Lewis Napper

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Hello Games.

June 16, 2024

Dolphin House,
3 North Street,
Guildford,
Surrey,
GU1 4AA

Dear Hello Games Recruitment Team,

I hope this letter finds you all well. Having seen the outstanding trailer for your new game *Light No Fire* at *The Game Awards* last year, I am excited to apply for the Graduate Programmer role advertised on your website. With my strong mathematical background, paired with experience in programming and the arts, I am well-placed to make the most of this fantastic opportunity to learn new skills whilst making a visible contribution to stunning, large-scale, fantasy worlds.

I am currently studying for a Ph.D. in mathematical physics, during which I have:

- Published several papers on applications of geometry (e.g. quaternions and vector constructions) to fluid dynamics and relativity.
- Presented my work in popular presentations, technical talks, and student seminars at the likes of Imperial College London and the University of Sorbonne (Paris), developing my ability to communicate complex ideas in both written and spoken word.
- Initiated and coordinated collaborations with researchers at the Universities of Vienna, Cardiff, and Heriot–Watt, in parallel to my primary research, honing my organisational and leadership skills.

Working with these amazing interdisciplinary teams of mathematicians, physicists, and computer scientists has been a truly enjoyable experience and is one of my proudest achievements (second only to winning an informal *Super Smash Bros. Ultimate* tournament at a relativity conference in Germany).

In addition to providing a unique perspective on problem solving, I have also gained the ability to quickly parse documentation, learn new software, and resolve errors from helping to teach numerics (MATLAB, Python, LaTeX) and statistics (R-Studio) undergraduate courses throughout my time at university. However, I am always keen to improve and am currently exploring C++, SFML, and CUDA by developing an application for computing and visualising cellular automata on irregular grids, as well as working through John Horton's *Beginning C++ Game Programming (2nd Edition)* in order to deepen my understanding of game development techniques. Much of this work can be found on GitHub and on my Website, the front-end for which I constructed used HTML, CSS, and JavaScript (JQuery). Through these projects I have not only learned a bit about UI and UX, but also about programming interactive elements of large scale, live projects, and project planning using Git and GitHub to track changes.

While I have enjoyed the learning and problem solving experience of undertaking a Ph.D., I am excited to begin a career where I can grow professionally and apply the tools I have developed to an industry I am passionate about. Having been part of the video-game community for most of

my life, creating fan-art, attempting speedruns, and staying up until the early hours of the morning to watch E3, I would love to be able to make a direct contribution to the amazing works of art that come out of studios such as yours. Due to graduate in the New Year, I am looking forward to learning new skills and exchanging knowledge with talented individuals from a wider range of disciplines.

My desire to begin my game development career at Hello Games stems partly from seeing how *No Man's Sky* has grown over the last 8 years. Not only does the talent and care with which you create shine through each of the updates, from Foundations to Adrift, but the way in which your studio leads have supported and defended the developers throughout is truly admirable. Being a part of the Guildford Games community and contributing to Hello Games' next step would be an honour. From a professional perspective, I appreciate your investment in the health, well-being, and development of your team and truly believe that I can evolve into an experienced software engineer and games programmer under your guidance.

Given my strong background in mathematics research, desire to learn, and genuine passion for the video games industry, working as a Graduate Programmer at Hello Games will provide an excellent start to my career in game development. Above all, I am thrilled by the opportunity to join a diverse, multidisciplinary team of industry experts and create some games that wouldn't exist otherwise.

I greatly appreciate you taking the time to consider my application and I look forward to hearing from you soon.

Yours sincerely,
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: *Applications of Geometry to PDEs, Vortices, and Relativity*
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

Portfolio Projects

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

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

– Investigating how Cellular Automata, such as Conway's Game of Life, can be encoded as sparse matrix algorithms and how grid regularity affects their emergent behaviour.

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!

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.

Employment

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

– 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.

Employment (continued)

2024 **Visiting Research Fellow, University of La Rochelle, France**

– Recipient of a 3-month fully-funded research fellowship (Value: £4300) to work at a CNRS laboratory and support Franco–British collaboration, issued by the French Embassy in the UK.

– Researched the application of generalised geometry and geometric numerical integrators to dynamical systems including turbulence, alongside Dr. V. Salnikov.

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

– 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.

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 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 £7000, 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.