

Elbio Leonel Avanzini

Abstract:

I developed my professional career in business management, operations, and profitability improvement projects. My primary training is as a Chemical Engineer, and I did postgraduate degrees in business, including an MBA. I obtained a Ph. D. in Engineering Science, working in multi-stage stochastic optimization applied to natural resources (agribusiness). My research focuses on stochastic models, and uncertainty quantification for applications in supply chain in natural resources, and more recently, in medical devices supply chains. Currently, I'm working for a health company as Sr. Data Scientist developing in-house solutions in Operational Research and Machine Learning, and at Pontificia Universidad Católica de Chile, both teaching and researching.

Keywords: optimization, stochastic optimization, decision support solutions design, operation management, operation research, business management

Education:

Ph.D. en Cs. Ingeniería, Ingeniería Industrial y Transporte (Rank: 1st) 08-2015/ 03-2022
Pontificia Universidad Católica de Chile, PUCC

Magíster en Administración de Empresas - Administración Estratégica (Rank: 1st) 07-2007/08-2010
Universidad de Belgrano – EENI

Chemical Engineer (Rank: 1st) 04-1997/08-2004
Universidad Nacional de San Luis – FICA (ex FICES)

Languages

English: Satisfactory Oral and Written

Spanish: Native

Programming languages:

- Python (numerical libraries, simulation, and optimization tools and algorithms)
- AMPL: stochastic optimization using CPLEX and linked to Python.

Academic Experience

Teaching activities

08/2016 - Present Professor in *Pontificia Universidad Católica de Chile*
(Operations Management at *MTIG*¹; Optimization Methods at the *School of Economics and Administration*; Operational Research Workshop (Capstone) in *Industrial Civil Engineering*; Dynamic Systems at *MII*²; Thesis Project Workshop at *MII*; AI in Business at *MII*)

08/2017 – 12/2019 Professor of Operational Excellence (Optional) at *MII, UCN*³ (Chile)

¹ *Magíster en Tecnologías de información y Gestión*

² *Magíster en Ingeniería Industrial*

³ *Magíster en Ingeniería Industrial, Universidad Católica del Norte (sede: Antofagasta), Chile*

WOS publications

Avanzini, E. L., Mac Cawley, A. F., Vera, J. R., & Maturana, S. (2021). Comparing an expected value with a multistage stochastic optimization approach for the case of wine grape harvesting operations with quality degradation. *International Transactions in Operational Research*.

Brunner-Parra, C. F., Croquevielle-Rendic, L. A., Monardes-Concha, C. A., Urra-Calfuñir, B. A., Avanzini, E. L., & Correa-Vial, T. (2022). Web-Based Integer Programming Decision Support System for Walnut Processing Planning: The MeliFen Case. *Agriculture*, 12(3), 430.

Miranda, R. Avanzini, E. Monardes-Concha, C.A. (Submitted in 2023). Info-Gap Decision Theory for handling harvest quality uncertainty in a grape-packing Agribusiness Supply Chain. *Annals of Operations Research*

Congresses and Proceedings

“A gentle path towards stochastic optimization for strategic capacity management in the medical devices industry” – Brunaud Braulio, Yang Haokun, Avanzini Elbio, Torres Nelson, Varma Vishal – IFORS 2023

“Info Gap Decision Theory for handling deep uncertainties in an Agribusiness Supply Chain” - Roberto Miranda, Carlos Monardes, Elbio Avanzini – CLAIO 2022

“Multistage Stochastic Optimization Approach for the Case of Wine Grape Harvesting Operations with Quality Degradation.” - Elbio Avanzini, Alejandro Mac Cawley, Jorge Vera, Lluís M. Plà, Sergio Maturana – INFORMS Annual Meeting – Virtual– 2020

“Resource Allocation Flexibility value in the wine grape harvesting” - Elbio Avanzini, Alejandro Mac Cawley, Jorge Vera, Lluís M. Plà, Sergio Maturana – IV Seminar on Agro BigData and Decision Support Systems in Agriculture - Virtual – 2020

“Rolling Tree as a Source of Flexibility: Its Added Value in an Agriculture Case” - Elbio Avanzini, Alejandro Mac Cawley, Jorge Vera, Lluís M. Plà, Sergio Maturana – INFORMS Annual Meeting – Seattle, USA – 2019

“Rolling Tree and flexibility: effects and value of optimization models succession in an uncertain environment in agriculture” - Elbio Avanzini, Alejandro Mac Cawley, Jorge Vera, Lluís M. Plà, Sergio Maturana – XV International Conference on Stochastic Programming - Trondheim, Norway – 2019

“The value of a Rolling tree in a flexible context: an agriculture case” - Elbio Avanzini, Alejandro Mac Cawley, Jorge Vera, Lluís M. Plà, Sergio Maturana – EURO2019 - Dublin, Ireland – 2019

“Flexible Decisions And Flexible Resources: A Balance For Efficient Operations” - Elbio Avanzini, Alejandro Mac Cawley, Jorge Vera, Sergio Maturana - INFORMS 2018 - Arizona, USA – 2018

“Fresh fruit harvesting: Flexible resources or flexible decisions?”- Elbio Avanzini, Alejandro Mac Cawley, Jorge Vera, Sergio Maturana - CLAIO 2018 - Lima, Perú –2018

“Planificación de Cosecha en Viña usando Opciones Reales” – Elbio Avanzini, Alejandro Mac Cawley, Jorge Vera, Sergio Maturana – OPTIMA 2017 - Chile – 2017

“Information quality value under a real option planning approach: the case of wine grape harvesting”- Elbio Avanzini, Alejandro Mac Cawley, Jorge Vera, Sergio Maturana – IFORS 2017 – Quebec, Canada - 2017

III International Conference on Agro BigData and Decision Support Systems in Agriculture: “Decisions,

Technologies, and Innovation for the 2030 Agriculture” - Valparaiso, Chile – 2019: Local Committee.

Research projects

(2018-2021) “*Multi-stage stochastic optimization production planning models in agriculture: integrating operational and resource flexibility*” – *Proyecto de FONDECYT - Iniciación #11180502 – Prof. Alejandro Mac Cawley – Research Fellowship*

(2000-2004) “*Experimentación, diseño, modelado, y simulación de reactores de membrana inorgánica para la producción de gas de síntesis*” - *Proyecto de Investigación P518602 perteneciente al INTEQUI – CONICET – Profesor Adolfo Castro Luna - Research Fellowship*

Visits and Stays

- 2019 - July - Lleida, Spain - University of Lleida - Host: Dr. Lluís M. Plà
- 2019 - January and February - Lleida, Spain - University of Lleida - Host: Dr. Lluís M. Plà
- 2019 - February - Wageningen, The Netherlands - Wageningen University and Research (WUR) - Host: Dr. Renzo Akkerman

Academic awards

- REPSOL / YPF undergraduate scholarship for academic performance - 1999-2003
- Chile National Doctorate Scholarship – 2019
- Full ELAVIO scholarship 2019 – Spain
- Ph.D. level Introduction to Stochastic Programming (THE XV INTERNATIONAL CONFERENCE ON STOCHASTIC PROGRAMMING) scholarship 2019 – Norway
- International Summer School - Kühne Logistics University 2022 - Germany

Non-Academic Experience:

02/2022 - present	Sr Data Science Analyst in <i>Johnson & Johnson</i> Optimization software development. Optimization modeling and spikes developments.
01/2017 - 03/2019	Consulting Service in Improvement of Operations in <i>PUCC</i> (Chile) Simulation models applied in Industry and Operation Management Consulting, agribusiness.
08/2013 - 06/2015	Business Management and Operations Consultant (Business Management and Operations Consulting) - <i>Barón y Cía. SA</i> ⁴ - (Argentina, working from Chile)
11/2011 - 12/2014	Consultant in Management of Operations and industrial processes - <i>Advanta SAIC</i> ⁵ (Argentina) Project to adapt an agro-industrial chain to the UNILEVER Sustainability protocol Development of an operations management system for NUTRISUN, a biotechnological-industrial business focused on quality.

⁴*Barón y Cía. SA: Agro-industrial-commercial-consignee organization, annual billing 2013 - US\$ 50.000.000 - Buenos Aires, Argentina*

⁵*ADVANTA SAIC: Agricultural Biotechnology, Indian multinational, Union Phosphorus Limited - Buenos Aires, Argentina*

- 02/2011 - 07/2013 Planning Manager - *Barón y Cía. SA* (Argentina)
 Development of a planning system focused on financial flow, scenario analysis, and exposure to external risk for the grain business. It resulted in a 20% improvement in profitability.
 Development of operational and strategic management control systems for agro-industries.
- 01/2007 - 01/2011 General Manager (Business Administration, and Industrial Manager) - *Compañía Oleaginosa del Sur SA*⁶ (Argentina)
 Development of a commercial portfolio for agribusiness, specifically industrial oils. Base billing increased by more than 60%, significantly contributing to the total business margin.
 Implementation of FSSC 22000 standard.
- 07/2005 - 12/2006 Head of Research and Development (Research and Development of Products and Processes) - *ARCOR SAIC- Dulciora SA*⁷
 Responsible for R&D projects for Products and Equipment in the food industry. Global savings of around 3.5% on sales due to the replacement of materials and changes in the process. More than 70 products were industrially launched, which implied significant changes (new lines and complex technologies) and about 1000 variants to existing products.
- 01/2004 - 06/2005 Process Engineer (Process and Operations Improvement)- *ARCOR SAIC- Dulciora SA*
 Early Equipment and Process Management Leader (*Total Productive Maintenance TPM*). Development of improvement projects based on Lean in production lines (instability of oil extraction yields, weight deviations, variations in quality of delivery to port, and others)
- 01/2003 - 12/2003 Young Professional (Rotation and training)- *ARCOR SAIC- Dulciora SA*
- 06/2000 - 12/2004 Researcher Jr. (Modelling Reactors - Syngas) -*UNSL – CONICET*⁸

Professional Postgraduates:

- 2014, *Project Management - University of Belgrano*
 2013, *Genetic Improvement and Management of Seed Companies - Austral University*
 2012, *Senior Management in Agribusiness and Food University of Buenos Aires*
 2012, *Risk Management in Agro-related Companies - Austral University*
 2011, *Price Risk Management - Austral University*
 2005, *Statistical Engineering - ARCOR In Company*

Teaching references

⁶*Compañía Oleaginosa del Sur SA: Edible Oil SME, for industry and human consumption, billing 2010 USD 4.500.000 – Buenos Aires, Argentina*

⁷*Dulciora S.A., Grupo ARCOR SAIC Plant for the production of fruit derivatives and beverages. Multinational food and candy production company with annual turnover of USD 3,900,000,000 in 2010 - San Luis, Argentina*

⁸*UNSL – CONICET – INTEQUI: Instituto de Investigación Química y Universidad Nacional de San Luis – San Luis, Argentina*

- Sra. Carmen Harambour Palma – Coordinadora Magister en Ingeniería Industrial MII UC
(charambour@ing.puc.cl) +562 2354 4085
- Sr. Sergio Maturana Valderrama – Profesor Titular Escuela de Ingeniería Industrial y Sistemas PUCC y ex director del Magister en Ingeniería Industrial MII UC (2015/2020) – (smaturan@ing.puc.cl) +562 2354 4272
- Sr. Alejandro Mac Cawley – Profesor Asociado Escuela de Ingeniería Industrial y Sistemas PUCC – Cursos: Gestión de Operaciones, Taller de investigación Operativa (amac@ing.puc.cl) +562 2354 4272

Research references:

- Sr. Jorge Vera Andreo – Profesor Titular Escuela de Ingeniería Industrial y Sistemas PUCC y Supervisor de Tesis doctoral del candidato (jvera@ing.puc.cl) +562 2354 4272
- Sr. Alejandro Mac Cawley – Profesor Asociado Escuela de Ingeniería Industrial y Sistemas PUCC y director ejecutivo de ICHIO – Co supervisor de tesis doctoral del candidato (amac@ing.puc.cl) +562 2354 4272
- Sr. Esteve Nadal-Roig – Profesor Asistente Universitat de Lleida - (enadal.udl@gmail.com)
- Sr. Lluís Plà-Aragónés – Profesor Titular Universitat de Lleida - (impla@matematica.udl.cat)
- Sr. Carlos Monardes Concha – Profesor Asistente Universidad Católica del Norte – (cmonardes@ucn.cl)

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