

Nicholas Sale

Email: nicholas.j.sale@gmail.com

Webpage: nicksale.github.io/

Citizenship: British

Address: Computational Foundry, Bay Campus

Swansea University, Wales. SA1 8EN

Research interests Topological Data Analysis, Applications of Persistent Homology, Applied Topology, Phase Transitions, Statistical Physics, Machine Learning

Education

| | |
|---|--------------------|
| Swansea University | Swansea, UK |
| PhD in Mathematics | Oct 2019 – Present |
| Supervisors: Prof. Jeff Giansiracusa, Prof. Biagio Lucini | |
| Current Title: Applications of Topological Data Analysis to Statistical Physics | |
| Expected Completion: Autumn 2022 | |

| | |
|---|---------------------|
| University of Oxford | Oxford, UK |
| MMathCompsci Mathematics & Computer Science | Oct 2015 – Jul 2019 |
| First Class | |

Honors and scholarships

| | |
|--|-----------|
| Swansea University Research Excellence Scholarship | 2019-2022 |
| Undergraduate Scholarship (New College, Oxford) | 2016-2019 |
| CyberFirst Bursary (UK Civil Service) | 2015-2019 |
| Arkwright Engineering Scholarship (Arkwright Foundation) | 2013-2015 |

Prizes and awards

| | |
|--|----------|
| SIAM Student Travel Award (to attend SIAM AG21) | Aug 2021 |
| Winner of TopFlavours Gongshow | Jun 2021 |
| 2 nd place in Welsh Mathematics 3-Minute Thesis Competition | Mar 2021 |

Preprints

Quantitative analysis of phase transitions in two-dimensional XY models using persistent homology
Nicholas Sale, Jeffrey Giansiracusa, Biagio Lucini.
arXiv:2109.10960, September 2021.

Invited Talks

| | |
|--|----------|
| Quantitative analysis of phase transitions in two-dimensional XY models using persistent homology | Sep 2021 |
| Machine Learning for High Energy Physics, on and off the Lattice ECT* Trento (hybrid) | |
| Persistent Homology for Phase Transitions | Nov 2020 |
| UK Centre for TDA, University of Oxford (online), November 27, 2020 | |

Contributed Talks

| | |
|--|----------|
| Persistent Homology and Phase Transitions | Jun 2021 |
| TopFlavours, University of Warwick (online), June 18, 2021 | |

| | | |
|------------------------|--|----------------------------------|
| Teaching experience | Teaching assistant, Department of Mathematics (Swansea University) | |
| | MA-308: Machine Learning | Lent Term 2021 |
| | MA-131: Geometry, Logic, and Communication | Michaelmas Term 2020 |
| | MA-262: Numerical Methods | Lent Term 2020 |
| | MA-121 Methods of Algebra and Calculus | Michaelmas Term 2019 |
| Other Service | Organiser of Swansea Maths PhD Seminar | |
| | | Jun 2021 - Present |
| | Co-organised minisymposium for SIAM AG21 | |
| | | Aug 2021 |
| | Invited speakers for a 2-session minisymposium on Persistent Homology for Phase Transitions, co-organised with Quoc Hoan Tran. | |
| Research experience | Assisted with the LMS Undergraduate Summer School | |
| | | Jul 2021 |
| | Spoke to participants about my experience of doing a PhD during coffee breaks throughout the 2 week event hosted by Swansea University. | |
| | Applied Research Summer Placement | |
| | UK Civil Service | Jul 2018 – Sep 2018 |
| Technical skills | An 11-week placement researching how machine learning and other data science techniques could be applied to aid my team with data annotation. Presented my work and an introduction to topological data analysis in a seminar for the data science community within the government department. | |
| | Applied Research Summer Placement | |
| | UK Civil Service | Jul 2017 – Sep 2017 |
| | An 11-week placement researching the feasibility of using data science techniques to identify certain types of network devices based on limited information about their traffic. Presented my work at the kick-off meeting for an external workshop on analysing network traffic and as a seminar for the data science community in the government department. | |
| | Programming | |
| Non-academic positions | Python (numpy, sci-kit learn, pandas), Java, C [#] , Javascript | |
| | Cluster Computing | |
| | Slurm, Spark | |
| | New College Boat Club Committee | |
| | President | New College, Oxford 2018-2019 |
| | Secretary | 2017-2018 |
| | Lower Boats Captain | 2016-2017 |
| | Women's 3 rd Boat Coach | 2018-2019 |
| | Bar Sports Captaincies | |
| | Darts Captain | New College, Oxford 2017-2018 |
| | Pool Captain | 2016-2017 |