Sebastian Holtedahl Castedo

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EDUCATION

The University of Manchester, UK   Sept 2019 – June 2023

MPhys Physics with Study in Europe. First Class Honours (82%).

Sorbonne Université, FR   Sept 2021 – July 2022

Master 1 Physique Fondamentale et Applications. Erasmus exchange programme

Courses Taken

- Classical & Quantum Shannon Theory
- Artificial Intelligence for Physics
- Advanced Statistical Mechanics
- Computational Physics
- Quantum & Classical Field Theory
- Group Theory
- Complexity Theory
- Markov chain Monte Carlo

Computational Projects

- Travelling Salesman problem using Monte Carlo Metropolis and Simulated Annealing in Fortran.
- Classification problem distinguishing between supersymmetric particles and background using a variety of AI techniques (Deep Neural Network, K Means Clustering and Principal Component Analysis).
- Built from scratch an automatic differentiation tool and MLP in C++ that performed classification tasks.

Cardinal Vaughan Memorial School, London, UK   Sept 2016 – Jun 2018

A-level: Maths (A*), Further Maths (A), Physics (A), Computer Science (B), AS-History (A).

SKILLS

Technical: Python (incl. Qiskit, Keras, Scikit-learn), C++, Fortran, R and VB.net/VBA.
Language: Fluent in English, Spanish, Norwegian and French.

WORK EXPERIENCE

The University of Manchester, UK   Sept 2022 – June 2023

Master Thesis

- Path integral approach to Lotka-Volterra ecosystems with random matrices. Under the supervision of *Tobias Galla*. Results currently in the process of being published.

Institute for Cross-Disciplinary Physics and Complex Systems, Palma ES   Jul 2022 - Aug 2022

Summer Undergraduate Research Fellowship (SURF)

- Developed machine learning models using a variety of tools (VAE, XGBoost, CatBoost) for the prediction and detection of childhood obesity using microbiota data.

Laboratoire de Physique Théorique et Hautes Energies, Paris FR   Apr 2022 - Jun 2022

Internship studying the Landau-Lifshitz-Gilbert equation under the supervision of Leticia Cugliandolo

- Derived the Langevin equations using a concrete model for the environment giving rise to dissipation & noise and obtained the corresponding Fokker-Planck equation.
- Numerically simulated the evolution of a few such coupled moments.
- This work has recently been published in Phys. Rev. B: https://arxiv.org/pdf/2205.10418.pdf

Fermi National Accelerator Laboratory, Chicago US   Jul 2021
Quantum Computing Internship for Physics Undergraduates
- Gained experience programming for existing quantum computers using Python and Qiskit. Covered algorithms including Quantum Fourier Transforms, Grover's Algorithm, and Quantum Phase Estimation.
- Took part in lectures on the fundamentals of quantum mechanics and quantum computing.

Slipstream Education, Manchester UK   Apr 2020 – Sept 2021
Campus Director
- Set up and led a charity aimed at bridging the inequality gap in applications to higher education. We provide underprivileged high school students from Manchester with mentors from top universities to assist them with their university applications.
- Set up partnerships with university societies, raised over £5000 in funding and mentored over 50 students.

Accenture PLC, London UK   Sept 2018 - May 2019
Consulting Analyst. Horizons Internship Scheme
Worked on projects for a large energy player and a UK government entity.
- Coded and launched a visual planning tool used to scope future deployments. It was utilised by a Director General of the Civil Service and was subsequently deployed in five other workstreams.
- Created detailed cutover plans using MS Project and maintained the VSTS work management tool.
- Enabled 6 successful deployments into a test environment by coordinating the delivery of externally facing functionality across multiple suppliers and streams of work.

INTERESTS

Social Impact
- Organising member of a student housing co-operative in Manchester
- Contributed to a pamphlet with the Fabian Society and two Members of Parliament ahead of COP 26.
- Volunteered at a children's orphanage in Bolivia in 2019, helping the children with homework, teaching programming and English in addition to aiding the staff in maintaining the orphanage. Part of a solo 4-month backpacking trip through South America.
- In 2016, fundraised over £3,000 and volunteered for a Cambodian orphanage to help build a new school.

Music
- Sing in the University of Manchester choir. Previously sang with the Schola Cantorum performing at venues including Westminster Abbey.
- Obtained Grade 7 trumpet, Grade 5 music theory and Grade 4 piano.

Sport
- Part of The University of Manchester's running & karate teams. Ran the London Half Marathon. Taught karate to children for 4 years as a teaching assistant. Represented my borough in the London Youth Games.