

Juan Manuel Boullosa Novo

Battery Energy Storage | Applied ML & Optimisation | Forecasting & Real-Time Control

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PROFESSIONAL SUMMARY

Engineer specialising in applied machine learning and optimisation for energy systems, with focus on battery energy storage, time-series forecasting, and real-time control. Four years of research at ForWind (Oldenburg), master's thesis at the University of Colorado Boulder in collaboration with NREL, and ten months as Technical Co-founder and CTO at Zentus, a Stanford Doerr Sustainability Accelerator portfolio company. Delivered BESS dispatch optimisation work across multiple power markets (UK, ERCOT). Open to roles in battery analytics, energy storage optimisation, or applied ML for energy — based in Spain or remote across Europe.

TECHNICAL EXPERTISE

Machine Learning & Optimisation

- Deep learning (Transformer networks, sequence models, PyTorch)
- Probabilistic time-series forecasting and uncertainty quantification
- Model Predictive Control (MPC)
- Physics-informed modelling, statistical analysis, signal processing
- Model validation, performance monitoring, lifecycle management

Wind Energy

- Offshore wind blades — condition monitoring, fatigue / RUL, EPRI damage classification
- Wind farm modelling — wake steering, AEP analysis, predictive maintenance
- Wind turbine simulators (OpenFAST, ROSCO, FLORIS, QBlade)

Hardware & Real-time Control

- Real-time embedded control (cRIO, FPGA)
- Wind-tunnel instrumentation, data acquisition (DAQ)

Energy Storage & Power Markets

- Battery energy storage (BESS) — dispatch optimisation
- Multi-market modelling — day-ahead, real-time, frequency response
- Asset performance — uncertainty quantification, scenario analysis
- Solar-plus-storage hybrid optimisation (clipping recovery, sizing)

Programming & Tools

- Python (Polars, PyTorch, Plotly, scientific stack)
- MATLAB / Simulink, LabVIEW
- Git • Docker • Linux / HPC • SQL • C / C++ • Streamlit

PROFESSIONAL EXPERIENCE

Technical Co-founder & CTO — Zentus, Inc.

AUG 2025 – PRESENT

Stanford Doerr Sustainability Accelerator portfolio • Remote (Vigo, Spain)

- As sole technical founder, designed and built a **multi-market BESS dispatch optimiser** using Model Predictive Control (MPC). The system covers UK and ERCOT power markets across day-ahead, real-time, and frequency-response timescales, integrating warranty constraints (flexible vs rigid terms) as part of the optimisation objective.
- Designed and shipped a physics-informed blade condition monitoring system for offshore wind: OpenFAST aeroelastic simulation of the IEA 15 MW reference turbine, EPRI-classified damage scenarios, fatigue-based remaining useful life estimation, and statistical anomaly detection validated on real wind-farm SCADA.
- Led commercial engagements with major operators including **EDF Renewables North America** (signed LOI for a 6-month blade defect prediction pilot, January 2026) and **EDP Renovables** (leading-edge erosion AEP loss modelling for US onshore wind portfolio); shortlisted for **BP's Singapore Offshore Innovation Challenge** (offshore wind predictive maintenance).
- Built end-to-end Python stack — physics simulation, SCADA ingestion, fatigue analysis (IEC/DNV), market-data pipelines, dispatch optimiser, validation framework.

Visiting Scholar & Master's Thesis Researcher — University of Colorado Boulder, USA

AUG 2024 – JUL 2025

Collaboration with the National Renewable Energy Laboratory (NREL)

- Adapted the **TACTIS-2** transformer architecture for ultra-short-term, probabilistic wind-direction forecasting with uncertainty quantification, trained and evaluated on operational SCADA data from NREL's **AWAKEN** wind-plant field campaign.
- Built the end-to-end Python framework for advanced wake-steering control, leveraging **NREL's FLORIS** model for simulation and validation of the control strategy.
- Master's thesis: "*Spatiotemporal Wind Direction Forecasting with Uncertainty Quantification using Transformers*" — github.com/achenry/wind-forecasting.

Research Assistant — ForWind, Center for Wind Energy Research

NOV 2020 – AUG 2024

University of Oldenburg, Germany

- Designed and implemented robust real-time control and data-acquisition systems for aerodynamic experiments in turbulent wind tunnels using LabVIEW and cRIO/FPGA hardware.
- Implemented and validated real-time control algorithms for scaled wind turbine models, contributing to multiple research projects on turbine performance and grid stability.
- Earlier student internship at ForWind (Jul 2019 – May 2020) developing control-system software for experimental scaled wind turbines using MATLAB, LabVIEW, and cRIO/FPGA.

EDUCATION

M.Sc. Engineering Physics — Wind Energy specialisation

2022 – 2025

Carl von Ossietzky University of Oldenburg, Germany

- Grade **1.45** (German scale, 1.0 = maximum); equivalent to *Sobresaliente* / GPA ~3.8 / "A"
- Thesis: "*Spatiotemporal Wind Direction Forecasting with Uncertainty Quantification using Transformers*"
- Coursework: Wind Turbine Design, Computational Fluid Dynamics, Future Power Supply, Photovoltaics, Solar Thermal Energy, Energy Meteorology, Energy Systems

B.Eng. Engineering Physics

Carl von Ossietzky University of Oldenburg, Germany

- Exchange year at the University of Nottingham Ningbo, China
- Specialised coursework in renewable-energy systems and laser physics

SELECTED PROJECTS

Real-time MPC for Wind Turbine Control — Bachelor's thesis

2019 – 2020

- Developed an embedded quadratic-optimisation solver for real-time Model Predictive Control achieving consistent sub-millisecond performance (mean 550 μ s) on cRIO hardware.
- Designed and validated MPC performance through extensive wind-tunnel experiments, demonstrating the feasibility of advanced control on embedded systems.

HyperPod — SpaceX Hyperloop Pod Competition

2016 – 2017

- Co-designed the magnetic-levitation system for an international student team competing to build a functional Hyperloop pod.
- Presented to SpaceX engineers at the international finals at **SpaceX Headquarters** in Hawthorne, California; team awarded the **Innovation Award** out of 1,200+ global competitors.

LANGUAGES

Native: Spanish, Galician

Intermediate: Portuguese, German, Chinese

Fluent: English (C2 — Cambridge CAE, grade B)