LAURA FLEIG

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EDUCATION

University of California, San Diego   La Jolla, CA
Bachelor of Science in Cognitive Science (Machine Learning & Neural Computation)   *Sept 2021 – June 2025*
Minor in Mathematics
Cumulative GPA: 4.0

RESEARCH EXPERIENCE

Honors Thesis Student   *May 2024 – Present*
Department of Cognitive Science, UC San Diego | *Advisor: Dr. Virginia de Sa*
- Lead a research project integrating Facial Expression Recognition with Large Language Models to help virtual agents better understand the user's affective state, particularly in educational settings.
- Build multi-modal vision-language machine learning models that fuse video and text input.

Undergraduate Research Assistant   *Sept 2023 – Present*
Department of Music, UC San Diego | *Advisors: Dr. Shlomo Dubnov, Dr. Ross Greer*
- Investigate human-robot interaction in musical settings, focusing on nonverbal communication between musicians and a robotic conducting agent, as part of an ongoing research project.
- Programmed a camera-based robotic interface capable of detecting specific gestures from musicians and responding with appropriate movements, using Python for gesture detection and C++ for pitch analysis, enabling real-time interaction.
- Led literature review and contributed substantially to system design and two research papers.

Undergraduate Research Assistant   *Aug 2024 – Present*
Department of Electrical & Computer Engineering, UC San Diego | *Advisor: Dr. Mohan Trivedi*
- Contribute to a multi-year project aimed at classifying drivers' alcohol impairment levels using multi-modal data.
- Assist in data preparation and preprocessing for machine learning experiments, working with multi-camera footage, thermal imaging, and driving behavior metrics.

PUBLICATIONS

1. Greer, R., **Fleig, L.**, Dubnov, S. *Creativity and Visual Communication from Machine to Musician: Sharing a Score through a Robotic Camera.* EAI ArtsIT Conference Proceedings, 13th EAI ArtsIT Conference 2024, New York University, Abu Dhabi, Nov 2024. Publication pending.
2. Greer, R., **Fleig, L.**, Dubnov, S. *ImproVision Equilibrium: Towards Multimodal Musical Human-Machine Interaction.* Under review.
3. Greer, R., Viborg Andersen, M., Gopalkrishnan, A., Rattigan, J., **Fleig, L.**, Marcotte, T., Trivedi, M. *Multimodal Machine Vision Analysis of Driver Activity and Driving Performance Under the Influence of Alcohol.* Manuscripts under preparation.

LEADERSHIP & PROFESSIONAL EXPERIENCE

Student Developer   *April 2024 – Sept 2024*
Laboratory for Emerging Intelligence, UC San Diego
- Contributed to an interdisciplinary project developing an AI-driven learning hub for higher education, piloted in 2 UC San Diego classes and scheduled for rollout to ~600 students in Fall 2024.
- Designed and developed LLM-based interactive math modules for the AI tutor, supporting incoming students with math placement test preparation; improved platform usability through prompt engineering, creating rubrics to evaluate performance, UI/UX testing, and code review to identify and integrate classroom workflows.

Undergraduate Teaching Assistant   *Sept 2023 – June 2024*
Department of Cognitive Science, UC San Diego
- Introduction to Statistical Analysis (300 students; Fall 2023) & Introduction to Python (600 students; Spring 2024)
- Responsibilities included leading weekly discussion sections, holding weekly office hours, grading exams and coding labs, proposing exam questions, creating review materials, and monitoring an online discussion platform.

President   *Sept 2021 – Present*
Symphonic Student Association, UC San Diego
- *President, 2024-Present:* Lead a student-run classical music organization for undergraduates and graduates; responsibilities include managing a 19-member board in weekly meetings, collaborating with the music department and other organizations, and organizing concerts, field trips, and social events, including an annual concert at UC San Diego's 2850-seat amphitheater.
- *Audio/Video Chair, 2022-2024:* Responsible for photography and videography of events and concerts, video editing, and managing the organization's YouTube channel.

RELEVANT PROJECTS

Exploring Convolutional Neural Networks for Facial Expression Recognition   *Jan 2024 – March 2024*
Final project for *ECE 176–Deep Learning and Applications*
- Designed and evaluated four progressively complex CNN architectures with squeeze-and-excite attention mechanisms for facial expression recognition, implementing comprehensive data augmentation and semi-supervised learning techniques.

Transcript Assistance Tool   *Sept 2023 – Dec 2023*
Final project for *LIGN 167–Deep Learning for Natural Language Understanding*
- Built web application for improving lecture video accessibility using OpenAI's Whisper API for synchronized transcription and GPT-4 for real-time translation, summarization, and explanation of selected transcript segments.
- Invited to Student Developer position (above) following project completion.

ADDITIONAL

Technical Skills:
- Programming Languages: Python, R, C++
- Machine Learning/Computer Vision: TensorFlow, PyTorch, OpenCV, MMPose
- Data Analysis & Visualization: NumPy, Pandas, Matplotlib, Seaborn

Languages: English (native); German (native); French (conversational proficiency)
Awards: Provost Honors (2021-2024)
Activities: Muir Musical (piano/keyboard; rehearsal pianist), Cognitive Science Student Association
Interests: Reading, classical music, musical theater

REFERENCES

Dr. Ross Greer, *Asst. Prof. of Computer Science*
UC Merced
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Dr. Virginia de Sa, *Prof. of Cognitive Science*
UC San Diego
desa@ucsd.edu

Dr. Mohan Trivedi, *Prof. of Electrical and Computer Engineering*
UC San Diego
mtrivedi@ucsd.edu