

Sam A. Scivier

British & Canadian Citizen

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SUMMARY & INTERESTS

I am a PhD student in the Department of Earth Sciences at the University of Oxford, developing probabilistic methods for uncertainty quantification in geophysics. I hold a Master's in Physics from the University of Birmingham and have gained industry experience through internships in quantum computing at D-Wave Systems (Canada) and Riverlane (UK). My research focuses on Gaussian process-based approaches for probabilistic fusion of geospatial datasets, with applications to earthquake ground motion prediction and seismic hazard assessment. I am interested in applying physics-based computational, data science, and machine learning methods to tackle challenges across geoscience, aerospace, sustainability, and emerging technologies, with a particular focus on research opportunities that combine rigorous scientific methodology with practical applications having tangible societal impact.

EDUCATION

Ph.D., Geophysics 10/2022 – Present
University of Oxford (Hertford College), Oxford, UK Expected 2026

Funding: Oxford-NERC DTP in Environmental Research (Full studentship ~ £120k)

Advisor(s): Paula Koelemeijer, Tarje Nissen-Meyer, Atılım Güneş Baydin

Gaussian processes for the probabilistic fusion of geophysical datasets – with application to seismic hazard assessment.

M.Sci., Physics (First Class Honours) 10/2018 – 07/2022
University of Birmingham, Birmingham, UK

Advisor(s): Alberto Vecchio

Graduated as M.Sci. Physics student with highest overall mark. Specialized coursework in theoretical and quantum physics, radar and imaging techniques.

Final project: Machine learning algorithms for early identification of massive black hole binary mergers for LISA mission (ESA; launch 2035).

Third year project: Bayesian inference for parameter estimation of binary black hole mergers in LIGO experiment.

High School Diploma, British Columbia 09/2013 – 06/2018

Prince of Wales Secondary School, Vancouver, Canada

Graduated as highest GPA student. Top scholar for Grades 10, 11, and 12.

RESEARCH EXPERIENCE & EMPLOYMENT

Ph.D. Researcher 10/2022 – Present
Department of Earth Sciences, University of Oxford, Oxford, UK

Working on probabilistic methods for uncertainty quantification in geophysics. Developed Gaussian process-based approach for geospatial data fusion with applications to earthquake ground motion prediction and seismic hazard assessment. Building collaborations to extend methods to other geophysical problems, and developing open-source software to make methods broadly accessible across the geosciences.

Quantum Science Intern

06/2021 – 08/2021

Riverlane, Cambridge, UK

Focused on improving resource efficiency in quantum computation, and developed software for quantum computers using Python. Collaborated with a multidisciplinary team of physicists, chemists, mathematicians, and software engineers. Delivered algorithm implementation and research presentation, and co-authored a paper published in the *Journal of Chemical Theory and Computation* (2022).

Quantum Research Intern

06/2019 – 08/2019

D-Wave Systems, Burnaby, Canada

Conducted theoretical research in quantum technology and applications, using MATLAB for simulations of nonstoquastic quantum processing and analysis. Designed optimization protocol for nonstoquastic quantum annealing, and co-authored a paper published in *Physical Review A* (2021).

Student Science Mentee

03/2016 – 04/2016

DPoint Technologies, Vancouver, Canada

Worked in a commercial research laboratory, preparing membrane samples and testing them using analytical equipment. Analyzed results and their implications for commercial applications.

PUBLICATIONS

- [3] **S.A. Scivier**, T. Nissen-Meyer, P. Koelemeijer, and A.G. Baydin, “Gaussian Processes for Probabilistic Estimates of Earthquake Ground Shaking: A 1-D Proof-of-Concept,” *arXiv:2412.03299 [physics.geo-ph]* (2024). DOI: [10.48550/arXiv.2412.03299](https://doi.org/10.48550/arXiv.2412.03299). Peer-reviewed and presented at ML4PS Workshop at NeurIPS 2024.
- [2] N.S. Blunt, J. Camps, O. Crawford, R. Izsák, S. Leontica, A. Mirani, A.E. Moylett, **S.A. Scivier**, et al., “Perspective on the current state-of-the-art of quantum computing for drug discovery applications,” *Journal of Chemical Theory and Computation* **18**, 7001-7023 (2022). DOI: [10.1021/acs.jctc.2c00574](https://doi.org/10.1021/acs.jctc.2c00574).
- [1] E.M. Lykiardopoulou, A. Zucca, **S.A. Scivier**, and M.H. Amin, “Improving nonstoquastic quantum annealing with spin-reversal transformations,” *Physical Review A* **104**, 012619 (2021). DOI: [10.1103/PhysRevA.104.012619](https://doi.org/10.1103/PhysRevA.104.012619).

TEACHING & OUTREACH**Workshop Leader**

11/2024

Gaussian Processes for Probabilistic Earthquake Ground Motion Prediction**Oxford Intelligent Earth CDT, University of Oxford, Oxford, UK**

Led workshop for first-year PhD students on probabilistic fusion of seismic velocity models using Gaussian Processes, with application to seismic hazard. Created open-source Jupyter notebook with interactive examples demonstrating data fusion and uncertainty quantification. Designed progressive exercises covering engineering safety assessment and computational optimization. Materials available at: github.com/sscivier/intelligent-earth-cdt-earthquakes-gp.

NON-TECHNICAL PROFESSIONAL EXPERIENCE**Assistant Programme Coordinator**

06/2020 – 08/2020

Squash British Columbia, Vancouver, Canada

Worked with the Executive Director to design, coordinate, and communicate Squash BC’s response to the COVID-19 pandemic. Organized and executed a panel discussion on university opportunities and experiences for an audience of competitive junior squash players.

Assistant Squash Professional
Jericho Tennis Club, Vancouver, Canada

06/2016 – 09/2018

Worked with junior and adult players to improve their squash game through tailored (private and group) coaching sessions. Created a positive and inclusive sports environment, and served as a role model for junior squash players.

AWARDS & RECOGNITION

IAGA/IASPEI Travel Grant 09/2025
IAGA/IASPEI Joint Scientific Meeting

Waived registration fee to attend the IAGA/IASPEI Joint Scientific Meeting in Lisbon, Portugal, for presenting my work on probabilistic fusion of seismic velocity models using Gaussian Processes. (Value €290)

Best Student Poster – British Seismology Meeting 03/2024
International Seismological Centre

Awarded for my poster presentation at the British Seismology Meeting in Reading, UK. (Value £100)

SWJ Smith Prize 07/2022
School of Physics and Astronomy, University of Birmingham

Awarded to the M.Sci. Physics student graduating with the highest overall mark. (Value £500)

Physics Sports Bursary 2019 – 2022
School of Physics and Astronomy, University of Birmingham

Awarded for combined academic and athletic achievement. (Value £800/year)

Academic Achievement Scholarship 01/2019
School of Physics and Astronomy, University of Birmingham

Governor General's Academic Medal 06/2018
Government of Canada

The most prestigious award that students in Canadian schools can receive. Awarded to the student graduating with the highest GPA from a high school.

TECHNICAL SKILLS

Programming: Python (7+ years), Git, MATLAB, Bash, HTML

ML & Data Science: TensorFlow, PyTorch, Gaussian Processes, Bayesian inference

Geophysics: Finite difference methods, seismic wave propagation, geospatial data

Tools: GitHub/GitLab, LaTeX, VSCode

Methods: Probabilistic methods, machine learning, numerical methods, open-source development

INVITED TALKS

Towards physics-based probabilistic estimates of earthquake ground motion using Gaussian processes 11/2024

Mathematics and Statistics Seminar Series, University of Exeter, Exeter, UK

Seminar on developing probabilistic methods for incorporating uncertainties from seismic velocity model inconsistencies in earthquake ground motion prediction using Gaussian process regression.

SELECTED CONFERENCES & PRESENTATIONS

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| Invited Talk <i>University of Exeter</i> | November 2024 Gaussian process methods for ground motion prediction |
| Oral Presentation <i>IAGA/IASPEI Assembly, Lisbon</i> | September 2025 Probabilistic fusion of seismic velocity models |
| Poster <i>NeurIPS ML4PS Workshop, Vancouver</i> | December 2024 Gaussian Process workflow for earthquake ground motion |
| Poster (<i>Best Student Prize</i>) <i>British Seismology Meeting, Reading</i> | March 2024 Neural process methods for seismic velocity merging |
| Workshop <i>SPIN ITN, Pitlochry, Scotland</i> | March 2023 Earth imaging and inverse problems in geophysics |

LANGUAGES

English (Native) • French (Professional) • Romanian (Basic)

EXTRACURRICULAR ACTIVITIES

Competitive Squash: Gold medal (2022 BUCS Team Championships); Silver Medal (2019 BUCS Team Championships); Silver medal (2019 Canada Winter Games); University of Birmingham Squash Club – President (2019-2020), Media Secretary (2020-2021), Welfare Secretary (2021-2022)

Other Interests: Skiing, hiking, cycling, climbing, photography

PROFESSIONAL MEMBERSHIPS

Fellow of the Royal Astronomical Society (Elected 02/2025) • Institute of Physics Member (2018–Present)