# MIGUEL J. BAGAJEWICZ

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## EDUCATION

* **Ph.D. IN CHEMICAL ENGINEERING:** California Institute of Technology (Caltech), 1987.
* **MASTER OF SCIENCE IN CHEMICAL ENGINEERING:** Caltech, 1984.
* **CHEMICAL ENGINEER:** Universidad Nacional del Litoral, Argentina, 1977.

## PRESENT POSITIONS

* **Research Professor.** State University of Rio de Janeiro
* **Emeritus Professor.** University of Oklahoma.

## AREAS OF EXPERTISE

- **Process Plant Data Management**: Data Reconciliation and Fault Analysis, **Process Engineering**: Energy Integration. Crude Fractionation, Water reuse and allocation planning, Optimal Basic Process Equipment Design. **Optimization Theory**: Algorithm development and Process Design applications. **Investment Planning and Project Evaluation**: With emphasis on Financial risk. **Product Design.**

## BOOKS

- Bagajewicz M. *Smart Process Plants: Software and Hardware for Accurate Data and Profitable Operations.* McGraw Hill. To appear, November 2009.
- Bagajewicz M. *Design and Upgrade of Process Plant Instrumentation.* (*ISBN:1-56676-998-1*), Technomic Publishing Company, PA. http://www.techpub.com, (2000).

## SELECTED REFEREED PUBLICATIONS (2015-2025 out of a total of 280+)

1. da C. Santos M. T., A. R. Secchi, M. J. Bagajewicz, and A. L. H. Costa. *On a New Globally Optimal Method for the Design Optimization of Air Coolers Coupled with Real Fans.* Chemical Engineering Science. 303 120926. https://doi.org/10.1016/j.ces.2024.120926 (2025).
2. Oliva D.G., Nahes A.L.M., J. C. Lemos, A.L.H. Costa, M. J. Bagajewicz. *Globally Optimal Simultaneous Heat Exchanger Network Synthesis and Basic Heat Exchanger Design.* AIChE Journal. Vol. 70, No 8, DOI:10.1002/aic.18450 (2024).
3. Peccini A., L. F. S. Jesus, A. R. Secchi, M. J. Bagajewicz, A. L. H. Costa. *Globally Optimal Distillation Column Design Using Set Trimming and Enumeration Techniques.* Computers and Chemical Engineering. Vol. 174, 108254. (2023).
4. Nahes A. L. M., A. L.H. Costa, M. J. Bagajewicz. *A New Approach for the Globally Optimal Design of Gasketed Plate Heat Exchangers with Variable Properties.* Chemical Engineering Science, Vol., 280, 5, DOI: 10.1016/j.ces.2023.119067 R, 119067 (2023).
5. Nahes A. L. M., A. L.H. Costa, M. J. Bagajewicz. *A Novel Method for the Globally Optimal Design of Fixed Bed Catalytic Reactors.* Chemical Engineering Science, Vol., 271, 5, 118524 (2023).
6. Kim S. Y., A. L. H. Costa, M. J. Bagajewicz. *New Robust Approach for the Globally Optimal Design of Fired Heaters.* Chemical Engineering Research and Design, Vol. 197, 434-448 (2023).
7. Lin, Q., Z. Liao, M. Bagajewicz. *Globally optimal design of Minimal WHEN systems using enumeration.* AIChE Journal. https://doi.org/10.1002/aic.17878 (2023).
8. Peccini A., M.J. Bagajewicz, A. L. H. Costa. *Design of double pipe heat exchanger structures using linear models and smart enumeration*. Brazilian Journal of Chemical Engineering 40: 231–245. https://doi.org/10.1007/s43153-022-00238-2 (2023).
9. Da Cruz Souza A. R., Bagajewicz M J, Costa A L H. *Set Trimming approach for the globally optimal design of sieve trays in separation columns.* AIChE J., 69 (5), DOI: 10.1002/aic.18003 (2023).
10. Chang C., Z. Liao, A. L. H. Costa, and M. J. Bagajewicz. *Globally Optimal Design of Intensified Shell and Tube Heat Exchangers using Complete Set Trimming.* Computers and Chemical Engineering. 158, DOI: 10.1016/j.compchemeng.2021.107644 (2022).

11. Lemos, J. C., A. Costa, M. Bagajewicz. *Design of Shell and Tube Heat Exchangers Considering The Interaction of Fouling and Hydraulics*. AIChE J. Vol 68. 5, DOI: 10.1002/aic.17586 (2022)
12. André Nahes, Miguel J. Bagajewicz, André L. H. Costa. *Design Optimization of Double Pipe Heat Exchangers using a Discretized Model.* Ind. Eng. Chem. Res. 60, 48, 17611–17625. DOI: 10.1021/acs.iecr.1c02455 (2021).
13. Parra A., M. Noriega, L. Yokoyama and M. Bagajewicz. *Does Pressure Retarded Osmosis Help Reverse Osmosis in Desalination?* Ind. Eng. Chem. Res. 60, 11, 4366. (2021).
14. Chang C., Z. Liao, A. L. H. Costa, M. J. Bagajewicz. *Globally Optimal Synthesis of Heat Exchanger Networks. Part III: Non-isothermal Mixing in Minimal and Non-minimal Networks*. AIChE Journal. Volume 67, Issue 11 (2021).
15. Sales G. M., E. M. Queiroz, A. Nahes, M. J. Bagajewicz and A. L. H. Costa. *Globally Optimal Design of Kettle Vaporizers.* Thermal Science and Engineering Progress. Volume 25, 1 (2021).
16. Pereira, I. P. S., M. Bagajewicz and A. Costa. *Global Optimization of the Design of Horizontal Shell and Tube Condensers.* Chemical Engineering Science 236 (2021).
17. Nahes A. L., N. R. Martins, M. J. Bagajewicz, A. L. H. Costa. *A Computational Study of the Use of Set Trimming for the Globally Optimal Design of Gasketed-Plate Heat Exchangers*. Ind. Eng. Chem. Res., 60, 4, 1746–1755 (2021).
18. Chang C., Z. Liao, A.L.H. Costa and M. Bagajewicz. *Globally Optimal Synthesis of Heat Exchanger Networks. Part II: Non-Minimal Networks.* AIChE J. Vol 66, 7 (2020).
19. Chang C., A. Peccini, Y. Wang, A.L.H. Costa and M. Bagajewicz. *Globally Optimal Heat Exchanger Networks Design using Synheat and Linear Models. Part I: Networks featuring Minimum Number of Units.* AIChE J., 66, 7 (2020).
20. Lemos, J. C., André L. H. Costa, M. J. Bagajewicz. *Set Trimming Procedure for the Design Optimization of Shell and Tube Heat Exchangers*. Ind. Eng. Chem. Res. 59, 31, 14048-14054 (2020).
21. Fischer C.F., A. L. H. Costa and M. J. Bagajewicz. *MILP Approach for the Design of Vertical Vapor-Liquid Separation Vessels- Comparison with Heuristics.* Latin Am. App. Res. Vol 50, No 2, pp 65-70 (2020).
22. Costa A. L. H., M. J. Bagajewicz. 110th Anniversary: *On the Departure from Heuristics and Simplified Models towards Globally Optimal Design of Process Equipment.* Ind. & Eng Chem Res. 58, 18684−18702 (2019).
23. Borges de Carvalho C., M.A.S.S. Ravagnani, M. Bagajewicz and A. L. H. Costa. *Globally optimal design of Air Coolers considering Fan Performance*. Applied Thermal Engineering, 161, 114188 (2019).
24. Gonçalves C., A. Hemerly Costa and M. Bagajewicz. *Linear method for the Design of Shell and Tube Heat Exchangers using the Bell–Delaware Method.* AIChE Journal, 65, 8 (2019).
25. Parra A., M. Noriega, L. Yokohama, and M. Bagajewicz. *Reverse Osmosis Network Rigorous Design Optimization.* Ind. Eng. Chem. Res. 58, 3060−3071 (2019)
26. Peccini A., J. C. Lemos, A. L. H. Costa and M. Bagajewicz. *Optimal Design of Double Pipe Heat Exchanger Systems*. Ind. Eng. Chem. Res. 58, 12080−12096 (2019).
27. Levy A. L. L., J. N. M. Souza, M.J. Bagajewicz and A.L.H. Costa. *Globally Optimal Design Optimization of Cooling Water Systems*. Ind. Eng. Chem. Res. 58, 9473−9485 (2019).
28. Lemos J. C., A. L. H. Costa, and M. Bagajewicz – *Globally Optimal Linear Approach to the Design of Heat Exchangers Using Threshold Fouling Modeling.* AICHE Journal, v. 64, No 6. p. 2089-2102 (2018).
29. Gonçalves, C. O., Costa, A. L. H.; Bagajewicz, M. J. *Alternative MILP Formulations for Shell and Tube Heat Exchanger Optimal Design*. Industrial and Engineering Chemistry Research, v.56, p. 5970-5979, (2017).
30. Kim S. Y. P. Jongsuwat, U. Suriyapraphadilok and M. Bagajewicz. *Global Optimization of Heat Exchanger Networks. Part I: Stages/Substages Superstructure.* Ind. Eng. Chem. Res. v.56, 5944−5957 (2017).
31. Faria D., S. Y. Kim and M. Bagajewicz. *Global Optimization of the Stage-wise Superstructure Model for Heat Exchanger Networks.* Ind. and Eng. Chem. Res. Vol. 54 No 5, pp 1595–1604 (2015).

## TEACHING

* Federal University of Rio de Janeiro: *Process Systems Engineering* (Graduate Class) (2021-2024)
* University of Oklahoma: *Design I, Capstone Process Design. Thermodynamics. Graduate Applied Math, Graduate Process Synthesis* (1996-2016)

* Pan American Advanced Studies Institute (PASI) Program on Process Systems Engineering. *Lecturer on Energy Integration (Graduate Class). Iguazu Falls, August 2005.*
* UPSA (Universidad Privada de Santa Cruz de la Sierra), Santa Cruz Bolivia. *Financial Risk Management. (One week Graduate Class). May 2005.*
* UPSA (Universidad Privada de Santa Cruz de la Sierra), Santa Cruz Bolivia. *Oil and Gas Process Enginering (One week Graduate Class). December 2004.*
* Chulalongkorn University-Thailand. Visiting Lecturer*: Process Simulation and Design. (Two weeks Graduate Class).* October 2003 and October 2004
* UCLA. Visiting Lecturer*: Process Economics and Process Design.* January-June 1995.
* INTEC-Argentina. *Chemical Engineering graduate and undergraduate courses.* (1988-1989).

## *Industrial Short Courses*

* **CDT-GAS.**. Bucaramanga Colombia. Data Reconciliation. August 2010.
* **ConocoPhillips.** Energy Integration-Pinch Technology. November 2007.
* **Chulalongkorn University. Bangkok, Thailand**. Financial Risk Management in Process Operations Scheduling and Project Investment Planning (2 days Short course). Oct. 2004. Petroleum Fractionation: Simulation, Optimal Operations, Energy Efficiency and Retrofit (2 days Short course). Oct.r 2003.
* **Colombian Chemical Engineering Association. Bucaramanga, Colombia.** Process Design and Planning Under Uncertainty. (2 days Short course). August 2003.
* **Pemex. Ciudad del Carmen. Mexico.** Principles of Data Reconciliation (7 Short course). September 2002. Principles of Data Reconciliation (7 Short course). July 2002.
* **Conoco. Ponca City, Oklahoma, USA**. Heat Integration (3 days Short course).July 2000.

## INDUSTRIAL EXPERIENCE

**# (2010-2012)** Ok-solutions (www.ok-solutions.org). Various industrial projects on the energy retrofit of Crude Fractionation units.

**# (1992-1995)** Software development for Plant Data Reconciliation and Process Simulation. (At SimSci)

**# (1989-1992)** Development of Novel Design Methods for Mass-Exchange Networks for Waste Minimization and Cost Effective/ Energy Efficient Distillation Networks. (At UCLA)

**# (1987-1989)** a) Development of Design Methods for Steam and Power Systems. b) Revision of the Basic Engineering of a H2O2 New Plant. (At INTEC, Argentina)

**# (1982-1987)** High Temperature Gas Desulfurization using metal oxides. Experiments were done using different sorbents in fixed beds. Modeling work of gas-solid reactions in pellets and fixed bed reactors was also included. (At Caltech)

**# (1980-1982)** Studies of Existing Plant Energy Revamping were done for local Industries in Argentina.

**# (1976-1980)** Basic Engineering and Supervision of the Detailed Engineering of a Heavy Water Plant in Argentina. Development of a Process Simulator. Design of the layout, pumping, and P&I diagram preparation. About 14 reports were produced. (Intec)

## OTHER POSITIONS AND AWARDS

* Associate Editor: International Journal of Chemical Engineering
* Editorial Advisory Board. Industrial and Engineering Chemistry Research (2005-2008).
* Regents Award for Superior Research Activities. University of Oklahoma (2003)
* Presidential Professorship. University of Oklahoma (2001-)
* Head of the Start-Up Group. Heavy Water Plant Project. Intec-Argentina (1982)
* Head of *Process Simulation*. Industrial Extension Unit. Intec-Argentina (1981-1982).
* Research Fellow. Argentine Atomic Energy Commission. (1978).
* Argentine National Research Council and Inter-American Development Bank Fellowship. (1982-1987).

## PARTICIPATION IN CONGRESSES

- More than 260 papers were presented to various Congresses (AIChE, PSE, IFAC, ESCAPE, PRESS).
- Member of the Scientific Committee of various conferences (ESCAPE, PRES, FOCAPO, etc.)

**COMPLETE CV @** http://www.ou.edu/class/che-design/index.htm