CRISTIAN **BASOALTO**

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PROFESSIONAL SUMMARY

Passionate researcher specializing in robotics, autonomous systems, and AI. Focused on advancing autonomous robots for challenging environments, my expertise aligns with the Robotic Systems Lab's work on improving robotic autonomy and mobility. With experience in high-impact research and teaching, I am committed to contributing to innovative control and learning algorithms for legged robots and mobile manipulators in real-world applications. Being part of a prestigious institution like ETH Zurich would provide an ideal environment to further develop these technologies and push the boundaries of robotic systems.

WORK HISTORY

03/2019 - Current **Assistant professor**

University of Bío-Bío - Concepción

- Teaches two to four courses each semester, including Statics, Dynamics, Computer Programming, Robotics, and Control Systems. Designed lectures for each course, tailoring content and activities. Developed and taught elective courses in Robotics and Control Systems, integrating theoretical principles with hands-on experiences.
- Currently teaches Advanced Control Systems in Master's program in Mechanical Engineering at Universidad del Bío-Bío, focusing on Model Predictive Control and Reinforcement Learning concepts.
- Supervised nine undergraduate theses in Robotics, Control Systems, Computer Vision, and Artificial Intelligence, guiding students through complex research projects. Managed multidisciplinary project to assess feasibility of establishing Mechatronics Engineering program.
- Works on 'Lafkenewen Wave Energy Generator' project at Universidad del Bío-Bío, initiated in 2022 and funded by Government of Bío-Bío Region under FIC-R projects. Responsible for designing and implementing hydraulic system of Power Take-Off (PTO) and control system to optimize energy generation efficiency.
- Currently working as Alternate Head for the "Trending Topics in Mechanical Engineering" project (PEAUSC-03-2024), Office of Academic Extension. Manage and coordinate university seminars focused on emerging trends in Mechanical Engineering. Lead discussions, organize presentations, and play a key role in enhancing the academic and professional development of participants.

03/2017 - 07/2017 **volunteer teacher**

Infocap - Concepción

- Volunteered as teacher at Infocap, institute supporting economically disadvantaged individuals, teaching mathematics for flat-pack furniture program.

EDUCATION

09/2023 - Current **Certificate of Higher Education**: Robotics
Stanford University - Palo alto
Currently enrolled in the Robotics and Autonomous Systems Graduate Certificate program. Completed courses include:

- **Principles of Robot Autonomy I (AA274a)** - (Online).
- **Principles of Robot Autonomy II (CS237B)** - (In-person).

08/2019 - 11/2023 **Master of Science**: Mechanical Engineering
University of Concepción - Concepción, Chile

- **Overall GPA:** 6.4/7.0
- **Thesis:** Model-Based Predictive Control Applied to an Indoor Airship.
- **Honors:** Thesis approved with 6.9/7.0 *Outstanding*.
- **Relevant Courses:** Multivariable Control, Digital Image Processing.
- **Observations (*):** Successfully completed the project despite the challenges of being unable to access the laboratory throughout the COVID-19 quarantine. Furthermore, the demands of my full-time role as an assistant professor contributed to a delay in completing my thesis.

03/2013 - 03/2019 **Bachelor of Science**: Mechanical Engineering
University of Bío Bío - Concepción, Chile

- **Overall GPA:** 5.6/7.0 (Second highest in graduating class).
- **Final Grade Project:** Control Strategies Applied to a Point Absorber for Wave Energy Generation: Latching and Model Predictive Control. Approved with 6.9/7.0 *Outstanding*.
- **Relevant Courses:** Computer Programming, Control Systems, Industrial Process Automation, CNC Programming and Manufacturing, Mechanical Design.
- **Teaching Assistant (TA):** Two semesters in Computer Programming, three semesters in Computer-Aided Mechanical Drawing, and one semester in Statics.

01/2018 - 06/2018 **International Studies Program**
University of Illinois At Urbana-Champaign - Illinois, United States

- **Honors:** PIE 2.0-UBB Scholarship, Macrofacultad de Ingeniería 2030 Scholarship.
- **Relevant Courses:** Introduction to Robotics (ECE470), Digital Signal Processing I (ECE310), Control Systems (ECE 486).

PUBLICATIONS

- Pierart, F. G., Villegas, C., **Basoalto, C.**, Hüsing, M., & Corves, B. (2023). *Model and Control Analysis for a Point Absorber Wave Energy Converter in Lebu, Chile*. In *International Workshop IFToMM for Sustainable Development Goals* (pp. 19-26). Springer Nature Switzerland.
- Vásquez, L., **Basoalto, C.**, & Pierart, F. G. (2023). *Experimental Evaluation of Model-Based Predictive Control Applied to a Point Absorber*. In *2023 IEEE CHILEAN Conference on Electrical, Electronics Engineering, Information and Communication Technologies (CHILECON)* (pp. 1-6). IEEE.
- Pierart, F. G., Fernández, J., Rubilar, M., & **Basoalto, C.** (2023). *Parametric Data-Based Model for a Wave Energy Converter*. Available at SSRN 4466380.
- **Basoalto, C.** E., Vicuña, C., Tinapp, F., & Sbarbaro, D. (2024). *Model Predictive Control with Kalman Filter Applied to an Autonomous Blimp*. Manuscript in preparation.

- Pierart, F.G., Campos, P., **Basoalto, C.,** Rohten, J., & Davey, T. *Experimental Implementation of Reinforcement Learning Applied to Maximise Energy from a Wave Energy Converter.* Manuscript in preparation, to be submitted to *Energies*.

CONFERENCES

- **"Experimental Evaluation of Model-Based Predictive Control Applied to a Point Absorber" (Co-author).** Presented at the *CHILECON: IEEE Chilean Conference on Electrical, Electronics Engineering, Information and Communication Technologies,* Valdivia, Chile, 2023.
- **"Design and Control of a Power Take-Off System for the Lafkenewen Wave Energy Generator" (Co-author).** Presented at the *XX Conference on Computational Mechanics,* Austral University of Chile, Valdivia, Chile, 2022.
- **"Control Strategies in Point Absorber Wave Energy Converters" (Co-author).** Presented at the *3rd International Workshop on Wave and Tidal Energy,* Valdivia, Chile, 2018.

EXTRA CURRICULAR

- UTFSM Mechanical Invention Contest, Valparaíso (Chile), 2016.
- Robotics Competition UTFSM, Valparaíso (Chile), 2015.

SKILLS

Programming Languages:
- **Python:** Expert
- **C++:** Advanced
- **Matlab:** Expert

Software and Tools:
- **ROS2:** Advanced
- **SolidWorks:** Advanced

Machine Learning and AI:
- **Neural Networks and Convolutional Neural Networks:** Expert
- **Reinforcement Learning:** Advanced

LANGUAGES

English
Advanced

Spanish
Native

REFERENCES

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