

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

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

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 [P10].
- Designed and conducted human-subject experiments for modeling users in multimodal interfaces [P10, P9, P3].
- Enhanced closed-loop human-machine interactions using game theory and machine learning algorithms [P7, P5].
- 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.

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 [P2, P1].
- 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.

Publications

- P10. **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](#)
- P9. **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.*
- P8. 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.*
- P7. 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](#)
- P6. 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.* | [Link](#)

- P5. 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*.
- P4. 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](#)
- P3. **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](#)
- P2. **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](#)
- P1. **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

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

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

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

Mentorship

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

Presentations

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

Services & Outreach

- Student Representative, ECE Faculty Search Committee** Winter - Spring 2024
 - Organized and facilitated student meetings with faculty candidates, and collected feedback from attendees.
- Co-Chair, WomXn at the Forefront of ECE Research Conference (WAFER) | Link** 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.
- Organizing Member, UW ECE Graduate Student Coffee Chat** Fall 2023 - Present
 - Organizing monthly graduate student coffee chats for networking and community building.
- Seminar Host, DUB (Design, Use, Build) | Link** Spring 2023 - Winter 2024
 - Hosted and moderated the weekly DUB seminars with 100+ attendees from the HCI community.
- Conference Moderator, NSF Disability and Rehabilitation Engineering (DARE) | Link** 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

Samuel A. Burden (PhD advisor)

Associate Professor, Electrical & Computer Engineering
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Amy Orsborn

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Rice University
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Farzaneh Khorsandi (MS advisor)

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and Agricultural Engineering
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