

CURRICULUM VITAE

Name: DE BATTISTA, Hernán

Job Address: Group of Control Applications (GCA)
Institute LEICI of Electronics, Instrumentation, Control and Signal Processing
Faculty of Engineering, La Plata National University
C.C. 91 La Plata 1900, Argentina.
Tel/Fax: +54 221 4259306.
e-mail: deba@ing.unlp.edu.ar
web: www.gca.ing.unlp.edu.ar

1. Educational Record

Engineer in Electronics, La Plata National University, Argentina. 1994.
Graduated with Highest Honors (Grade Point Average 9.43 out of 10).

Doctor in Engineering, La Plata National University, Argentina. 2000.

2. Current Teaching/Research Positions

Dean of the School of Electronic Engineering, Faculty of Engineering, La Plata National University, Argentina.

Full Professor, Faculty of Engineering, La Plata National University, Argentina.

Senior Researcher, National Research Council (CONICET) at GCA-LEICI, Faculty of Engineering, La Plata National University, Arg.

Researcher Grade I, the highest level (1 out of 5) of National Research Board Scale.

3. Visiting Positions Held

2002-2004, 2009-2011 and other shorter visits: Institute of Automation and Industrial Informatics ai2, Technical University of Valencia, Spain.

May/June 2012: Department of Biosystems Engineering, Faculty of Bioscience Engineering, Ghent University, Belgium.

November 2012: Institute of Informatics and Applications, University of Girona, Spain.

4. Awards

Awarded with the *Ernesto Galloni prize* from the National Academy of Exact, Physical and Natural Sciences of Argentina. November 2002. (Prize yearly awarded to a scientist below 35 years old in recognition to his career).

Awarded with the *Simón Gershanik prize* from the Buenos Aires Academy of Engineering, Argentina. November, 2006. (Prize biennially awarded to an engineer below 40 years old in recognition to his career).

5. Teaching Experience

I have been teaching the graduate course of **Analog Electronics** since 1998 and a course of **Semiconductor Physics** since 2018 at the Faculty of Engineering of La Plata National University. Additionally, I periodically

teach postgraduate courses in **Linear Systems Theory** and **Sliding Mode Control** in our country and abroad.

6. Research Experience

My research experience is mainly in the field of automatic control, both in theoretical aspects and its applications. The topics are nonlinear control, sliding mode control, switched control, geometric control, constrained control. The applications I am most interested in are renewable energy control systems, bioprocess and biosystems control, and constrained process control.

7. I&D Projects

On-going projects

PICT 2017-3211 (2019-2022). “Methods and algorithms of switched control with applications to bioprocess and biomedical engineering”. Financed by the Argentine Agency for the Promotion of Science and Technology (ANPCyT). Director.

PID 11/I216 (2016 - 2019). “Advanced automatic control techniques applied to biosystems, renewable energy and autonomous systems”. Financed by La Plata National University (UNLP). Member of the Responsible Board.

PICT 2016-2258 (2018 - 2020). “Control of multisubstrate biotechnological processes using intra and extracellular data”. Financed by ANPCyT. Researcher Collaborator.

PICT-2015-3586 (2017 - 2019). “Advanced control of wind turbines: active power control and mechanical loads alleviation”. Financed by ANPCyT. Researcher Collaborator.

Past projects (last 5 years)

PICT 2014-2394 (2015-2018). “Control of switched and invariant dynamical systems. Application to the optimization and monitoring of biological processes and systems”. Financed by ANPCyT. Director.

DPI2014-55276-C5-1-R (2015-2017). “Synthetic biology for bioproduction enhancement: design, optimization, monitoring and control”. *Science and Innovation Ministry, Spain*. External Researcher.

PIP 112-201101-00361 (2012 - 2014). “Constrained systems control”. *CONICET, Argentina*. Director.

DPI2011-28112-C04-01 (2012-2014). “Multi-scale inference, monitoring, optimization and control: from engineered cells to bioreactors”. *Science and Innovation Ministry, Spain*. External Researcher.

8. Staff/Student Supervision

I have supervised/co-supervised six PhD theses. I currently supervise/co-supervise four full-time Researchers (who are members of CONICET), two Postdocs and four PhD students.

Supervised Theses:

Fabrizio Garelli. PhD Thesis. “Variable Structure Systems in Constrained Control”, March 11th, 2007. La Plata National University.

José Gabriel García Clúa. PhD Thesis. “Hybrid Control Systems. Application to Hydrogen Production from Renewable Energy Resources”. August, 8th, 2013. La Plata National University.

Fernando Inthamoussou. PhD Thesis. “Switched Control Applied to Grid Connection of Renewable Energy Conversion Systems”. November 15th, 2014. La Plata National University.

Sebastián Núñez. PhD Thesis. “Control and Estimation of Multivariable Biotechnological Processes”. December 5th, 2014. La Plata National University.

Martín Jamilis. PhD Thesis. “Modelization, monitoring and control of bioplastic production processes”. September 8th, 2016. La Plata National University.

Juan Luis Rosendo. PhD Thesis. “Robust control techniques for mobile robotic systems”. March 22nd, 2019. La Plata National University.

9. Publications

Patents:

1. Patent Application AR 15015601. Title: Method and software for the determination and time profile of an insulin dosis. Authors: H. De Battista, F. Garelli, F. León, J. Vehí. Assignee: CONICET(AR), UNLP(AR), UdG(ES). Priority date: January 30th, 2015

Books:

1. F. Garelli, R. Mantz, H. De Battista, *Advanced Control for Constrained Processes and Systems*. IET Institute of Engineering and Technology (ISBN 978-1849192613). London, in press.
2. F. Bianchi, H. De Battista, R. Mantz, 风力机控制系统原理建模及增益调度设计 (国际电气工程先进技术译丛) 作者:(阿根廷). *China machine press*. (ISBN 9787111258292). Beijing, 2009. Chinese translation of the book: *Wind Turbine Control Systems*.
3. F. Bianchi, H. De Battista, R. Mantz, *Wind Turbine Control Systems*. Springer (ISBN 1-84628-492-9), 228 Pp, London, UK. Jun. 2006, Jan. 2007, Dec. 2010.

Book Chapters:

1. P. Colmegna, F. Garelli, H. De Battista, F. Bianchi, R. Sánchez-Peña. “The ARG algorithm: clinical trials in Argentina”. In *The Artificial Pancreas: Current Situation and Future Directions*. Editors: R. Sánchez-Peña and D. Chernavsky. Elsevier (ISBN: 978-012-8156551), Ch. 4, pp. 79-104. London, 2019.
2. F. Inthamoussou, F. Bianchi, H. De Battista, R. Mantz, “Gain scheduled Hinf control of wind turbines for the entire operating range”. In *Wind Turbine Control and Monitoring*. Editors: N. Luo, Y. Vidal, L. Aho. (ISBN: 978-3319084121). Ch. 4, pp. 71-96. Springer. Sep. 2014.
3. J. Picó, E. Picó-Marco, J. Navarro, H. De Battista, “Control of fed-batch bioreactors”. In *Nonlinear and Adaptive Control: Tools and Algorithms for the User*. Editor: A. Astolfi. Imperial College Press (ISBN 1-86094-617-8), Ch. 8, pp. 207-237. London, Dec. 2005.

Journal Articles (total 67).

In last 5 years (subtotal 24):

1. H. De Battista, E. Picó-Marco, F. Santos-Navarro, J. Picó. “Output feedback linearization of turbidostats after time scaling”. *IEEE Transactions on Control Systems Technology* (ISSN: 1063-6536). In press. # TCST-2017-1196.

2. H. Haimovich, H. De Battista. "Disturbance-tailored super-twisting algorithms: Properties and design framework". *Automatica, Elsevier Science Ltd.* (ISSN: 0005-1098). Vol. 101, pp. 318-329, 2019.
3. L. Levieux, F. Inthamoussou, H. De Battista. "Power dispatch assessment of a wind farm and a hydropower plant: a case study in Argentina". *Energy Conversion & Management, Elsevier Science Ltd.* (ISSN: 0196-8904). Vol. 180, pp. 391-400, 2019.
4. R. Sánchez-Peña, P. Colmegna, F. Garelli, **H. De Battista**, D. García-Violini, M. Moscoso-Vásquez, N. Rosales, E. Fushimi, E. Campos-Náñez, M. Breton, V. Beruto, P. Scibona, C. Rodriguez, J. Giunta, V. Simonovich, W. Belloso, D. Chervavsky, L. Grosembacher. "Artificial Pancreas: Clinical Study in Latin America without Pre-meal Insulin Boluses". *Journal of Diabetes Science and Technology, SAGE Pub* (ISSN 1932-2968). Vol. 12(5), pp. 914-925, 2018.
5. T. Castañeda, S. Núñez, F. Garelli, C. Voget, H. De Battista. "Comprehensive analysis of a Metabolic Model for lipid production in *Rhodospiridium toruloides*". *Journal of Biotechnology, Elsevier Science Ltd.* (ISSN: 0168-1656). Vol 280, pp. 11-18, 2018.
6. E. Fushimi, N. Rosales, F. Garelli, H. De Battista. "Artificial Pancreas Clinical Trials: Moving Towards Closed-Loop Control Using Insulin-on-Board Constraints". *Biomedical Signal Processing and Control, Elsevier Science Ltd.* (ISSN: 1746-8094). Vol. 45, pp. 1-9, 2018.
7. J. García-Clúa, R. Mantz, H. De Battista. "Optimal sizing of a grid-assisted wind-hydrogen system". *Energy Conversion and Management, Elsevier Science Ltd.* (ISSN: 0196-8904). Vol. 166, pp. 402-408, 2018.
8. M. Jamilis, F. Garelli, H. De Battista. "Growth rate maximization in fed-batch processes using high order sliding controllers and observers based on cell density measurement". *Journal of Process Control, Elsevier Science Ltd.* (ISSN: 0959-1524). Vol. 68, pp. 23-33, 2018.
9. N. Rosales, H. De Battista, J. Vehí, F. Garelli, "Open-loop glucose control: Automatic IOB-based Super-Bolus feature for commercial insulin pumps". *Computer Methods and Programs in Biomedicine, Elsevier Science Ltd.* (ISSN: 0169-2607). Vol. 159, pp. 145-158, 2018.
10. P. Colmegna, F. Garelli, H. De Battista, R. Sánchez-Peña. "Automatic regulatory control in type 1 diabetes without carbohydrate counting". *Control Engineering Practice, Elsevier Science Ltd.* (ISSN: 0967-0661). Vol. 74, pp. 22-32, 2018.
11. H. De Battista, M. Jamilis, F. Garelli, J. Picó. "Global stabilisation of continuous bioreactors: tools for analysis and design of feeding laws". *Automatica, Elsevier Science Ltd.* (ISSN: 0005-1098). Vol. 89(3), pp. 340-348, 2018.
12. R. Sánchez-Peña, P. Colmegna, L. Grosembacher, M. Breton, H. De Battista, F. Garelli, W. Belloso, E. Campos-Náñez, V. Simonovich, V. Beruto et al. "Artificial Pancreas: First Clinical Trials in Argentina". *IFAC-PapersOnLine* (ISSN: 2405-8963). Vol. 50(1), pp. 7731-7736, 2017.
13. F. Inthamoussou, H. De Battista, R. Mantz, "LPV-based active power control of wind turbines covering the complete wind speed range". *Renewable Energy, Elsevier Science Ltd.* (ISSN: 0960-1481). Vol. 99, pp. 996-1007, 2016.
14. S. Nuñez, F. Garelli, H. De Battista. "Closed-loop growth-rate regulation in fed-batch dual-substrate processes with additive kinetics based on biomass concentration measurement". *Journal of Process Control, Elsevier Science Ltd.* (ISSN: 0959-1524). Vol. 44 (1), 14-22, 2016.
15. M. Jamilis, F. Garelli, H. De Battista. "Smooth extremum-seeking control for fed-batch processes". *IFAC-PapersOnLine.* (ISSN: 2405-8963). Vol. 49, pp.103-108, 2016.

16. García-Clúa JG, Mantz RJ, De Battista H, Gallegos NG. “Stabilization of grid assistance for a renewable hydrogen generation system by min-projection strategy”. *IET Control Theory & Applications* (1751-8644). Vol. 10, pp.183-189, 2016.
17. S. Nuñez, F. Garelli, H. De Battista. “Product-based sliding mode observer for biomass and growth rate estimation in Luedeking–Piret like processes.” *Chemical Engineering Research and Design* (ISSN: 0263-8762). Vol. 105, pp.24-30, 2016.
18. M. Jamilis, F. Garelli, Md.S.I. Mozumder, T. Castañeda, H. De Battista. “Modeling and estimation of production rate for the production phase of non-growth associated high cell density processes” *Bioprocess and Biosystems Engineering, Springer* (ISSN: 1615-7591). Vol. 38, pp. 1903-1914, Oct. 2015.
19. G. Monsalve-Bravo, F. Garelli, Md.S.I. Mozumder, H. Alvarez, H. De Battista, “Model-based scale-up methodology for aerobic fed-batch bioprocesses. Application to polyhydroxybutyrate (PHB) production”, *Bioprocess and Biosystems Engineering, Springer* (ISSN: 1615-7591). Vol. 38, pp 1179-1190, jun. 2015.
20. M. Jamilis, F. Garelli, S. Mozumder, E. Volcke, H. De Battista, “Specific growth rate observer for the growing phase of a Polyhydroxybutyrate production process”. *Bioprocess and Biosystems Engineering, Springer* (ISSN: 1615-7591). Vol. 38, pp. 557-567, Mar. 2015.
21. F. León, F. Garelli, H. De Battista, J. Vehí, “Postprandial response improvement via safety layer in closed-loop blood glucose controllers”, *Biomedical Signal Processing and Control, Elsevier Science Ltd.* (ISSN: 1746-8094). Vol. 16, pp.80-87, Feb. 2015.
22. S. Nuñez, H. De Battista, F. Garelli, J. Picó, “Sufficient conditions for state observability in multi-substrate bioprocesses with additive growth dynamics”. *IEEE Latin America Transactions* (ISSN: 1548-0992). Vol 12 (5), pp. 928-934, 2014.
23. S. Núñez, F. Garelli, H. De Battista, “Second-order sliding mode observer for biomass concentration and growth rate estimation in batch photo-bioreactors”. *International Journal of Hydrogen Energy, Elsevier Science Ltd.* (ISSN: 0360-3199). Vol. 39(16), pp. 8772-8779, 2014.
24. F. Inthamoussou, F. Bianchi, H. De Battista, R. Mantz, “LPV wind turbine control with anti-windup features covering the complete wind speed range”. *IEEE Transactions on Energy Conversion* (ISSN: 0885-8969). Vol. 29(1), pp. 259-266, 2014.