Oscar Andrés Cartagena Villalobos

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WOS Profile: GVU-1567-2022

Ph.D. in electrical engineering, motivated to perform research on optimizing dynamical processes through advanced control techniques and elements from the computational intelligence framework.

Education

Ph.D. in Electrical Engineering **January 2024**
Universidad de Chile

Master of Engineering Sciences, Mention in Electrical Engineering **July 2019**
Universidad de Chile

Bachelor of Science in Electrical Engineering **2017**
Universidad de Chile

Employment and teaching activities

Postdoctoral Researcher **April 2025 – March 2028**
Universidad de Chile
Principal Researcher in the Project Fondecyt Postdoctorado N°3250509, "Optimal planning of smart ports based on computational intelligence and evolving systems."

Postdoctoral Researcher **March 2024 – March 2025**
Universidad de Chile
Postdoctoral Researcher in the Project ANID/ATE230035 "Sea Harbour Operation with Renewable Energies (SHORE)"

Professor at PentaUC Program **August 2022 – December 2022**
Pontificia Universidad Católica de Chile
Professor of the course Statistics and Probability for decision making (2nd Semester 2022) – for High School Students

Professor at Summer School **January 2021 – July 2022**
Universidad de Chile
Professor of the course Applied Engineering (in the versions of Summer 2021, May 2021, October 2021, Summer 2022 and Winter 2022) – for High School Students

Teaching Assistant **August 2017 – January 2022**
Universidad de Chile
Teaching Assistant in the courses Advanced Control Laboratory (Semesters 2017-2, 2018-1 and 2018-2) Seminar on Automatic Control (Semester 2019-2) and Predictive Control (Semesters 2020-2 and 2021-2)

Assistant **September 2016 – August 2020**
Universidad de Chile
Assistant in the courses Advanced Control of Systems (Semesters 2016-2 and 2017-1), Advanced Control Laboratory (Semesters 2017-1 and 2019-1), Predictive Control (Semester 2019-2) and Intelligent Control (Semester 2020-1)

Publications

Journals

- **O. Cartagena**, F. Trovò, D. Sáez, “A multivariate approach for fuzzy prediction interval design and its application for a climatization system forecasting”, in Expert Systems with Applications, vol. 255 part C, 124715, 2024, DOI: 10.1016/j.eswa.2024.124715
- **O. Cartagena**, F. Trovò, M. Roveri, D. Sáez, “Evolving Fuzzy Prediction Intervals in Nonstationary Environments”, in IEEE Transactions on Emerging Topics in Computational Intelligence, Early Access, DOI: 10.1109/TETCI.2023.3296486.
- **O. Cartagena**, M. Ožbot, D. Sáez, I. Škrjanc, “Evolving fuzzy prediction interval for fault detection in a heat exchanger”, in Applied Soft Computing, vol. 145, 110625, 2023. DOI: 10.1016/j.asoc.2023.110625.
- A. Endo, S. Parra, **O. Cartagena**, D. Sáez, C. Muñoz, J.I. Huircan, “Energy–Water Management System Based on MPC for a Greenhouse in a Mapuche Indigenous Community”, in Applied Sciences, vol. 13, issue 8, 4734, 2023. DOI: 10.3390/app13084734.
- **O. Cartagena**, S. Parra, D. Muñoz-Carpintero, L. G. Marín and D. Sáez, "Review on Fuzzy and Neural Prediction Interval Modelling for Nonlinear Dynamical Systems," in IEEE Access, vol. 9, pp. 23357-23384, 2021.DOI: 10.1109/ACCESS.2021.3056003.

Conferences

- K. Chamorro-Cáceres, A. Navas-Fonseca, J. S. Gomez, C. Ahumada, **O. Cartagena**, L. G. Marín, D. Sáez and G. Aguila, "Hierarchical energy management system with demand side management for green hydrogen-based microgrids," 2024 IEEE 42nd Central America and Panama Convention (CONCAPAN XLII), San Jose, Costa Rica, 2024, pp. 1-7.
- B. Moreno Vásquez, **O. Cartagena**, J. Ocaranza, A. Navas-Fonseca, D. Sáez Hueichapan and R. Cardenas Dobson, "Multi-Objective Distributed Predictive Secondary Control Design for Frequency Restoration and Active Power Sharing of Microgrids," *IECON 2024 - 50th Annual Conference of the IEEE Industrial Electronics Society*, Chicago, IL, USA, 2024, pp. 1-6.
- J. Ocaranza, **O. Cartagena**, D. Sáez and A. Navas-Fonseca, "Robust Predictive Control based on Evolving Intervals for Greenhouse Energy Management," *IECON 2024 - 50th Annual Conference of the IEEE Industrial Electronics Society*, Chicago, IL, USA, 2024, pp. 1-7.
- L. Jiménez, **O. Cartagena**, J. Ocaranza, A. Navas-Fonseca and D. Sáez, "Fuzzy Interval-Based Fault Detection for Water Consumption Profiles From Isolated Communities," 2024 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE), Yokohama, Japan, 2024, pp. 1-8.
- **O. Cartagena**, D. Sáez and I. Skrjanc, "Two-Stages Interval Fuzzy Model for Forecasting Wind Power in Microgrids," *2024 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE)*, Yokohama, Japan, 2024, pp. 1-8.
- L. Rojas, J. Ocaranza, **O. Cartagena**, D. Sáez, L. Daniele and C. Ahumada, " Robust Energy-Water Management System with Prediction Interval Based on Deep Learning," 2023 International Joint Conference on Neural Networks (IJCNN), Gold Coast, Australia, 2023, pp.1-9.

- A. Endo, **O. Cartagena**, J. Ocaranza, D. Sáez and C. Muñoz, "Fuzzy and Neural Prediction Intervals for Robust Control of a Greenhouse," 2022 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE), Padua, Italy, 2022, pp. 1-8.
- A. Endo, **O. Cartagena**, D. Sáez and D. Muñoz-Carpintero, "Predictive Control based on Fuzzy Optimization for Multi-Room HVAC Systems," 2020 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE), Glasgow, United Kingdom, 2020, pp. 1-8.
- D. Muñoz-Carpintero, S. Parra, **O. Cartagena**, D. Sáez, L. G. Marín and I. Škrjanc, "Fuzzy Interval Modelling based on Joint Supervision," 2020 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE), Glasgow, United Kingdom, 2020, pp. 1-8.
- T. Lara, **O. Cartagena**, S. Céspedes and D. Sáez, "Robust Model-based Predictive Control for a Cooperative Cycling Cyber-physical System," 2019 IEEE CHILEAN Conference on Electrical, Electronics Engineering, Information and Communication Technologies (CHILECON), Valparaiso, Chile, 2019, pp.1-6.
- **O. Cartagena**, D. Muñoz-Carpintero and D. Sáez, "A Robust Predictive Control Strategy for Building HVAC Systems Based on Interval Fuzzy Models," 2018 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE), Rio de Janeiro, 2018, pp. 1-8.

Research Visits

Visiting Ph.D. Student **December 1, 2022 – July 16, 2023**
Politecnico di Milano, Milan, Italy
Supervisor/Collaborator: Professor Manuel Roveri

Visiting Ph.D. Student **April 5, 2022 – June 30, 2022**
University of Ljubljana, Slovenia
Supervisor/Collaborator: Professor Igor Škrjanc

Other Project Participations

Comunidad InGenio - Mujeres e Ingeniería **December 2017 – September, 2018**
Instituto Sistemas Complejos de Ingeniería (ISCI)
Assistant in the Project: "Mujeres e Ingeniería"

Robust Distributed Predictive Control Strategies for the Coordination of Hybrid AC and DC Microgrids **2017 – 2018**
Project FONDECYT 1170683 - *Thesis student*

Solar Energy Research Center SERC-Chile **2017**
Project ANID/FONDAP/15110019
Thesis student

Solar Powered Car: Eolian 4 **2014**
Member of the electronics team

Awards and Honors

Academic Distinction award in the PhD in Electrical Engineering program, Year 2024
Distinction granted by: Escuela de Postgrado y Educación Continua, Facultad de Ciencias Físicas y Matemáticas - Universidad de Chile.

Second Place in Posters Competition - EVIC 2017
Prize granted by the XIII IEEE Latin American Summer School on Computational Intelligence (EVIC), Chile, Valparaíso, 2017.

Outstanding Student, Year 2017
Distinction granted by: Escuela de Ingeniería y Ciencias, Universidad de Chile.

Outstanding Student, Year 2016
Distinction granted by: Escuela de Ingeniería y Ciencias, Universidad de Chile.

Volunteering Activities

Peer Reviews in Journals
Reviewer in Applied Soft Computing, Knowledge-based Systems, IEEE Transactions on Smart Grid, Journal of Cleaner Production, Smart Agricultural Technology, Heliyon, World Electric Vehicle Journal, Aerospace Science and Technology, Energies and Sustainability

Reviewer in different international conferences
Reviewer activities performed in: 2020 European Control Conference (ECC), IEEE Chilecon 2021, IEEE Chilecon 2023 and IEEE International Joint Conference on Neural Networks 2024-2025 (IJCNN)