SYL SHAW

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EXPERIENCE

University of Warwick   *October 2023 - Present*
PhD Candidate - Theoretical Physics Group

· Research in modelling tight binding lattices in real-space, with a focus on disordered systems and topology.
· Optimised C++ code for faster execution using the Eigen library, allowing for the analysis of 500x larger system sizes.
· Performed statistical analysis on 100GB+ datasets, finding numerically robust properties over 1000+ of disorder realisations.
· Implemented a parallel computing framework to interface between wolframscript code and slurm, in order to perform computational algebra manipulations across multidimensional parameter ranges simultaneously.

University of Warwick   *October 2023 - Present*
Senior Graduate Teaching Assistant

· Delivering in-person support and feedback classes for two sets of undergraduate students every week.
· Classes are for PX153 'Mathematics for Physicists' covering linear algebra, Fourier analysis and differential equations.
· Offered extension classes for ambitious students focusing on more rigorous applications of mathematics to quantum mechanics, e.g. step-by-step deriving the Heisenberg uncertainty principle or breaking down probabilistic concepts in quantum mechanics into understandable lessons.

G-Research   *April 2025*
Spring into Quant Finance

· Selected for an exclusive week-long experience hosted by G-Research giving insight into their operations in quantitative finance, focusing on their applications of machine learning methods to financial data.
· Attended workshops covering machine learning techniques, research engineering and applications to quantitative research.
· Created a gradient boosting algorithm based on regression trees from scratch and compared performance with popular boosting algorithms, such as XGBoost.
· Competed in an algorithmic trading competition in a team of 4. Price data was provided, which we used to fit an ARIMA model. Trading signals were generated from the model's prediction, and past performance was evaluated using pandas.

IMC   *April 2025*
Prosperity 3 Challenge

· Finished with top 5% performance of 20,000+ entrants. In a team of 4, we competed in a 15 day algorithmic trading competition in which new products were made available for trading every 3 days.
· Implemented backtesting system in python to accurately simulate order matching with the interface provided, in addition to setting up Jupyter notebooks to visualise past price data and analyse market participant behaviour from the order book.
· Traded using mean-reversion strategies for nonstationary products, and statistical arbitrage between composite products and their constituents, deriving trading signals from absolute deviations from a long-term mean.
· Implemented a Black-Scholes-based implied-volatility arbitrage strategy by constructing a python class to calculate the theoretical price, along with relevant derivatives using NumPy, then finding consistent trading strategies using the Z-score and calculating appropriate trading sizes via delta hedging.

PUBLICATIONS

· Shaw S, R A Römer, *Real-space renormalisation approach to the Chalker–Coddington model revisited: Improved statistics*, Physica E 165, 116073 (2025).
· *Time-reversal invariant Chalker-Coddington model and the real-space renormalisation group* - Presented talk at the 2025 spring DPG meeting.

EDUCATION

University of Warwick - PhD Physics   *October 2023 - Present*
PhD under the supervision of Rudolf Römer.

University of Warwick - MSc Physics   *October 2022 - September 2023*
Masters by research under the supervision of Rudolf Römer in the topic of the quantum Hall transition.

University of Warwick - BSc Mathematics and Physics   *September 2019 - June 2022*
Graduated with 2:1 classification - 72% average grade achieved in final year.

Brighouse High School Sixth Form   *September 2017 - May 2019*
A*AAA : Mathematics, Further Mathematics, Computer Science, Physics.

SKILLS

Technologies	C/C++ (Cmake, OpenMPI, GNU Parallel), Python (pandas, NumPy, SciPy, plotly, Jupyter).
Languages	English (Native), Japanese (Proficient).