SACHA LAPINS

Postdoctoral Researcher in Seismology

Email: sacha.lapins@bristol.ac.uk

School of Earth Sciences
University of Bristol
Wills Memorial Building
Queens Road
Bristol BS8 1RJ

Research Interests

My current research focuses on developing machine learning methods and other statistical approaches for seismic signal processing tasks, particularly detecting, characterising and locating earthquakes associated with volcanic and magmatic processes. I employ a variety of methods, including supervised/unsupervised deep learning, wavelet transforms, changepoint detection, linear/nonlinear regularised regression and Monte Carlo methods. I am an avid scientific programmer with years of experience producing my own research code. Programming languages include Python, R, MATLAB and C++.

Education

2017 – 2021	**PhD, Geophysics, School of Earth Sciences, University of Bristol, UK** Thesis title: *Detecting and characterising seismicity associated with volcanic and magmatic processes using deep learning and wavelet transform methods*
2015 – 2016	**MSc (Distinction), Volcanology, University of Bristol, UK** Dissertation title: *Spectral analysis of volcano-seismic data using the continuous wavelet transform*
2006 – 2009	**BSc (Hons), Mathematics & Statistics, University of Warwick, UK**

Academic Employment

2021 – present	**Postdoctoral Research Associate, School of Earth Sciences, University of Bristol, UK**
2016 – 2017	**Research Assistant, School of Earth Sciences, University of Bristol, UK**

Other Qualifications / Training

2020	***Distributed Acoustic Sensing (DAS) One-Week Virtual Workshop****, IRIS Workshop, online*
2020	***Remote Online Sessions for Emerging Seismologists (ROSES)****, IRIS Summer School, online*
2019	***Sequential Monte Carlo methods***, PhD course, Uppsala University, Sweden
2018	***Advanced Scripting and Computing Techniques***, NERC / Google Cloud PhD course, University of Manchester
2017 – 2018	***Computer Intensive Statistics / High-Dimensional Statistics***, APTS PhD course, University of Southampton
2017 – 2018	***Statistical Inference / Statistical Computing***, APTS PhD course, University of Cambridge
2016	***Risk & Uncertainty in Natural Hazards***, NERC CREDIBLE / Cabot Institute Summer School, University of Bristol

Publications

4. **2020, Lapins, S.**, B. Goitom, J.-M. Kendall, M.J. Werner, K.V. Cashman, J.O.S. Hammond. A Little Data Goes a Long Way: Automating Seismic Phase Arrival Picking at Nabro Volcano with Transfer Learning. *Journal of Geophysical Research: Solid Earth*, 126(7). doi.org/10.1029/2021JB021910.

3. 2020, Stork, A., A. Baird, S. Horne, G. Naldrett, **S. Lapins**, J.-M. Kendall, J. Wookey, J. Verdon, A. Clarke, A. Williams. Application of Machine Learning to Microseismic Event Detection in Distributed Acoustic Sensing (DAS) Data. *Geophysics*, 85(5). doi.org/10.1190/geo2019-0774.1.

2. **2020, Lapins, S.**, J.-M. Kendall, A. Ayele, M. Wilks, A. Nowacki, K.V. Cashman. Lower Crustal Seismicity on the Eastern Border Faults of the Main Ethiopian Rift. *Journal of Geophysical Research: Solid Earth*, 125(8). doi.org/10.1029/2020JB020030.

1. **2020**, **Lapins, S.**, D.C. Roman, J. Rougier, S. De Angelis, K.V. Cashman, J.-M. Kendall. An examination of the continuous wavelet transform for volcano-seismic spectral analysis. *Journal of Volcanology and Geothermal Research*, 389. doi.org/10.1016/j.jvolgeores.2019.106728.

Meeting / Conference Presentations

2021	***Automating Seismic Phase Arrival Picking at Nabro Volcano with Transfer Learning*** (presented talk) COMET annual meeting, virtual conference

2020	***A Little Data Goes a Long Way: Automating Seismic Phase Arrival Picking at Nabro Volcano, Eritrea, Using Transfer Learning and a Limited Seismic Catalogue*** (presented talk and panel discussion) AGU Fall Meeting 2020, virtual conference
2020	***Automating Seismic Phase Arrival Picking at Nabro Volcano, Eritrea, Using Transfer Learning and a Limited Seismic Catalogue*** (presented talk) International Volcanology Seminar Series, virtual seminar
2020	***Seismic Event Detection and Processing Using Machine Learning*** (presented talk) Bristol University Microseismicity ProjectS (BUMPS), virtual conference
2019	***Transfer Learning for Automated Seismic Phase Arrival Detection on Volcano-Seismic Networks*** (poster) AGU 2019, conference, San Francisco, USA
2019	***Investigation of deep-focus rift flank seismic events in the Main Ethiopian Rift*** (poster) Magmatic and Volcanic Process in Continental Rifts, conference, Hawassa, Ethiopia
2017	***Seismic phase picking using statistical methods*** (presented talk) Bristol University Microseismicity ProjectS (BUMPS), conference, Bristol, UK

Teaching

Earth Sciences teaching

2020 – 2021	*Topics in Volcanology* (teaching), MSc Volcanology programme, University of Bristol, UK
2018 – 2020	*Computing for Earth Scientists* (demonstrator), BSc Geology/Geophysics course, University of Bristol, UK

Language teaching

2013 – 2014	English language teacher, multiple language schools, UK and Costa Rica

Fieldwork / Expedition Experience

2013	Expedition Project Manager & Trek Guide (3 months), Raleigh International, Costa Rica / Nicaragua
2011	Expedition Volunteer (3 months), Raleigh International, Costa Rica / Nicaragua

Non-Academic Employment

2014 – present	Trustee, Young & Free Charity, Bristol, UK
2014 – 2015	Medical Secretary, Urology Dept, Southmead Hospital, Bristol, UK
2014	Language Teacher, International House, Bristol, UK
2013 – 2014	Language Teacher, Idiomas Mundiales, San Jose, Costa Rica
2009 – 2012	Financial Reporting & Administration, Royal Free NHS Foundation Trust, London, UK

Funding / Grants

2017 – 2021	National Environmental Research Council (NERC) GW4+ Doctoral Training Partnership PhD funding

Other Academic Service

2020	**Machine learning reading group leader** – organising reading / discussion groups and producing practical tutorials for seismology researchers at School of Earth Sciences, University of Bristol
2019 – present	**Mentor** to PhD student conducting research on deep learning approaches to event detection for hydraulic fracturing induced seismicity

References

Prof. Kathy Cashman	Professor of Volcanology, School of Earth Sciences, University of Bristol, UK
Prof. Mike Kendall	Professor of Geophysics, Department of Earth Sciences, University of Oxford, UK