

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
Riverlane, Cambridge, UK

06/2021 – 08/2021

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.

PROFESSIONAL EXPERIENCE

Assistant Programme Coordinator

June – August 2020

Squash British Columbia, Vancouver

COVID-19 pandemic response design. Communications management and virtual event organization.

Assistant Squash Professional

June 2016 – September 2018

Jericho Tennis Club, Vancouver

Junior and adult coaching. Positive sports environment development.

AWARDS & RECOGNITION

IAGA/IASPEI Travel Grant (2025) • British Seismology Best Student Poster (2024) • SWJ Smith Prize - Highest M.Sci. Physics Graduate (2022) • Physics Sports Scholarship (2019-2022) • Governor General's Academic Medal (2018) • BC Academic Achievement Scholarship (2018)

TECHNICAL SKILLS

Programming: Python (7+ years), 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, numerical methods, open-source development

SELECTED CONFERENCES & PRESENTATIONS

Invited Talk	November 2024
<i>University of Exeter</i>	Gaussian process methods for ground motion prediction

Oral Presentation	September 2025
<i>IAGA/IASPEI Assembly, Lisbon</i>	Probabilistic fusion of seismic velocity models

Poster	December 2024
<i>NeurIPS ML4PS Workshop, Vancouver</i>	Gaussian Process workflow for earthquake ground motion

Poster (<i>Best Student Prize</i>)	March 2024
<i>British Seismology Meeting, Reading</i>	Neural process methods for seismic velocity merging

Workshop	March 2023
<i>SPIN ITN, Pitlochry, Scotland</i>	Earth imaging and inverse problems in geophysics

LANGUAGES

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

EXTRACURRICULAR ACTIVITIES

Competitive Squash: Silver medal (2019 Canada Winter Games), Gold medal (2022 BUCS Championships), University of Birmingham President (2019-2020)

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

PROFESSIONAL MEMBERSHIPS

Fellow of the Royal Astronomical Society (2025) • Institute of Physics Member (2018–present)