Lewis Napper

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Education

2021 – · · · · **Ph.D. Mathematics, University of Surrey.**
Key Topics: 2/3D Geometry, Hamiltonian Mechanics, Quaternions, Fluid Dynamics.
Thesis: *Monge–Ampère Geometry and Vortices.*
Supervisors: Dr. M. Wolf and Prof. I. Roulstone.

2017 – 2021 **M.Math. 1st class (hons) Mathematics, University of Surrey.**
Key Topics: Linear Algebra, Matrix Analysis, Graph Theory, Vector Calculus.
Thesis: *Algebraic Bethe Ansatz for* $\mathfrak{su}(2)$ *Spin Chains and Beyond*.
Supervisors: Prof. A. Torrielli and Dr. A. Prinsloo.
Average grade: 98%

2010–2017 **Therfield Secondary School and Sixth Form**
A-level: 3 *A**, 1 *A (plus* 1 *A at AS level).*
GCSE: 9 *A* including English and German Language,* 3 *A,* 1 *B*
Other: D*2 Cambridge Nationals ICT, A FSMQ Additional Mathematics

Employment

2019 – · · · · **Teaching Assistant, University of Surrey**

– Supervised undergraduate MATLAB and R-Studio programming labs for Statistics and Numerical Methods modules. Was regularly contacted by students from other courses for help due to my high quality teaching and code debugging.

– Edited notes and exercises for 3 modules to a high standard, consequently becoming an invited expert for the Journal of Geometry and Physics.

– Supported the delivery of 10 undergraduate modules, including those in which I had no prior experience, providing students with clear and concise feedback within a week of work submission.

2019–2020 **Undergraduate Researcher, University of Surrey**

– Awarded a London Mathematical Society funded research bursary (Value: £1440), supervised by Dr. J. Grant, to study synthetic general relativity.

– Initiated a collaboration with outstanding researchers at the Universities of Vienna and Cardiff, resulting in 2 scientific publications.

Portfolio Projects

Cellular Automata on Aperiodic Mono-tiles (unpublished, ongoing)

– Investigating how grid regularity affects emergent behaviour and Turing completeness of Game of Life and Langton's Ant algorithms (see GitHub for a command-line implementation).

– Developing a C++ application for visualising simulations using SFML for UI and CUDA for efficiency, as part of a collaboration with Dr. M. J. Gabbay from Heriot–Watt University.

Beginning C++ Game Development (GitHub, ongoing)

– Learning C++ (SFML/OpenGL) and game development programming patterns by following John Horton's book of the same name. Includes clones of the classic games Pong and Timber!

Portfolio Projects (continued)

- 3**DSage Raycaster** (GitHub, dormant)
  – Raycaster game engine in C++ (OpenGL/Glut) based on 3DSage's tutorials. Code produces a top down map view as well as a 2.5D world which can be explored.
  – On hiatus while I investigate alternatives such as SFML and Binary Space Partitioning.

Skills

Software Skills

- **Scripting:** Moderate experience with MATLAB, Mathematica, R-Studio, and Python through undergraduate study, teaching, and research.
- **Programming:** Basic experience with C♯ and C++ from reviewing and debugging other researchers' code, as well as personal projects.
- **Web Development:** HTML, CSS, JavaScript, and JQuery frontend skills developed through making my own Website and several small web apps. See GitHub for more.
- **Source Control:** Familiarity with GitHub Desktop and basic experience with using Git for commits to personal project repositories.
- **Other:** Microsoft Office (Word, Excel, etc.), LaTeX typesetting, Adobe Photoshop, Affinity Suite.

Professional Skills

- **Report Writing:** Refined writing skills during my Ph.D. and Professional Skills university module, resulting in successful grant applications worth over £3000, as well as 3 scientific publications.
- **Public Speaking:** Contributed 8 talks for conferences and seminars over the past 2 years, including invited talks at Imperial College London and the University of Sorbonne. See my Website for sample slides.

Activities and Achievements

- **Excellence:** Four time winner of the annual Mathematics Department Prize for Excellence (2017-2021) for best performance in a year of an undergraduate/master's degree.
- **Merit:** Awarded the University of Surrey Merit Scholarship (2017) for exceptional A-level grades.
- **Societies:** Academic secretary of the Surrey Maths Society (2018), for which I produced updated graphic design, ran revision sessions, and organised seminars with invited speakers. Active member of the Surrey Film Society (2017-2022).
- **Quant:** Member of the University of Surrey team and regional finalist in the WorldQuant Championships (2018), for which I learnt the software WebSim.
- **Art:** Presented art at the Surrey Youth Voice Awards and at my Sixth Form art festival, accompanying the latter by playing guitar as part of a live band. Produced digital and traditional art for art-shares and paid commissions.

References

Dr. Martin Wolf
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Prof. Alessandro Torrielli
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University of Surrey,
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