Eduardo Andres Vyhmeister Bastidas

Chemical Engineer – AI/ML – Data Scientist

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Innovative and versatile AI/ML expert with a track record of leveraging data science expertise to drive advancements in chemical engineering, simulate and optimize industrial processes, and spearhead leading-edge research projects across academia and industry.

Proven track record of managing complex, multi-stakeholder EU-funded projects tasks, including initiatives focused on incorporating AI and Trustworthy AI considerations into the manufacturing sector (**ASSISTANT**) and advancing data monetization, value evaluation, data quality, and bias reduction (**DATAMITE**). Experienced in developing AI-driven solutions for energy market prediction and implementing machine learning techniques to optimize industrial processes. Development of different AI/ML components using state of the art approaches including LLM, RNN, and different ML driven approaches. Skilled in applying innovative methodologies to address diverse challenges, from energy market forecasting and dengue outbreak prediction to CO_2 sequestration and operational units evaluation. Adept at bridging the gap between theoretical concepts and practical applications, with experience developing and deploying machine learning tools such as constraint acquisition systems and real-time controllers. Highly knowledgeable in navigating the ethical and regulatory landscape of AI implementation, with a strong focus on human-centric design and compliance with European AI Trustworthy regulations. Renowned for effective communication across interdisciplinary teams, as evidenced by a robust publication record and successful collaborations with industry partners, legal experts, and academic institutions.

Areas of Expertise and Experience

- AI/ML Development & Application
- Phenomenological Modelling
- AI Regulatory Compliance
- Statistics & Experimental Design
- Computer Programming
- Project Management
- Process Optimization
- Data Science & Analytics
- Research & Development
- Ethical AI Implementation
- Industrial Process Simulation
- Teaching, Lecturing, & Training
- Modelling & Forecasting / Predicting
- Process Control (PID, Fuzzy, MPC, Others)
- Simulation (Dynamic, Stochastic, Discrete Event)

Professional Experience

Researcher Support Officer | University College Cork – Cork, Ireland   09/2018 – Present

DATAMITE – Horizon Europe - Management & R&D:

Manage key work packages Tasks in line with business KPIs and metrics for data monetization, interoperability, trading, and exchange. Engage multiple stakeholders including law firms, industry leaders, and research centers to foster collaborative development. Lead the creation of tools and foundational elements essential for the metrics analysis framework tailored for industrial stakeholders.

Key Contributions:

- Elevated the strategic integration of business intelligence through the development of advanced metrics for data monetization based on different stakeholders' needs.
- Led heterogeneous consortium effectively to enhance project cohesion and ensure rigorous adherence to scheduled deliverables.
- Innovated core methodologies that significantly boosted the functionality and applicability of data monetization strategies.
- Development of different interactive tools and services including Chatbots (through LLMs), Backend, Frontend (Django), and GUIs. Participating in the development of tools for data bias reduction. Development of frameworks for data quality metrics and measurements with an end goal for use cases implementation.

ASSISTANT – Horizon 2020 – Management & R&D:

Lead the coordination of project work package in developing a regulatory and ethical AI framework within the manufacturing sector. Direct the integration of Trustworthy AI and machine learning frameworks into the AI/ML development and implementation while ensuring compliance and innovation.

Key Contributions:

- Developed a pioneering AI framework that became benchmark for incorporating ethical standards in manufacturing applications.
- Managed interdisciplinary teams aimed at achieving exceptional compliance and innovation in machine learning applications.
- Development of AI/ML-based components to predict and control application distribution over complex networks. Construction of different AI/ML based components for forecasting and prediction and interpretation (CNN, STLM, DNN, RNN).

FOCASTOCK – World Bank – Management:

Oversee evaluations concerning the readiness of cloud and AI technologies for forest carbon stock assessment for the World Bank.

Coordinate global research activities, integrating technological advancements into actionable strategies.

Key Contributions:

- Evaluated and recommended modifications for forest carbon assessment methodologies by integrating novel methodologies including AI and cloud-driven technologies.
- Led the institutional participation in a global project, a project that led to the development of the "Assessment of Innovative Technologies and Their Readiness for Remote Sensing-Based Estimation of Forest Carbon Stocks and Dynamics" report.

Industrial Projects (ØRSTED & GLOWDX) – R&D:

Pioneer technology transfer initiatives from academia to industry, focusing on AI-driven energy market predictions and disease outbreak forecasts. Develop/Automate KPIs for accurate forecasting and geo-location services for disease estimation based on environmental data.

Key Contributions:

- Led the transfer of AI technologies to industry, enhancing predictive accuracies in energy markets and health sector forecasting.
- Developed innovative forecasting models that instrumental in predicting and managing energy and health-related challenges.

AI/ML Tools & Optimization Development – R&D:

Designed and implemented diverse machine learning tools and data science techniques for system analysis, prediction, and optimization. Applied advanced algorithms in real-time controllers, image processing, and symbolic representation of equations.

Key Contributions:

- Advanced field of machine learning applications by developing versatile tools for real-time decision-making and system optimisation.
- Enhanced system efficiencies through the innovative application of constraint acquisition tools and symbolic processing techniques.

Associate Professor | Universitat Politècnica de Catalunya (UPC) – Barcelona, Spain   08/2017 – 08/2018
Lecturer

Delivered lectures on Process Design and Modelling and Simulation courses for bachelor's degree students to ensure understanding and engagement. Developed/updated course materials to reflect latest developments in the fields of process design and simulation.

Key Contributions:

- Enhanced student learning outcomes by integrating real-world applications and contemporary case studies into the curriculum.

R&D in CEPIMA Group

Engaged in advanced research within the CEPIMA group whilst focusing on the application of Machine Learning to Mixed-integer Multiparametric Approaches. Collaborated with a team of researchers to explore innovative methodologies and enhance existing models through rigorous data analysis.

Key Contributions:

- Advanced the field of multiparametric modelling by applying Machine Learning techniques to complex representation problems.
- Drove interdisciplinary research initiatives that bridged gaps between theoretical approaches/practical, industry-relevant applications.

Universidad de las Fuerzas Armadas | Ecuador   03/2015 – 08/2017
Researcher & Lecturer in Petrochemical Engineering

Delivered engaging lectures on key topics within the Petrochemical Engineering curriculum, including Petrochemical Plant Design, Modeling and Simulations, and Mass Transfer Phenomena. Conducted comprehensive courses that cover the full spectrum of petrochemical processes, employing cutting-edge educational tools to enhance student understanding and application. Updated course content to ensure relevance and integration of the latest industry practices and technological advancements.

Key Contributions:

- Spearheaded a pioneering research project that successfully produced lactic acid from Ecuadorian brown seaweed using supercritical fluids, marking a significant advancement in sustainable chemical processing.
- Developed and implemented a control strategy for high-pressure grinding rollers using Model Predictive Control (MPC) techniques, enhancing operational efficiency and safety in petrochemical applications.

Universidad Andres Bello | Santiago, Chile   05/2011 – 12/2014
Vice Principal & Lecturer (Industrial Engineer, Mining Engineer, Automation and Robotics Engineer)

Provided specialized lectures on Optimization (Bachelor and Master levels), Thermodynamics, Econometrics, and Control Theory to students in multiple engineering disciplines. Designed and updated course curricula to incorporate the latest industry standards, ensuring students received up-to-date knowledge and skills in engineering concepts. Participated in key research projects related to mining and automation, applying industry-relevant methodologies and advanced engineering solutions.

Key Contributions:

- Contributed to the development of an advanced SAG mill controller aimed at improving operational performance and reducing downtime in mining operations.
- Played key role in ecological evaluation of mining processes, introducing sustainability-focused solutions to minimize environmental impact.
- Elevated engineering programs by continuously refining academic content whilst aligning educational outcomes with industry needs and technological advancements.

Additional Experience

Researcher | Universidad de Santiago de Chile, Santiago, Chile Postdoctoral
Fellow | Georgia Institute of Technology
Minor Works During Degrees Studies

Education

Doctor of Philosophy in Chemical Engineering | University of Puerto Rico at Mayaguez (UPRM), Puerto Rico, 2008, GPA: 3.92/4.0
Thesis: Surface Modification of Nanoporous Films Using Organosilanes Dissolved in Supercritical Carbon Dioxide

Key Highlights:

- Conducted a cross-collaborative research project between the University of Arizona and UPRM.
- Gained expertise in operating advanced analytical instruments, including HPLC, FTIR, SFC, pumps, goniometer, and ellipsometer.

Master of Science in Chemical Engineering | University of Santiago of Chile, Santiago, Chile, 2004
Thesis: Optimal Synthesis of Reverse Osmosis System Using Genetic Algorithms

Bachelor of Science in Chemical Engineering | University of Santiago of Chile, Santiago, Chile, 2003
Award: Best Student, Cohort 2003

Technical Proficiencies

Engineering and Analysis Tools: MATLAB, HYSYS/ASPEN, LabVIEW, CPLEX

Programming: Python (including libraries like TensorFlow, Scikit-learn, Pandas, Django, Numpy, PyTorch, SymPy), Langchain, Langflow, GitLab, GitHub, Docker, and MATLAB

AI and ML components: LLM, CNN, DNN, and implementation of general Clustering, regression, and classification tools (python).

General Software: MS Office Suite

Additional Relevant Skills

Machine Learning: Advanced techniques in machine learning and deep neural networks.

Ethics in AI: Designed algorithms with human-centric considerations aligned with European AI Trustworthy legislation.

Optimization: Expert in optimizing complex systems using both mathematical and non-mathematical algorithms.

Sustainable Design: Applied sustainable practices in process modelling and optimization, using tools, such as LCA and GREENSCOPE for evaluation.

System Modelling: Extensive experience in dynamic and static modelling of complex systems using various methods including phenomenological, econometrics, and empirical approaches.

Scientific Contributions & Recognition

Publications: Research Work: Authored up to 60 publications, including journal articles, book chapters, and conference presentations on a diverse range of topics. Profile: Detailed publication list available next (with emphasized publications related to Trustworthy AI) and in [ResearchGate](#).

Honors & Awards:

- Outstanding Researcher: Universidad de las Fuerzas Armadas, ESPE, Ecuador, 2017 and 2016.
- Young Scientist Paper Award: Second Prise at the 7th International Conference on Environmental Science and Technology, 2014.
- Jose Trias Monge Travel Scholarship: For Academic Excellence, University of Puerto Rico.
- Scholarship of Scientific Initiation: For academic excellence, University of Santiago, Chile, 2002.

Certifications:

- ASPEN Plus: Aspen Technology Inc., Houston, TX, 2007.
- Andragogy Certification: Laureate Group, Santiago, Chile, 2012.
- Innovation and Entrepreneurship: Laureate Group, Santiago, Chile, 2013.
- Pilot Plant Operations: Xytel, South Carolina, USA, 2016.
- Lean Six Sigma, On Track for Certification, The Council for Six Sigma Certification, 2025.

Academic & Professional Training

Courses Taught: Simulation & Modelling | Intelligent Systems | Petrochemical Plant Design I & II | Mass Transfer | Kinetics & Catalysis | Modern Optimization | Statistics | Control Theory | Graduate Projects | Econometrics | Thermodynamics | Mass & Energy Balance (Further Detail on Courses and Teaching Interest under request).