

# Amber Hsiao-Yang Chou

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I am a PhD student in Electrical and Computer Engineering (ECE) at the University of Washington (UW). I am interested in integrating physiological sensing, including peripheral neural signals, eye movements, and gestures, to understand motor control in **human-machine interaction**. I leverage control theory, data-driven algorithms, and insights from experiments to enhance the usability of multimodal interfaces for applications in assistive technology and rehabilitation.

## Education

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### University of Washington, Seattle

Ph.D. in Electrical and Computer Engineering | Advisor: Samuel A. Burden

Concentration: Human-Computer Interaction, Sensorimotor Control, Neuroengineering

Passed the PhD Qualifying Exam May 2022

Seattle, WA

Sep. 2020 – Present

### University of California, Davis

M.S. in Biological Systems Engineering | Advisor: Farzaneh Khorsandi

Davis, CA

Sep. 2018 – Sep. 2020

### University of California, Davis

B.S. in Biological Systems Engineering

Davis, CA

Aug. 2014 – Sep. 2018

## Research Experiences

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### Graduate Student Researcher | BioRobotics Lab

Seattle, WA | Sep. 2020 - Present

- Designed and programmed a multimodal interface, integrating surface EMG and an eye-tracking headset, capable of adapting to individuals across diverse human-computer tasks such as tracking, pointing, and drawing [P5].
- Designed and conducted human-subject experiments for modeling users in multimodal interfaces [P5, P3, L2].
- Enhanced closed-loop human-machine interactions using game theory and machine learning algorithms [P3, L4].
- Served as a scrum master in collaborative projects, designing interfaces that integrate haptic devices, gesture recognition technology, and a motion capture system within agile processes with rapid sprints [P4].

### Graduate Student Researcher | Machine Systems Lab

Davis, CA | May 2018 – Sep. 2020

- Developed and tested a navigation and steering system for the autonomous All-terrain Vehicle (ATV) based on GPS and image processing using Robotic Operation System (ROS) and OpenCV [P1, L1].
- Conducted outdoor field tests to evaluate the autonomous ATV and its safety systems.
- Collaborated on 3 projects including the development of the first ATV safety test station in the US, evaluating ATV safety for kids, and designing a chemical spraying system for orchards to improve safety for farmers.

### Sensor Engineering Intern | TacSense Inc.

Woodland, CA | Feb. 2016 – June 2018

- Integrated and tested pressure sensors into wearable products and assisted in prototyping for medical applications.
- Troubleshooted production issues in two research projects including fluid pressure and material strength analysis.
- Developed CAD designs for demonstration, documentation, and rapid prototyping.
- Skilled interpersonal communicator in both one-on-one and group settings.

## Archival Publications

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- P5. **Chou A. H.Y.**, Li S.J., Madduri M., Christensen A., Hutchison F., Burden S. A., Orsborn A. L. Using Eye Gaze to Train an Adaptive Myoelectric Interface. *Under review*. | bioRxiv | video demo
- P4. Li S.J., Madduri M., **Chou A. H.Y.**, Burden S. A., Orsborn A. L. Influencing Task Performance in Novel Hybrid Myoelectric Interfaces Through Decoder Adaptation. *In preparation*.
- P3. Yamagami M., Madduri M., Chasnov B., **Chou A. H.Y.**, Peterson L. N., Burden S. A. Co-adaptation improves performance in a dynamic human-machine interface. *In preparation*. | bioRxiv
- P2. Cashaback J. G.A., Allen J. L., **Chou A. H.Y.**, Lin D. J., Mangalam M., Price M. A., Secerovic N. K., Song S., Zhang H., Miller H. L. NSF DARE—transforming modeling in neurorehabilitation: a patient-in-the-loop framework. *Journal of Neuroengineering and Rehabilitation*. 2024. | Link
- P1. **Chou, H. Y.**, Khorsandi, F., Vougioukas, S. G., Fathallah, F. A. Developing and evaluating an autonomous agricultural all-terrain vehicle for field experimental rollover simulations. *Computers and Electronics in Agriculture*. 2022. (Vol.194, p. 106735). | Link

## Lightly Reviewed Publications

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- L5. **Chou A. H.Y.**, Madduri M., Li S.J., Burckhardt S., Christensen A., Hutchison F., Orsborn A. L., Burden S. A. Design principles for co-adaptive, multimodal interfaces. *ACM SIGCHI '24: Human-Factors in Computer Systems, PhysioCHI Workshop: Towards Best Practices for Integrating Physiological Signals in HCI*. 2024.
- L4. Pfister A., Madduri M., **Chou A. H.Y.**, Burden S. A. Matching User and Machine Learning Rates in Co-Adaptive Closed-Loop Myoelectric Interfaces. *IEEE Conference on Neural Engineering and Rehabilitation 2023*.
- L3. Peterson L. N., **Chou A. H.Y.**, Burden S. A., Yamagami M. Predictive Model of EMG and Manual Interfaces for Human Machine Interaction. *IFAC-PapersOnLine*, 55(41), pp.1-6. 2022. | [Link](#)
- L2. **Chou A. H.Y.**, Yamagami M., Burden S. A. Evaluating a Human/Machine Interface with Redundant Motor Modalities for Trajectory-Tracking. *IFAC-PapersOnLine*, 55(41), pp.125-130. 2022. | [Link](#)
- L1. **Chou H. Y.**, Khorsandi F. Developing and Testing a GPS-Based Steering Control System for an Autonomous All-Terrain Vehicle. *ASABE Annual Conference 2020*. | [Link](#)

## Honors & Awards

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UW Graduate & Professional Student Senate (GPSS) Travel Grant	Feb. 2024
Amazon Elevate Fellowship Funds (\$10,000 award, 3 awardees)	Dec. 2023
UW NeuroTechnology, Engineering & Computing International Travel Award	Apr. 2023, Feb. 2024
UW ECE DEI Travel Award	Apr. 2023
Fellow at NSF Disability and Rehabilitation Engineering (DARE) [P5]	Mar. 2023
UW ECE sponsorship for the Women in Science and Engineering (WISE) Conference	Feb. 2021
UC Davis Peter J. Shields and Henry A. Jastro Research Award	2019-2020
UC Davis Bio and Ag Engineering Graduate Student Researcher Fellowship	2018-2020
UC Davis Jastro-Shields Travel Award	Apr. 2018
Robert Roy Owen Scholarship & Howard R. Murphy Scholarship	2017-2018
UC Davis Dean's Honor List in College of Engineering	2015, 16, 18

## Skills & Coursework

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**Technical Skills:** Experimental Design, Problem Identification and Formulation, Data Analysis, Scientific Writing

**Soft Skills:** Project Management, Problem-solving, Collaboration, Mentoring

**Programming languages:** Python, Matlab

**Software & Tools:** ROS, OpenCV, PyTorch, Arduino, Raspberry Pi, Labgraph (Meta), SolidWorks, Inkscape, LaTeX

**Operating Systems:** Microsoft Windows, macOS, Linux

**Relevant Coursework:** Control Theory, Game Theory, Machine Learning, Computer Vision, Robotics, Statistics, Probability, Signal Processing, Data Analysis, Neural Engineering, Deep Learning for Neuroscience

## Teaching

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<b>Teaching Engineering   Teaching Assistant</b>	Seattle, WA   Spring 2024
<ul style="list-style-type: none"><li>• Grade homework and assist projects for 50+ undergraduate students.</li><li>• Taught a lesson about making and presenting academic posters.</li></ul>	
<b>Engineering Design and Communication   Teaching Assistant</b>	Davis, CA   Fall 2019
<ul style="list-style-type: none"><li>• Led undergraduate engineering design and communication labs, studios, and workshops.</li><li>• Assisted in organizing the research showcase for 100+ undergraduate students.</li></ul>	
<b>Engineering Economics   Teaching Assistant</b>	Davis, CA   Winter 2019, 2020
<ul style="list-style-type: none"><li>• Assisted in teaching undergraduate engineering economics class with 80+ students.</li><li>• Led office hours and guided students' class projects.</li></ul>	
<b>Classical Physics   Lab Teaching Assistant</b>	Davis, CA   Spring 2019
<ul style="list-style-type: none"><li>• Taught 4 undergraduate physics labs with a total of 80+ students.</li></ul>	

## Mentorship

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Liya Hutchison, <i>UW undergraduate</i>	Winter 2023 - Present
Emmy Chow, <i>UW ECE PhD</i>	Fall 2023 - Present
Andrew Christensen, <i>UW HCDE undergraduate</i>	Spring 2023 - Spring 2024
Annika Pfister, <i>Wellesley Neuroscience, now PhD student at UW</i>	Summer 2022
Lauren Peterson, <i>UW ECE undergraduate, now PhD student at Rice</i>	Winter - Spring 2021
Alexis Blakes, <i>UW Center for Neurotechnology Research REU student</i>	Summer 2021

## Presentations

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• Poster presentation, Neural Control of Movement (NCM) <i>Enhancing Co-Adaptive Myoelectric Interfaces with Eye Tracking</i>	Apr. 2024
• Lightning talk and poster presentation, UW ECE Research Showcase	Mar. 2024
• Oral Presentation, UW Elevate program partnership with Amazon Robotics <i>Personalized Multimodal Human-Machine Interfaces</i>	Feb. 2024
• Poster presentation, Women in NeuroAI, UW Center for Neurotechnology <i>Using Eye Tracking to Train Adaptive Myoelectric Interfaces</i>	Feb. 2024
• Poster presentation, Neural Control of Movement (NCM) <i>Uncontrolled manifold emerges from coordinated feedback in human-machine interaction</i>	Apr. 2023
• Lightning talk and poster presentation, UW ECE Research Showcase	Mar. 2023
• Poster presentation, NSF Disability and Rehabilitation Engineering (DARE) <i>Uncontrolled manifold emerges from coordinated feedback in human-machine interaction</i>	Mar. 2023
• Oral and poster presentation, IFAC Workshop on Cyber-Physical Human System (CPHS) <i>Evaluating a Human/Machine Interface with Redundant Motor Modalities for Trajectory-Tracking</i>	Dec. 2022
• Poster presentation, UW WomXn at the Forefront of ECE Research <i>Optimally Combine Sensorimotor Pathways in Human-Machine Task with Multiple Sensory Modalities</i>	Dec. 2021
• Oral presentation, American Society of Agricultural and Biological Engineers (ASABE) <i>Developing and Testing a GPS-Based Steering Control System for an Autonomous All-Terrain Vehicle</i>	July 2020
• Poster presentation at the ASABE CA-NV Section meeting in Tulare, CA	Feb. 2020
• Oral presentation, American Society of Agricultural and Biological Engineers (ASABE) <i>Developing and Testing an Autonomous All-Terrain Vehicle to Experimentally Test Rollover Incidents</i>	July 2019
• Poster presentation at the International Society for Agricultural Safety and Health (ISASH) <i>Developing an Autonomous All-Terrain Vehicle to Evaluate Performance of Crush Protection Devices in Rollover Incidents.</i>	June 2019
• Poster presentation, UC Davis Engineering Senior Design Showcase <i>Semi-autonomous temperature monitoring system of large-scale poultry compost windrows</i>	June 2018

## Services & Outreach

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<b>K12 Outreach, Engineering Discovery Days</b>	May 2024
• Presented EMG-controlled devices and organized hands-on activities for 4th through 8th-grade students.	
• Mentored three undergraduate students in making a poster and facilitating interactive activities.	
<b>Student Representative, ECE Faculty Search Committee</b>	Winter - Spring 2024
• Organized and facilitated student meetings with 10 faculty candidates.	
• Attended search committee meetings and provided collected feedback from attendees.	
<b>Co-Chair, WomXn at the Forefront of ECE Research Conference (WAFER)   Link</b>	Fall 2023
• Organized WAFER with 100+ attendees to highlight research conducted by women and non-binary individuals.	
• Invited speakers including faculty and industry leaders from Amazon, Boeing, Impinj, Meta, and Microsoft.	
<b>Organizing Member, UW ECE Graduate Student Coffee Chat</b>	Fall 2023 - Present
• Organizing monthly graduate student coffee chats for networking and community building.	
<b>Seminar Host, DUB (Design, Use, Build)   Link</b>	Spring 2023 - Winter 2024
• Hosted and moderated the weekly DUB seminars with 100+ attendees from the HCI community.	
<b>Conference Moderator, NSF Disability and Rehabilitation Engineering (DARE)   Link</b>	Mar. 2023
• Moderated conference presentations and took notes as an NSF DARE fellow.	

**Mentor, UW ECE Graduate Application Support Program***Fall 2021, Fall 2022*

- Mentored a total of six undergraduate students and provided feedback on their graduate school applications.

**Outreach, World Agricultural Expo***February, 2020*

- Presented posters and hosted a booth to promote Crash Protection Devices (CPD) for All-Terrain Vehicle (ATV) rollover crashes to researchers and farmers at the Ag Expo (Tulare, CA).

## References

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**Samuel A. Burden (PhD advisor)**

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and Agricultural Engineering  
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