Sam A. Scivier

British & Canadian Citizen

Department of Earth Sciences, University of Oxford
South Parks Road, Oxford, OX3 1AN, UK

sam.scivier@earth.ox.ac.uk | sscivier.github.io | samscivier
sscivier | Google Scholar | Oxford Profile

Professional Summary

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

PhD in Earth Sciences October 2022 – present
University of Oxford, England Expected 2026

- Funding: Oxford-NERC DTP in Environmental Research (Full studentship ∼£120k)
- Research: Developing probabilistic methods for uncertainty quantification in physics-based seismic hazard assessment
- Focus: Gaussian process-based approaches for probabilistic fusion of overlapping geospatial datasets

MSci Physics (First Class Honours) October 2018 – July 2022
University of Birmingham, England

- Specialized coursework in theoretical and quantum physics, radar and imaging techniques
- Final year project: Machine learning algorithms for early identification of massive black hole binary mergers for LISA mission
- Third year project: Bayesian inference for parameter estimation of binary black hole mergers

British Columbia High School Diploma September 2014 – June 2018
Prince of Wales Secondary School, Vancouver, Canada

- Graduated as highest GPA student with A grades in all Grade 12 subjects
- Top scholar for Grades 10, 11, and 12

Research Experience

PhD Researcher October 2022 – present
Department of Earth Sciences, University of Oxford

- Developing probabilistic methods for uncertainty quantification in physics-based seismic hazard assessment
- Creating Gaussian process-based approaches for probabilistic fusion of overlapping geospatial datasets
- Building collaborations to extend methods to other geophysical problems

- Developing open-source software to make methods broadly accessible across geosciences

Quantum Science Intern June – August 2021
Riverlane, Cambridge, UK

- Focused on improving resource efficiency in quantum computation
- Developed software for quantum computers using Python extensively
- Worked in multidisciplinary team of physicists, mathematicians, and software engineers
- Delivered algorithm implementation and research presentation

Quantum Research Intern June – August 2019
D-Wave Systems Inc., Burnaby, Canada

- Conducted theoretical research in quantum technology and applications
- Used MATLAB for simulations of nonstoquastic quantum processing and analysis
- Designed optimization protocol for nonstoquastic quantum annealing
- Co-authored paper published in Physical Review A (2021)

Student Science Mentorship Programme Researcher March – April 2016
DPoint Technologies Inc., Vancouver, Canada

- Worked part-time in commercial research laboratory during high school
- Prepared membrane samples and conducted testing using analytical equipment
- Assessed results for commercial energy recovery ventilation applications

Publications

1. **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. 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**, C. Sunderhauf, P. Schopf, 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
3. 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

Teaching & Outreach

Gaussian Processes for Probabilistic Earthquake Ground Motion Prediction November 2024
Workshop Leader, Oxford Intelligent Earth CDT

- Led workshop for first-year PhD students on probabilistic fusion of seismic velocity models using Gaussian Processes
- 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 June – August 2020
Squash British Columbia, Vancouver, Canada

- Collaborated with Executive Director to design Squash BC's COVID-19 pandemic response
- Managed communications to member facilities through website, newsletters, and online meetings
- Organized virtual panel discussion on university opportunities for competitive junior players

Part-Time Assistant Squash Professional June 2016 – September 2018
Jericho Tennis Club, Vancouver, Canada

- Coached junior and adult squash players in private and group lessons
- Created positive sports environment and served as role model for junior players

Awards & Recognition

- IAGA/IASPEI 2025 Travel Grant – Free registration (€290 value) (2025)
- British Seismology Meeting 2024 – Best Student Poster Prize (2024)
- University of Birmingham School of Physics and Astronomy SWJ Smith Prize – Highest M.Sci. Physics graduate (2022)
- University of Birmingham Physics Sports Scholarship (2019-2022)
- Canadian Governor General's Academic Medal – Highest GPA graduate (2018)
- British Columbia Academic Achievement Scholarship (2018)
- University of Birmingham School of Physics and Astronomy Academic Achievement Scholarship (2018/19)
- SFU Applied Sciences Math 11 Award, Simon Fraser University (2017)

Technical Skills

Programming: Python (7+ years), MATLAB, Bash, HTML, Java
Machine Learning & Data Science: TensorFlow, PyTorch, Weights & Biases, Gaussian Processes, Bayesian inference
Geophysical Modeling: Finite difference methods, seismic wave propagation, velocity model analysis
Software & Tools: GitHub/GitLab, LaTeX, VSCode, Microsoft Office
Research Methods: Probabilistic methods, statistical analysis, scientific computing, open-source development

Conferences & Presentations

Invited Talks

- "Towards physics-based probabilistic estimates of earthquake ground motion using Gaussian processes" – University of Exeter (November 2024)

Conference Presentations

- IAGA/IASPEI Joint Scientific Assembly 2025, Lisbon, Portugal (Oral presentation, September 2025)
- ML4PS Workshop at NeurIPS 2024, Vancouver, Canada (Poster, December 2024)
- NERC DTP Student Conference 2024, Oxford, UK (Poster, June 2024)
- British Seismology Meeting 2024, Reading, UK (Poster – *Best Student Poster Prize*, March 2024)

Professional Development

- SPIN Short Course 3: "Interrogating the Restless Earth" – SPIN ITN, Scotland (March 2023)

Languages

English: Native proficiency **French:** Professional working proficiency **Romanian:** Basic proficiency

Extracurricular Activities

Competitive Squash

- Silver medal, 2019 Canada Winter Games; Gold medal, 2022 BUCS Squash Team Championships
- 1st team player, University of Birmingham (2018-2022)
- President, University of Birmingham Squash Club (2019-2020)
- Sport Colours Award for outstanding contribution (2020)

Other Interests

Skiing, hiking, road/mountain biking, bouldering/climbing, photography

Professional Memberships

- Fellow of the Royal Astronomical Society (elected February 14, 2025)
- Institute of Physics Member (Studying) (2018 – present)