/24
- Developed a reinforcement learning agent that adapted behavior in simulated environments through feedback
 - Enhanced understanding of RL and AI principles directly applied in research projects at the Muotri Lab
- BIMM 143: Bioinformatics** 03/24 – 06/24
- Analyzed RNA-Seq cancer mutation data to identify key gene regulation pathways
 - Developed critical bioinformatics skills for processing and analyzing high-dimensional data
- COGS 118C: Neural Signal Processing** 01/24 – 03/24
- Focused on advanced techniques like Fourier transforms and power spectral density analysis to study brain signals
 - Aligned this knowledge with machine learning projects to interpret neural data
- NEUROSCIENCE GRADUATE 221: Advanced Topics/Neuroscience** 09/23 - 12/23
- Applied computational methods to brain cell sequencing data, exploring molecular diversity and cognitive function
 - Culminated in a project investigating brain cell diversity's implications for neurological disorders
- COGS 108: Data Science in Practice** 01/23 – 03/23
- Led a project creating a predictive model for neuronal density in brain organoids, focusing on drug responses
 - Applied advanced data science techniques in gene expression analysis, contributing to biological research

PRESENTATIONS & CONFERENCES

- UC San Diego Summer Research Conference, UC LEADS-STARS Program** 08/24
- Goal-Directed Navigation and Motor Neuron Recordings
- Neuromatch Academy** 07/22 – 07/24
- UC LEADS Symposium, UC Berkeley** 12/23
- Optogenetic Patterning in Cortical Organoids
- UC San Diego Summer Research Conference, UC LEADS-STARS Program** 08/23
- Pyramidal Neuron Cell Marker Prediction
- SACNAS NDISTEM Conference, McNair Program** 08/22
- EEG-Based Machine Learning for Predicting Brain Dynamics

TECHNICAL SKILLS

Programming & Development:

- *Languages:* Python, C++, R, SQL, Vue.js , Flutter, HTML/CSS, JavaScript
- *Frameworks & Libraries:* Danswer, TensorFlow, PyTorch, Keras, Langchain
- *Web Development & App Interfaces:* Web apps, mobile interface
- *API Development:* RESTful API development and integration
- *Deep Learning:* Reinforcement Learning (DQN, PPO, Q-Learning), CNN, RNNs
- *NLP:* GPT, BERT, Transformer models

AI Engineering:

- *AI & Cognitive Systems:* Agents & Memory Management, AI chatbots, AI tutor/assistant systems
- *TritonGPT Contributions:* Backend development, SSO integration, Kubernetes & Helm orchestration
- *Event Capture:* Implemented event capture system using Caliper Events for user interaction analytics

Cognitive Science, Neuroscience, and Bioinformatics Tools:

- *Neuroscience:* MNE-Python, Scanpy, BioPython,
- *Neurocomputational Models:* Spiking neural networks, bioinspired computation, neural activity modeling
- *Cognitive Modeling:* Simulation of cognitive processes, learning & decision-making models
- *Bioinformatics Tools:* RNA-Seq, DNA-Seq, Bowtie2, BLAST
- *Data Science & Visualization:* Jupyter Notebooks, Pandas, Scikit-learn, Matplotlib, Seaborn
- *Experimental Design:* jsPsych for neuroscience experiment design & analysis

Robotics & Wetware Integration:

- *Robotics:* Raspberry Pi, sensor integration for brain-machine interfaces
- *Electrostimulation setups:* Electrophysiology, neural feedback systems, Neuronexus Probe wetware integration

Virtual Environments for Embodied Agents:

- *Virtual Reality:* AltspaceVR, Oculus SDK
- *3D modeling software:* Maya
- *C. elegans NeuroAI Platform:* VR-based simulations for neuroscience research and agent behavior analysis

Cloud Computing & Infrastructure:

- *Platforms:* AWS (FaaS, AWS CLI, Secrets Manager), Google Cloud, Microsoft Azure
- *Virtualization & Containers:* Docker, Kubernetes, Helm for container orchestration
- *Serverless Architectures:* FaaS integration, AWS serverless functions and automation

Database Management & Data Analysis:

- *Database Systems:* PostgreSQL, MySQL
- *Data Integration:* Building apps to manage records & query data securely across large-scale environments

DevOps & Security:

- *CI/CD Tools:* Bamboo Build Plans, Postman, Docker
- *Security Protocols:* UCSD ITS Security, Wireshark, ClamAV, SAML-SSO, API Security
- *Version Control:* Git (GitHub, GitLab), Visual Code, Sourcecode

Soft Skills:

- Fluent in Spanish, Beginner in Mandarin
- Business digital literacy and phone-based customer service
- Experience mentoring and leading student teams in technical and research projects