

William Hampshire

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Physics undergraduate at the University of Sheffield, highly motivated to solve problems. Strong academic and professional background in optics research, specifically light confinement in “2D” heterostructures, and radiometric device R&D in industry, and experienced with Python machine learning techniques. Keen to research optics further, such as developing and characterising filters. Equipped to deliver solutions in a research setting, as learned on placement and during projects, using physics and practical skills complimented by Python data science techniques.

Education

- 2021 - present **BSc Physics with Year in Industry**, *University of Sheffield, Predicted First Class*
- 2019 - 2021 **A levels**, *The Sixth Form College, Colchester, Physics (A) Maths (A) Electronics (A) Chemistry (A)*
- 2014 - 2019 **9 GCSEs, 1 BTEC**, *Maltings Academy, Average 7.6 with 9 in Physics. Dist* in Business.*

Relevant Academic Modules (PHY)

- 332 **Atomic Physics** - quantum mechanics & angular momentum coupling, for electronic transitions & lasers.
- 304 **Solid State Physics** - Brillouin zones, dispersion relation, Fermi-Dirac statistics & magnetism.
- 382 **Semiconductor Physics & Technology** - applying solid state theory to construct electronic components.
- 235 **Programming in Python** - fundamentals of Python; functions, loops, conditionals.
- 328 **Advanced Programming in Python** - data science; using numpy, pandas, neural networks, & more
- 31002 **Research Project** - see “Academic Projects” below.

Employment

2023 - 2024 **Design Physicist Intern**, *AMETEK Land Instruments International*

- Advanced R&D; rectified Cassegrain optical device performance caused by glare. Applied radiometric theory, implementing absorbent and baffled surfaces, reducing glare 10%.
- Thermal imager calibration required internationally. Crafted integrating spheres and hot plates with <5%K thermal uniformity, reducing shipping costs, and minimising environmental impact.
- Quality control thresholds required balancing. Statistically analysed and visualized 40,000+ internal data log files, enabling efficient delivery of 7-figure orders with improved confidence & reliability.

Overall, impactful contributions made to the Physics team at Land, world leaders in non-contact temperature measurement solutions, furthering innovation and performance.

2022 - present **Volunteering**, *Student Staff Committee, University of Sheffield*

Volunteering for the Student Staff Committee, facilitating feedback from students to lecturers & faculty. Demands clear and effective communication, and good interpersonal understanding. For example, provided positive feedback on behalf of the cohort regarding a new lecture note platform, contributing to its anticipated broader implementation.

Academic Projects

Subwavelength Waveguide Simulation using Rigorous Coupled Wave Analysis

- Undergraduate computational research project. Simulated subwavelength waveguides to reveal photonic modes, with Professor Alexander (Sasha) Tartakovskii & research group, University of Sheffield.
- Strong Python ability leveraged to automate exploration and characterisation of grating Transition Metal Dichalcogenide (TMDC) based waveguides, using Rigorous Coupled Wave Analysis (RWCA).
- Produced graphical results and quantified photonic modes automatically, by fitting modified hyperbolic functions.

Personal Projects

Calculation of Radiance-Temperature Relationship for Digital Radiometric Optical Devices

- Created C# app that calculates the Radiance Temperature relationship used to calibrate radiometric instruments for a given wavelength band, temperature range, and filter, to practice implementing Physics with new languages.
- Implemented the Sakuma Hattori Planck 3 approximation to calculate thermal radiation, and SQLite database management for stackable filters, for simulating non-transparent beam path.
- 10x faster than Python predecessor it was based on, producing the same result without access to predecessor's source code, with improved GUI performance.

Further details and additional projects available on williamhampshire.com.

Technical and Personal skills

- **Programming Languages:** Python (numpy, pandas, seaborn, sklearn...), JavaScript/HTML/CSS.
Basic proficiency in C, C#, Matlab, VBA.
- **Industry Software:** Excel (& macros), Tableau, Autodesk Fusion 360, Adobe CS/CC.
- **General Business Skills:** Documentation and presentation, Understanding of business aims and objectives, Works productively in a team (see volunteering, internship).

Demonstrated these skills during placement and projects, including analyzing and presenting instrument data to ensure product quality while maintaining a high production pass rate, using programming and software to address physics and business challenges, and enhancing team capabilities by introducing dashboards and 3D modeling tools.

Interests and other achievements

- **1st** in University of Cambridge funded "Brilliant Project"; literary review on retina regrowth using protein conditioning (2018) supervised by Priwanka Makwana PhD.
- **Award Winner** at STEM showcase CSES, 2018.
- **Best Musician** award at Maltings Academy.
- **Senior Prefect** at Maltings Academy.
- Data Analysis & ML projects; investigate interesting/useful datasets (e.g. WBOD, Kaggle) with Python. Working towards Data Science Associate on DataCamp.
- Electronic projects, using Arduino, Raspberry Pi; RGB LED control powered by MOSFETs.
- 3D Printing, CAD, RC hobbyist; using Fusion 360 for 3D printing and modelling projects, building racing drones.
- Music & Sports; play Saxophone, Piano and Bass guitar. Toured Germany with jazz orchestra. Played field hockey and squash from a young age.

References

Dr [] Godden

Dr [] Rockett

Prof [] Tartakovskii

Redacted. Available on request