

Luis H. Cubillos

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About

Luis is a passionate engineer, with a background in Computer Science and Robotics, who focused during his Ph.D. on applying ML models to physiological signals such as from the brain and muscles and has published his work on top venues such as NeurIPS. He is looking for job opportunities related to signal processing and ML for health and wearable applications.

Education

University of Michigan - Cortical Neural Prosthetics Lab

Ph.D. in Robotics

Ann Arbor, USA

January 2021 – January 2025

Pontificia Universidad Católica de Chile

Professional Degree in Computer Science (similar to Master's degree)

Ranked among the top 10% of his class.

Santiago, Chile

March 2017 – August 2018

Pontificia Universidad Católica de Chile

B.Sc. Degree in Autonomous Systems and Robotics Engineering

Ranked among the top 10% of his class.

Santiago, Chile

March 2013 – August 2018

Notable Projects Led

Explainable deep learning for brain-machine interfaces

- Worked implementing KalmanNet, a variation of the Kalman filter that incorporates deep learning, to predict finger movements from intracortical brain data. Ran offline and real-time experiments with monkeys.
- Achieved results similar to the state-of-the-art while maintaining an explainable structure.
- Paper got accepted at NeurIPS 2024.

Brain and muscle synergies for brain-machine interfaces

- Studied how brain and muscle synergies can be used for compression, denoising, or generalization in decoding brain and muscle data into finger kinematics.
- Found benefits in compression but not in denoising and compression.
- Presented these results in two conferences: IEEE NER 2023 and SfN 2023. The manuscript is currently in preparation.

Open-source upper-limb myoelectric prosthesis

- Developed High-Five, the first Chilean upper-limb myoelectric prosthesis, using surface EMG electrodes to control a five DoF hand.
- Implemented code in C++, designed printed circuit board, and designed parts of the prosthetic device in CAD.
- Released the prosthesis as open-source, available [here](#).

Open-source web application for motor learning researchers

- Developed full backend and frontend of an open-source web application in Python and Javascript for motor learning researchers studying procedural skill learning with no coding experience.
- Ran a user study comparing in-lab to at-home experiments, showing we could replicate a previous study finding micro-learning.
- Published the results in the journal of Computers in Biology and Medicine.

Selected Publications

1. Exploring the trade-off between high-performing deep-learning and explainable models for brain-machine interfaces (*NeurIPS*, 2024). **L. Cubillos**, ..., C. Chestek. [DOI](#)
2. Balancing Memorization and Generalization in RNNs for High Performance Brain-Machine Interfaces (*NeurIPS*, 2023). J. Costello, H. Temmar, **L. Cubillos**, ..., C. Chestek. [DOI](#)
3. Artificial neural network for brain-machine interface consistently produces more naturalistic finger movements than linear methods (*bioRxiv*, 2024). H. Temmar, M. Willsey, J. Costello, M. Mender, **L. Cubillos**, ..., C. Chestek. [DOI](#)
4. Reliability and Minimal Detectable Change of Stiffness and Other Mechanical Properties of the Ankle Joint in Standing and Walking (*Gait & Posture*, 2023). **L. Cubillos**, ..., C. Krishnan. [DOI](#)
5. Breaking the barriers to designing online experiments: A novel open-source platform for supporting procedural skill learning experiments (*Computers in Biology and Medicine*, 2023). **L. Cubillos**, ..., C. Krishnan. [DOI](#)

Experience

University of Michigan - Cortical Neural Prosthetics Lab

Research Assistant

Ann Arbor, USA

Jan. 2021 – Present

- Worked developing new ML algorithms for brain and muscle signals decoding.
- Published work on multiple journals and top venues such as NeurIPS.

Meta Reality Labs Research

Research Scientist Intern

Redmond, USA

May. 2024 – August 2024

- Used haptic feedback to improve EMG control for AR/VR interactions.
- Ran a 20-people user study and confirmed intuitive control.

Zippedi

Software Engineer

Santiago, Chile

September 2020 – December 2020

- Zippedi is a robotics company based in Chile, that develops robots to assist in retail and home improvement stores.
- Worked designing architecture and developing software to monitor robots in real time in Django, Vue JS, and GCP.
- The software became the preferred monitoring platform for the company.

Prótesis High Five

Co-Founder

Santiago, Chile

Aug. 2016 – Dec. 2020

- Startup founded to create the first myoelectric upper-limb prosthesis in Chile. Raised over US\$20,000 in funding.
- Project started with two other classmates as the Capstone project. In only 4 months, was able to design and build a working prototype, able to read muscle signals, and transduce them into hand movement using machine learning techniques.
- Recognized as winners in Jump Chile and Brain Chile, both entrepreneurship contests, besting over 2000 teams.
- Project released as **Open Source**, making the prosthesis an affordable solution for Chilean and Latin American amputees.

CoMPAS Lab

Research Assistant / Robotics Software Engineer

Santiago, Chile

April 2019 – June 2020

- The Control, Modelling and Perception of Autonomous Systems Lab strives to create robotic solutions for multiple problems, specializing in underwater robotics.
- Worked developing hardware infrastructure and firmware mostly in C++ for an underwater exploration Remotely Operated Vehicle (ROV).
- Developed each part individually and then demonstrated the working system in a specialized pool.
- Helped Professor Giancarlo Troni create a graduate-level course in robotics, and was its teacher assistant.

Pontificia Universidad Católica de Chile

Project Engineer

Santiago, Chile

Nov. 2018 – April 2019

- Worked evaluating confidential project for the Chilean Navy, with great impact across the country.
- Developed computational model for the automatic evaluation of multiple alternatives.

Awards

PhD scholarship

Awardee

Ann Arbor, USA

Jan. 2021 - Jan. 2025

Funded by the Agencia Nacional de Investigacion y Desarrollo of Chile to pursue my Ph.D. at University of Michigan.

Brain Chile Scientific Entrepreneurship Contest

Finalist

Santiago, Chile

Aug. 2017

One of the 5 winners of the competition, of a pool of over 300.

School of Engineering, Pontificia Universidad Católica de Chile

Outstanding Student: For the connection between his engineering skills and his social commitment

Santiago, Chile

Aug. 2017

Awarded to two students per class of 800.

Jump Chile Entrepreneurship Contest

Bronze Category Winner

Santiago, Chile

Dec. 2016

One of the 10 winners of the competition, of a pool of over 2000.

UTFSM National Robotics Competition

2nd and 3rd place in the Open Category

Valparaíso, Chile

Oct. 2015

Languages

Spanish: Native, **English:** Full professional proficiency

Skills and Relevant Coursework

Advanced: Python, PyTorch, Arduino, Matlab, C++, LCM, ROS, CAD

Coursework: Machine Learning, Neural Engineering, Wearable Robotics, Robotic Systems Lab., Math for Robotics