Lucas Ertugrul

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3rd year aspiring physicist at Imperial College London with First Class Honours and Entrepreneurial experience, combining advanced theoretical knowledge with hands-on AI/ML development and business acumen. Co-owner of AI-driven startup with experience in high-voltage experimental physics, computational modeling, and technical education. Proven track record in leadership roles and translating complex physics concepts into practical applications.

Education

Imperial College London | October 2023 - July 2027
MSci Physics | *London, UK*
- 1st & 2nd Year - First Class Honours Average

Harrow School Online | August 2020 - July 2022
A Levels & Leadership | *London, UK*
- **A Levels:** A* Mathematics, A* Further Mathematics, A* Physics, A* EPQ - "AI, The Last Invention?"
- **Leadership:** Physics Research Club Leader, Advanced Physics Society Leader
- **SAT:** Scored 1550 on the SAT (790 Math, 760 English)

Research Experience

Research Assistant | July 2025 - September 2025
Imperial College London | *London, UK*
- Developed novel triggering techniques for pulsed power applications and plasma physics under **Prof. Simon Bland**, designing solid-state spiral generators for high-current systems including x-pinches and the 1.4 MA MAGPIE facility
- Fabricated **3D printed** high-pressure spark gap switches and modeled high-voltage circuits (tens of kV) using SPICE simulation to optimize switching performance
- Assisted in **synchrotron beamline experiments at ESRF (Grenoble)** investigating Richtmyer-Meshkov instability mitigation, contributing to PhD thesis research

Key Technical Projects

Scientific Computing & Physics Projects

Physics Informed Deep Learning | *Python, Git, PyTorch, TensorFlow, MATLAB* | May 2024 – July 2024
- Developed a **physics-informed deep learning system** to identify governing equations of non-linear dynamical systems and researching the efficacy of different neural network architectures and hyperparameters.
- Experience with Long Short Term Memory Networks and **Reinforcement Learning**
- Experience in Research Computing using the **Imperial High-Performance Cluster**
- **Achieved 75% overall score**

Interdisciplinary Research Computing | *Python, OpenFOAM* | January 2025 – March 2025
- **Runner-up Project Winner** - Using OpenFOAM to model the effect of various pathologies on blood flow in the human aorta.
- Developed computational fluid dynamics (CFD) simulations with varying degrees of stenosis (0-80% occlusion) to study blood flow patterns.
- Created parametric simulations to analyze wall shear stress, pressure gradients, and flow velocities in stenotic aortas.

Analogue Computing | *Python, LTspice, SciPy* | January 2024 – May 2024
- Designed and built an analogue computer circuit for solving second-order differential equations
- Created computational simulations of damped oscillatory systems to model real-world car suspension behavior
- **Achieved 83% overall score**

Robot Arm Control System | *Assembly, Microprocessor* | November 2025 - Present
- Programmed a microcontroller to control a robot arm with all control code written in assembly language
- Implemented precise motor control algorithms and real-time feedback systems for accurate positioning and movement

AI & Machine Learning Projects

JAMES (Automated Lab Book Generator) | *Python, Whisper, PyTorch, LLM* | January 2025 – Present

- Architected multimodal system generating lab books from recorded sessions using speech recognition, speaker diarization, and LLMs with **RAG knowledge base** for contextual understanding across experiments.
- Designed modular architecture supporting both local LLMs (Ollama) and cloud APIs (OpenAI/Anthropic) for flexible deployment.

Sentiment Analysis Trading Bot | *Python, API, PyTorch*   June 2024 – Present
- Used Alpaca API to get stock data and news articles.
- Implemented a **transformer** and Lumibot to execute trades every hour based on sentiment analysis of news articles. **20.7 % annual return on investment** in backtesting.

AgriView - LauzHack | *Python*   November 2024 - Present
- Participated in the LauzHack hackathon in Lausanne, developing an application that uses NLP interfacing with an computer vision image segmentation model (PASTIS) to predict crop yield based on open source satellite imagery. Still in development on the side.

Work & Leadership Experience

Co-Owner, Part-time Manager   June 2022 - Present
LeParfum.ai   *Barcelona, ES & London, UK & New York, US*
- Co-owner of a family run AI-driven online personalized perfume startup
- B2C for verticals such as weddings, corporate gifts, and events etc.
- Responsible for strategy, marketing materials, and onboarding process

Teaching Assistant - Communicating Physics at Westminster School   January 2025 - March 2025
Imperial College London   *London, UK*
- Selected as 1 of 20 students for Communicating Physics module and sole student assigned to Westminster School
- **Developed and led** computational physics after-school club, teaching numerical methods and Python programming to 5th/6th form students
- Created educational workbooks on **Fourier Analysis** and **Rocket Equation** modeling, guiding students through real-world physics applications

Head of Fleming House   August 2020 - July 2022
Harrow School Online   *London, UK*
- Led and mentored students as head of house, responsible for academic support, pastoral care, and house community development
- Organized inter-house competitions, study groups, and social events while maintaining high academic standards across the house

Technical Skills

Programming & Development
Python (NumPy, Pandas, SciPy), MATLAB, Git, LaTeX

Scientific Computing
OpenFOAM, SPICE, CFD, Signal Processing, Imperial HPC, Physics Simulations

AI & Machine Learning
PyTorch, TensorFlow, Neural Networks, NLP, Whisper, OpenAI API, Transformers

Engineering & Design
CAD (Fusion 360 & Solidworks), 3D Printing, Blender, High-Voltage Electronics, Rapid Prototyping

Applied Mathematics
Differential Equations, Statistical Analysis, Linear Algebra, Numerical Methods, Variational Methods

Languages & Additional Information

Languages
· Native: English, French
· Proficient: Italian
· Conversational: Spanish

Notable Achievements
· Mountaineering: Island Peak (6,165m), Stok Kangri (6,153m), Pokalde(5,806m) Monte Rosa (4,634m), Everest Base Camp (5,364m)

International Experience
Lived in France, UK, Singapore, Spain, Italy, and Brazil
Training in Psychological First Aid (HumanityCrew)

Interests
Philosophy, Electric Guitar, Waterpolo, Snowboarding, Cuisine