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Full Professor, Department of Electrical Engineering, University of Chile

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EDUCATION

- Doctor in Engineering Sciences, Pontificia Universidad Católica de Chile, December 2000.
 - Master in Engineering Sciences, Pontificia Universidad Católica de Chile, August 1995.
 - Civil Engineering, Mayor in Electrical Engineering, Pontificia Universidad Católica de Chile, August 1995.
 - Bachelor in Engineering Sciences, Pontificia Universidad Católica de Chile, March 1993.
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POSITIONS

2018- Date	Full Professor, Department of Electrical Engineering, University of Chile.
2019- Date	Head of Indigenous People Program, Faculty of Mathematical and Physical Sciences, University of Chile.
2010 – 2018	Associate Professor, Department of Electrical Engineering, University of Chile.
2003-2010	Assistant Professor, Department of Electrical Engineering, University of Chile.
1997 - Date	Faculty Member, Department of Electrical Engineering, University of Chile.

JOURNAL ASSOCIATE EDITOR

2020- Date	Associate Editor <i>IEEE Transactions on Smart Grid</i>
2017 - 2020	Associate Editor <i>IEEE Control Systems Magazine</i>
2011 - 2019	Associate Editor <i>IEEE Transactions on Fuzzy Systems</i>
2012-2013	Associate Editor <i>Soft Computing</i>

PARTICIPATION IN SCIENTIFIC SOCIETIES

2011-2013	Chair of Chilean Chapter IEEE Computational Intelligence Society.
2009-2010	Vice-Chair of IEEE Chile Section.
2007-2008	Chair of IEEE Chile Section.
2008	Member of Ad Hoc Committee on IEEE as a Model Global Association.
2005 - Date	Senior Member IEEE.

PUBLICATIONS

▪ BOOKS & BOOKS CHAPTERS

- [1] Núñez, A., Sáez, D., Cortés, C. “Hybrid Predictive Control for Dynamic Transport Problems”, Springer-Verlag London, Series Advances in Industrial Control, England, 2013, 172 Pages, ISBN-10: 1447143507 | ISBN-13: 978-1447143505.
- [2] Sáez, D., Cipriano, A., Ordys, A. “Optimization of Industrial Processes at Supervisory Level: Application to Control of Thermal Power Plants”. Springer-Verlag London, Series Advances in Industrial Control, England, 2002, 187 Pages. ISBN: 1852333863.
- [3] Sáez, D., Cipriano, A. “Supervisory Predictive Control of a Combined Cycle Thermal Power Plant”, Book Chapter “Thermal power plant simulation, monitor and control”, Edited by D. Flynn; IEE, The Institution of Electrical Engineering, 2003, United Kingdom, pp. 161-178, ISBN: 0 85296 419 6.
- [4] Vargas C., Morales, R., Sáez D. et al. (2019) Methodology for Microgrid/Smart Farm Systems: Case of Study Applied to Indigenous Mapuche Communities. In: Corrales J., Angelov P., Iglesias J. (eds) Advances in Information and Communication Technologies for Adapting Agriculture to Climate Change II. AACC 2018. Advances in Intelligent Systems and Computing, vol 893. Springer, Cham. https://doi.org/10.1007/978-3-030-04447-3_6

▪ ISI JOURNAL ARTICLES

- [1] Rozas, H., Muñoz-Carpintero, Sáez, D., Orchard, M., “Solving in Real-time the Dynamic and Stochastic Shortest Path Problem for Electric Vehicles by a Prognostic Decision Making Strategy”, Expert Systems With Applications, Accepted June 2021.
- [2] Raya-Armenta, J., Bazmohammadi, N., Avina-Cervantes, J., Sáez, D., Vasquez, J. C. and Guerrero, J. “Energy Management System Optimization in Islanded Microgrids: An Overview and Future Trends”, Renewable and Sustainable Energy Reviews, vol. 149, October 2021, 111327, doi.org/10.1016/j.rser.2021.111327.
- [3] Cartagena, O., Parra, S., Muñoz-Carpintero, D., Marín, L., Sáez, D., “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.
- [4] Espina, E., Cardenas-Dobson, R., Simpson-Porco, J. W., Saez, D., Kazerani, M., "A Consensus-Based Secondary Control Strategy for Hybrid ac/dc Microgrids with Experimental Validation,"

- in IEEE Transactions on Power Electronics, vol. 36, no. 5, pp. 5971-5984, May 2021, doi: 10.1109/TPEL.2020.3031539.
- [5] Navas, A., Gómez, J. S., Llanos, J., Rute, E., **Sáez, D.**, Sumner, M., "Distributed Predictive Control Strategy for Frequency Restoration of Microgrids Considering Optimal Dispatch," in IEEE Transactions on Smart Grid, vol. 12, no. 4, pp. 2748-2759, July 2021, doi: 10.1109/TSG.2021.3053092.
- [6] Roje, T., **Sáez, D.**, Muñoz, C., Daniele, L., "Energy–Water Management System Based on Predictive Control Applied to the Water–Food–Energy Nexus in Rural Communities", Applied Sciences. 2020; 10(21):7723. <https://doi.org/10.3390/app10217723>.
- [7] Burgos-Mellado, C., Llanos, J., Espina, E., **Sáez, D.**, Cárdenas, R., Sumner, M., Watson, A., "Single-Phase Consensus-Based Control for Regulating Voltage and Sharing Unbalanced Currents in 3-Wire Isolated AC Microgrids," in IEEE Access, vol. 8, pp. 164882-164898, 2020, doi: 10.1109/ACCESS.2020.3022488.
- [8] Espina, E., Llanos, J., Burgos-Mellado, C., Cárdenas-Dobson, R., Martínez-Gómez, M., **Sáez, D.**, "Distributed Control Strategies for Microgrids: An Overview," in IEEE Access, vol. 8, pp. 193412-193448, 2020, doi: 10.1109/ACCESS.2020.3032378.
- [9] Diaz, C., Quintero, V., Pérez, A., Jaramillo, F., Burgos-Mellado, C., Rozas, H., Orchard, M., **Sáez, D.**, Cárdenas, R. "Particle-Filtering-Based Prognostics for the State of Maximum Power Available in Lithium-Ion Batteries at Electromobility Applications," in IEEE Transactions on Vehicular Technology, vol. 69, no. 7, pp. 7187-7200, July 2020, doi: 10.1109/TVT.2020.2993949.
- [10] Serban, I., Céspedes, S., Marinescu, C., Azurdia-Meza, C., Gómez, J., **Sáez, D.**, "Communication Requirements in Microgrids: a Practical Survey," IEEE Access, vol. 8, pp. 47694-47712, 2020, doi: 10.1109/ACCESS.2020.2977928.
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- [13] Espina, E., Cardenas-Dobson, R., Espinoza-B, M., Burgos-Mellado, C., **Sáez, D.**, "Cooperative Regulation of Imbalances in Three-Phase Four-Wire Microgrids Using Single-Phase Droop Control and Secondary Control Algorithms". IEEE Transactions on Power Electronics, vol. 35, no. 2, pp. 1978-1992, Feb. 2020, doi: 10.1109/TPEL.2019.2917653.
- [14] Marin, L., Sumner, M., Muñoz-Carpintero, D., Köbrich, D., Pholboon, S., **Sáez, D.**, Núñez, A. "Hierarchical Energy Management System for Microgrid Operation Based on Robust Model Predictive Control", Energies 2019, 12, 4453.
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- [23] Bayas, A., Skrjanc, I., Sáez, D., “Design of Fuzzy Robust Control Strategies for a Distributed Solar Collector Field”. *Applied Soft Computing*, Vol. 71, pp. 1009-1019, 2018.
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▪ INTERNATIONAL CONFERENCES

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- [2] Navas, A., Burgos, C., Espina, E., Rute, E., **Sáez, D.**, Sumner, M., “Distributed MPC for Voltage Restoration and Economic Dispatch of DC MGs”, IEEE International Conference on DC Microgrids (ICDCM) 2021. Accepted.
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- [4] Muñoz-Carpintero, D., Parra, S., Cartagena, O., **Sáez, D.**, Marin, L., Skrjanc, I. “Fuzzy Interval Modelling based on Joint Supervision”, IEEE International Conference on Fuzzy Systems, WCCI 2020, Glasgow, UK, 19-24 July 2020.
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- [8] Cruz, N., Marin, L. **Sáez D.**, “Prediction Intervals with LSTM Networks Trained by Joint Supervision”, International Joint Conference on Neural Networks, IJCNN 2019, Budapest, Hungary, July 14-19, 2019.
- [9] Cruz, N., Marín, L., **Sáez, D.**, “Neural Network Prediction Interval based on Joint Supervision”. IEEE International Joint Conference on Neural Networks, WCCI 2018, Rio de Janeiro, Brazil, 8-13 July 2018.
- [10] Cartagena, O., Muñoz-Carpintero, D., **Sáez, D.**, “A Robust Predictive Control Strategy for Building HVAC Systems Based on Interval Fuzzy Models”, IEEE International Conference on Fuzzy Systems, WCCI 2018, Rio de Janeiro, Brazil, 8-13 July 2018.
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- [18] Morales, R., Valencia, F., **Sáez, D.**, Lacalle, M., “Supervisory Fuzzy Predictive Control for a Concentrated Solar Power Plant”, 19th IFAC World Congress, Cape Town, South Africa, August 24-29, 2014.
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PROJECTS

Funding programs from CONICYT Chilean National Commission for Scientific and Technological Research:

FONDECYT: National Fund for Scientific and Technological Development

FONDEF: Scientific and Technological Development Support Fund

FONDEQUIP: Scientific and Technological Equipment Program

FONDAP: Fund for Research Centers in Priority Areas

FONDART: National Fund for Cultural Development and the Arts.

1. Co-Investigator **FONDECYT** project 1210031 “A Hidden-Markov-Model-based Failure Prognostic Framework for Real-time Prognostic Decision Making”, 2021-2024.
2. Co-Investigator, **FONDART** project 576104, “Participatory Design for the Creation of a University Cultivation System” *Warriache*, 2021.
3. Co-Investigator, **FONDEF** ID19I10363, “Open expert system for supporting the water resources management through low-cost real-time monitoring of surface and groundwater”, 2020-2021.
4. Principal Investigator, **FONDECYT** Project 1170683 “Robust Distributed Predictive Control Strategies for the Coordination of Hybrid AC and DC Microgrids”, 2017-2020.
5. Co-Investigator, **FONDECYT** Project 1170044: “Prognostics Performance Metrics based on Bayesian Cràmer-Rao Lower Bounds”, 2017-2020.
6. Co-Investigator, **FONDEQUIP** Project EQM160122 “Equipment for the Emulation and Testing of Energy Storage Systems”, 2016-2017.
7. Co-Investigator, **International Cooperation** Project REDES150083 “Control Strategies and Hardware Topologies for the Operation of Energy Storage System in Microgrids”, Academic link AC3E UTFSM-U. of Waterloo, 2016-2017.
8. Principal Investigator, **FONDEF** Project 14I10063 “Design and Implementation of an Experimental Prototype of Microgrid for Mapuche Communities”, 2015-2018.
9. Director, Project from **Ministry of Energy**, Chile “Solar-Wind Energy Supply ‘Nehuen Kurruf Ka Antu’ for Community meeting place José Painecura”, 2015-2016.
10. Sub-director, **FONDEF** Project VIU14E075 “Development of a Real-time Estimator for the Energy Available of Battery Banks in Volcanic Monitoring Stations”, 2015-2016.

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11. Principal Investigator, **FONDECYT** Project 1140775 “Design of Robust Predictive Control Strategies for the Operation of Microgrids with High Penetration of Renewable Energy”, 2014-2016.
 12. Principal Investigator, **FONDECYT** Project 1110047 “Hybrid Fuzzy Predictive Control for Renewable Energy Plants”, 2011-2013.
 13. Co-investigator, **FONDECYT** Project 1100239 “Advanced Modelling and Optimization of Dynamic Transport Systems”, 2010-2013.
 14. Principal Investigator, **FONDEQUIP** Project EQM130058 “Microgrid Emulator for Design and Validation of Novel Control Strategies”, 2013-2014.
 15. Co-Investigator, **FONDEQUIP** Project EQM120111 “Equipment for Research in Hybrid Generation Systems”, 2013.
 16. Principal Investigator, **International Cooperation** Project REDES130053 “Control Strategies for Micro-grids with High Penetration of Renewable Energy”, U. Nottingham- Centre of Energy, U. Chile, 2013-2014.
 17. Co-Investigator, **International Cooperation** Project REDES130029 “Control and Management of Energy Storage Systems for Traction and Distributed Generation”, U. Waterloo – Centre of Energy, U. Chile, 2013-2014.
 18. Principal Investigator, **International Cooperation** Project REDENERG-0003 “Sustainability for Intelligent Micro-grids”, U. Waterloo – Centre of Energy, U. Chile, 2012-2013.
 19. Co-Investigator, **International Cooperation** Project REDENERG-0002 “Efficient applications of Lithium batteries to traction, renewable energies and energy storage”, U. Nottingham– Centre of Energy, U. Chile, 2012-2013.
 20. Associate Investigator, **FONDAP** Solar Energy Research Center, 2013-2018.
 21. Young Researcher, Complex Engineering Systems Institute, **Millennium Science Initiative** ICM: P-05-004-F, **CONICYT**: FBO16, 2011-date.
 22. Associate Investigator, Anillo-Bicentenario Project ACT32. **CONICYT** “Intelligent Real-Time Control for Integrated Transit Systems”. 2006-2010.
 23. Principal Investigator, **FONDECYT** Project 1061156 “Design of Predictive Control Strategies Based on Fuzzy Hybrid Modeling”, 2006-2008.
 24. Principal Investigator, **International Cooperation FONDECYT** Project 7070293 “Design of Predictive Control Strategies Based on Fuzzy Hybrid Modeling”, 2006.
 25. Principal Investigator, **FONDECYT** Project 1040698 “Hybrid Predictive Control Systems with Continuous and Discrete Variables”, 2004 -2006.
 26. Principal Investigator, **International Cooperation FONDECYT** Project 7040146 “Hybrid Predictive Control Systems with Continuous and Discrete Variables”. 2005.
 27. Investigator. **EPSRC Engineering and Physical Sciences Research Council** Project “Towards Multiple-model Based Learning Control Paradigms for Complex Systems”, 2003 – 2004.
 28. Principal Investigator, DI N°12-03/14-2 Project, **University of Chile**, “Design of Supervisory Control Strategies for Non-linear Multivariate Systems and their Application to Thermal Power Plants”. 2004 – 2006.
 29. Principal Investigator, FCFM Project, **University of Chile** “Design of Optimal Supervisory Control Strategies for Multivariate Nonlinear Systems”, 2003.
 30. Principal Investigator, **FONDECYT** Project 4000026 “Stability of Optimized Supervisory Control Systems considering a Fixed Regulatory Level”. 2000-2002.
 31. Principal Investigator, **FONDECYT** Project 2980029 “Design of Predictive Control Strategies based on Nonlinear Models and their Application to the Control of Thermal Power Plants”, 1998 – 2000.
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STUDENTS

▪ **PhD. THESIS ADVISOR**

- 7 graduate students
 1. Oscar Cartagena, “Fuzzy Interval Modelling and Control” (2019-Date)
 2. Alex Navas, “Predictive Control Strategies for EMS&DSM of Microgrids” (2018-Date). Double degree Ph. D in Electrical Engineering, U. Chile – U. Nottingham.
 3. Jacqueline Llanos, “Design of Control Strategies for Microgrids including Congestion”. Graduated 2020.
 4. Juan Sebastián Gómez, “Distributed Predictive Secondary Control Strategies for Microgrids”. Graduated 2020.
 5. Claudio Burgos, “Control Strategies for Improving Power Quality and Stability Evaluation in Microgrids” Double degree Ph. D in Electrical Engineering, U. Chile – U. Nottingham. Graduated in 2019.
 6. Luis Marín, “Hierarchical Energy Management System Based on Fuzzy Prediction Intervals for Operation and Coordination of Microgrids”, Graduated in 2018.
 7. Carolina Ponce, “Design of Fuzzy Predictive Control Strategies for Combined Cycle Power Plants with Integrated Solar Collectors”. Graduated in 2014.
 8. Freddy Milla, “Design of Non-linear Predictive Control Strategies for the Operation of Dynamic Public Transport Systems”. Graduated in 2012.
 9. Alfredo Núñez, “Design of Hybrid Predictive Control Strategies for Optimization of Operational Processes in Dynamic Transport Systems”. Graduated in 2009.

▪ **MASTER THESIS ADVISOR**

- 20 graduate students (2021: 2, 2020: 1, 2019: 1, 2017: 2, 2016: 4, 2013: 3, 2012: 2, 2011: 2, 2010: 2, 2009: 1, 2007: 3, 2005: 1).

▪ **UNDERGRADUATE FINAL PROJECT ADVISOR**

- 34 undergraduate (2019: 1, 2018: 1, 2017: 2, 2016: 5, 2015: 2, 2013: 5, 2012: 1, 2011: 2, 2010: 2, 2009: 1, 2007: 4, 2006: 2, 2005: 2, 2004: 3, 2003: 1).

TEACHING

Below is the list of courses that I have taught since 2001:

- EL4004 Principles of System Control (undergraduate course).
 - EL4105 Advanced Control of Systems (undergraduate course).
 - EL5205 Advanced Control Laboratory (undergraduate course).
 - EL7001 Intelligent Control (graduate course).
 - EL7025 Intelligent Control for Transport Dynamic Systems (graduate course).
 - EL7027 Seminar on Automatic Control (graduate course).
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