

JULIA ENDRIGO ANDRES

Graduate Physicist

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EDUCATION

BSc Physics with Study Abroad

University of Exeter (Sept 2022 - Jul 2026) - Exeter, UK

Exeter key modules: Thermal Physics (92%), Analytical & Chaotic Dynamics (87%), Quantum Mechanics I (87%), Electromagnetism I (84%), Scientific Programming in Python (80%). **1st class degree**

Exchange year at TUM (Munich, Germany) - key modules: Machine Learning for Physicists, Data Science, Plasma Physics, Fusion Research, General Relativity.

A-levels

Chestnut Grove Academy (Sept 2020 - Aug 2022) - London, UK

Mathematics, Further Mathematics, Physics, Chemistry

EXPERIENCE

Research Assistant

Max Planck Institute for Plasma Physics (May 2025 - Aug 2025) - Munich, Germany

Led construction and assembly of the polychromator apparatus for the neutral He-beam diagnostic tool on the ASDEX Upgrade tokamak (supervised by Prof. M. Griener). Conducted preliminary tests and digital analysis of the transmission properties of optical components.

Quantum Technologies Research Intern

University of Exeter (Jun 2024 - Aug 2024) - Exeter, UK

Developed a numerical Python model of boron vacancy spin dynamics under multiple driving fields to investigate its application as a magnetic field sensor. Optimised SNR through parameter fine-tuning, informing the design of novel quantum measurement protocols.

PROJECTS

ML-Assisted Raman Spectroscopy for Herbicide Classification

University of Exeter/Syngenta Collaboration (Jan 2026 - Mar 2026) - Exeter, UK

Independently designed and implemented a hierarchical PLS-DA classifier with PCA dimensionality reduction in Python (sci-kit learn), achieving **98.4% leaf-type accuracy** and up to **82.7% herbicide mode-of-action (MoA) classification accuracy**. Collaborate in a team of 6 delivering a rapid, non-invasive alternative to slow chemical reference tests. The classifier outperformed traditional methods on several MoAs supporting Syngenta's goal of more accurate herbicide screening.

Project has been commended as a top undergraduate work by supervisor Prof. J. Moger. Results of this work are currently being considered for publication.

Simulation of Rayleigh-Bénard Convection

University of Exeter (Oct 2025 - Nov 2025) - Exeter, UK

Performed direct numerical simulations of 2.5D Rayleigh-Bénard convection using the Dedalus3 Python spectral solver under rotation and non-rotating conditions. Benchmarked critical Rayleigh number result against linear stability theory with **0.02%** agreement. Investigated Nusselt-Rayleigh scaling and obtained a fit with $R^2 = 0.994$ and $R^2 = 0.991$ for non-rotating and rotating cases, respectively.

SKILLS

Technical Skills

Machine Learning: Python, scikit-learn; Data Analysis and Visualisation: pandas, SQL, Excel, MySQL, SIMBAD; Simulations: Dedalus3

Languages

- English (Bilingual)
- Spanish (Native)
- Catalan (Native)
- German (B2)
- French (A2)

VOLUNTEERING AND EXTRACURRICULAR

Science Educator

Royal Institution (Jun 2023) - London, UK

Delivered engaging, interactive science presentations to diverse audiences during family fun days, making complex topics accessible to people of all ages.

Physics Hackathon

Institute of Physics (Sept 2023) - London, UK

Analysed climate trends and their impact on plankton ecosystems using Python and produced visualisations to highlight ecosystem responses.

AWARDS

Gold Duke of Edinburgh

Duke of Edinburgh Award (2022) - London, UK

Prestigious UK youth achievement programme involving volunteering, fitness, skill-building, and a multi-day expedition. Achieved the top Gold level.