Joakin Ugalde

Contact Info

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Education

Universidad de Chile

2017 Professional title as Mechanical engineer (with maximum distinction)

2015 B. SC in Mechanical Engineering

Employment History

2022-until present **Lecturer - Department of Mechanical Engineering, Universidad de Chile** Lecturer on ME6030 Robotics Manipulators, ME4705 Digital Fabrication and ME5102 Design of Mechanical Systems.

2018-until present **Fablab staff - Fablab U de Chile** Develop machines and devices, create courses to teach digital fabrication, machine maintenance, provide technical assistance in mechanics and mechatronics to students, academics and entrepreneurs in their hardware projects.

2021-2022 **Hardware developer - Freelance engineer** Design and build mechanical hardware for clients. 3D printing service on-demand.

- External engineer providing design and fabrication services for the implementation of a robotic cell to produce novel wooden planks. Hired by Solsticio SPa, project for Strong by Form .
- Implementation of a food container for pets, using IOT, for Periferi.co.
- Design and fabrication of a portable and automated prune paste dispenser, for Agricoch, PodaSana project.

2016 - 2017 **Research assistant - Department of Mechanical Engineering, Universidad de Chile** Lab manager, research assistant on modular soft robotics in the project "Replicating the Morphogenetic Movements of the Embryo", financed by the ONR (Office of Naval Research) . T.A in different robotics and digital fabrication courses for undegraduates.

Research Publications

Journal Articles

1 Calderón, A. A., Ugalde, J. C., Chang, L., Zagal, J. C., & Pérez-Arancibia, N. O. (2019). An earthworm-inspired soft robot with perceptive artificial skin. *Bioinspiration & Biomimetics*, *14*(5), 056012. https://doi.org/10.1088/1748-3190/ab1440

Conference Proceedings

1. Mattamala, M., Olave, G., Campusano, M., Gómez, C., Martínez, L., Estefó, P., Ugalde, J., Urrutia, J., San Martín, F., Zúñiga, P., Carrasco, J., Villar, C., & González, R. (2017). Aprendizaje interdisciplinario en robótica: La innovadora experiencia de duckietown chile, In *Xxx congreso sochedi 2017*.

2. Calderón, A. A., Ugalde, J. C., Zagal, J. C., & Pérez-Arancibia, N. O. (2016). Design, fabrication and control of a multi-material-multi-actuator soft robot inspired by burrowing worms, In *2016 ieee international conference on robotics and biomimetics (robio)*.

Awards
ROBIO 2016 Best Paper Finalist Award IEEE Conference on Robotics and Biomimetics, Qingdao, China, 2016.

Technical Skills

CAD	Autodesk Inventor, Autodesk Fusion 360, SolidWorks, AutoCAD
Manufacturing	Turning, Milling, CNC machining, 3D printing (SLA, FDM), silicone mold making for casting.
Electronics	Experience with Arduino, Arduino modules, Eagle, basic circuit design, sensor modules and a variety of actuators and drivers
Programming	Python, Java, C++, Arduino, Matlab
Pneumatics	Experience designing low pressure pneumatic circuits with valves, compressors, actuators and other minor components.

Languages and hobbies

Languages	Spanish (native), English (98 in TOEFL ibt).
Hobbies	3d printing, making machines and robots, cycling, classical guitar, analog photography.

Teaching Experience

Universidad de Chile

Instructor

- Co-designed and taught the course *Robotics Manipulators* at the mechanical engineering department of the University of Chile.

- Co-designed and taught *Robotics and automation workshop* at the Canadian Centre for Joining and Welding (CCWJ), University of Alberta. (2017)

- Co-designed and taught the workshop *Developing a SumoBot* for high school students at the Fablab Universidad de Chile. (2016)

- Co-designed and taught a variety of digital fabrication workshops to engineering students within the **BRC: Beauchef Robotics Challenge**, a student organized robotics competition in the faculty of line follower robots. It escalated to an annual national festival with multiple activities and competitions.

Teaching Experience (continued)

Thesis committee member

I was part of the examining committee for the following bachelor's thesis to opt for the mechanical engineer professional title:

- *"Automated design of soft mechanical metamaterials using evolutionary algorithms in a simulated environment"*, Marlo Alegría, 2021.
- *"Design and construction of a low cost pyranometer"*, Matías Balagué, 2022.
- *"Improvement and assessment of a low pressure cold spray system"*, Andrés Cerda, 2024.
- *"Improvements and redesign of uni particle impact test (SPITS)"*, Joan Nuñez, 2024.

Teaching assistant, 2014-2022

I assisted the courses:

- ME4030 Design and innovation seminar / (7 times)
- ME4705 Digital Fabrication / (once)
- ME3001 Digital Fabrication of technological products / (once)
- EI2001 Developing soft robots / (twice)
- EI2001 Constructing kinetic sculptures / (once)
- (Co-designed) EI2001 Duckietown: Developing autonomous vehicles / (once)
- ME5601: Design of mechanical systems / (twice)
- CC3501: Computer modeling for engineers / (once)

Other Experience

Universidad de Chile

Hardware developer, 2020

I co-designed and built a mechanical ventilator **(BAMBU)** with a team of engineers and industrial designers at the engineering faculty during the first wave of the COVID-19 pandemic. My tasks were to design the piping system, and design and fabricate the actuation mechanism.

Community co-founder, 2016

With a group of friends we founded the Robotics Community of the university, our goal is to encourage students to get into the field through curricular and extracurricular activities, such as competitions and the courses described previously.

Ministry of Science, Technology, Knowledge and Innovation

Scientific advisor (volunteer), 2023

I volunteer as a scientific advisor to help teams of high school students to develop hardware projects in the Explora IIE initiative.

Other Experience (continued)

Participation in government founded projects

2023 — "**A 3D-printable formulation with therapeutic potential in bone regeneration, based on Histatin-1-loaded polycaprolactone**". Adapted a pellet 3d printer for a powder material and developed a code for making scaffolds.

2022-2023 — "**Characterization of the comminution potential of rocks, based on the understanding of geological and geomechanical properties at the microscale**" Developed an automated machine to measure the impact of falling steel balls against rock samples.

2022-2024 — "**Development of a psychophysiological microdata platform for the evaluation of public transportation, integrating service level and perception information**" Designed and fabricated a mould to produce several units of a wristband with embedded electronics.

References

Supervisors

Danisa Peric, Executive Director at Fablab U de Chile
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Juan Cristobal Zagal, former Associated Professor at Universidad de Chile
jczagal@ing.uchile.cl
Rubén Fernández, Assistant Professor at Universidad de Chile
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Portfolio

At personal website: https://jkugalde.github.io/portfolio