STUART BURRELL

Curriculum Vitae

Email	sb235@st-andrews.ac.uk
Website	stuartburrell.github.io
Programming	Python, Javascript, HTML & CSS, GAP, R, LaTeX, Linux.

ACADEMIC POSITIONS

Research Fellow, *University of St Andrews* 2021
- Funded by a *London Mathematical Society Early Career Fellowship*
- Awarded a top up grant by the Heilbronn Institute for Mathematical Research

EDUCATION

Doctor of Philosophy (PhD), Mathematics, *University of St Andrews* 2016 - 2020
- Supervisors: Professor Kenneth Falconer and Dr Jonathan Fraser
- Funded by: The Carnegie Trust for the Universities of Scotland

Master in Mathematics (MMath), First Class Honours (93%), *University of St Andrews* 2012 - 2016
- Dissertation: Sequential Monte Carlo in Population Dynamics (98%)

PROFESSIONAL TRAINING

Data Structures and Algorithms, *Udacity Nanodegree* 2021

Scottish Mathematical Sciences Training Center 2016 - 2018
- Graduate courses in Algebra, Analysis, Topology, Probability and Statistics

Academy for PhD Training in Statistics 2016 - 2017
- Graduate courses in Statistics at the Universities of Cambridge, Durham and Glasgow

Machine Learning Engineer, *Udacity Nanodegree* 2016 - 2017

SOFTWARE CONTRIBUTIONS

I have experience in Python, R, JavaScript, GAP, Git/GitHub, Unix, LaTeX and Maple. In 2016, I contributed code to the GAP Semigroup and Digraph packages, available in Versions 3.3.1 and 1.3.0 for public use, respectively.

GAP Semigroups package
- Methods on the torsion and order problems of natural and tropical matrix semigroups

GAP Digraphs package
- Methods for computing the simple circuits of a digraph

PUBLICATIONS

1. On the dimension and measure of inhomogeneous attractors
   Real Analysis Exchange, Vol. 44, No. 1 (2019), pp. 199-216. arXiv:1805.00887
2. The dimensions of inhomogeneous self-affine sets (with J. M. Fraser).
   Ann. Acad. Sci. Fenn. Math., Vol. 45, (2020), pp. 313-324. arXiv:1807.08694
3. Projection theorems for intermediate dimensions (with K. J. Falconer & J. M. Fraser).
   Journal of Fractal Geometry (to appear), 16 pages. arXiv:1907.07632
4. Digit expansions of numbers in different bases (with H. Yu).
   Journal of Number Theory (to appear), 21 pages. arXiv:1905.00832
5. Dimensions of fractional Brownian images
   Submitted, 20 pages. arXiv:2002.03659
6. The fractal structure of elliptical polynomial spirals, with K. J. Falconer and J. M. Fraser.
   Submitted, 22 pages. arXiv:2008.08539

SELECTED CONFERENCES, TALKS AND PRESENTATIONS

In addition to giving numerous internal seminars, I have presented at several international gatherings:

1. **Junior Ergodic Theory Seminar (JETS)**, Online, UK — November 2020
   Dimension and deformation of elliptical polynomial spirals
2. **Thermodynamic Formalism: Ergodic Theory and Geometry**, Warwick, UK — July 2019
   Projection theorems for intermediate dimensions (poster presentation)
3. **Fractal Geometry and Stochastics VI**, Bad Herrenalb, Germany — October 2018
   The dimensions of inhomogeneous affine sets (poster presentation)
   Awarded second place prize in poster competition (20 entrants).
4. **Dynamic Days Europe**, Loughborough, UK — September 2018
   A brief note on the dimension of inhomogeneous attractors
5. **British Mathematical Colloquium**, St Andrews, UK — June 2018
   A universal upper bound on the dimension of inhomogeneous attractors (speed talk)
6. **Edinburgh Mathematical Society PG Student Meeting**, Glen Esk, UK — May 2018
   How big are inhomogeneous attractors?
7. **Fractals and Dimensions**, Insitut Mittag-Leffler, Sweden — December 2017
   Inhomogeneous attractors and upper box dimension

AWARDS, SCHOLARSHIPS AND FINANCIAL SUPPORT

University Teaching Awards: Best Postgraduate Tutor (Nominee), *St Andrews* — May 2020
Associate Fellowship of the Higher Education Academy, *Advance HE* — May 2020
Arthur Hinton Read Memorial Prize (best student in pure maths) - £250, *St Andrews* — 2016
Sanderson Prize (best final year student) - £250, *St Andrews* — 2016
Duncan Prize (best senior honours dissertation in mathematics), *St Andrews* — 2016
Graduate Medal in Mathematics, *St Andrews* — 2016
The Principal's Scholarship for Academic Excellence - £5000, *St Andrews* — 2012 - 2016
ODSC Machine Learning/Deep Learning Scholarship — 2016
IMA Graduate Prize Winner, *Institute of Mathematics* — 2016
The University Scholarship for Research and Leadership - £1000, *St Andrews* — 2015
Laidlaw Undergraduate Research Internship Programme - £4000 — 2015
The Deans' List for Academic Excellence — 2012 - 2016
Gold Duke of Edinburgh Award — 2013
Head Teacher Award, *South Wolds Community School* — 2012

TEACHING IN HIGHER EDUCATION

I have several years of experience teaching at the University of St Andrews, and was selected for a paid position on a review panel assessing the teaching in the School of Economics and Finance in November 2020.

MT4511 Symbolic Computation, *Tutor* — 2021
MT2502 Analysis, *Tutor and guest lecturer* — 2019
MT3502 Real Analysis, *Guest lecturer* — 2019
MT4515 Functional Analysis, *Guest tutor* — 2019
MT2000 Python, *Demonstrator* — 2018
Math Base, *Helped run drop-in sessions for sub-honours students* — 2018
MT1002 Mathematics, *Tutor and demonstrator* — 2018
MT1003 Pure and Applied Mathematics, *Tutor* — 2017
MT2508 Statistical Inference, *Demonstrator* — 2017
MT2504 Combinatorics and Probability, *Tutor and demonstrator* — 2016

I have also completed the following two Master's level teaching courses.

Introduction to University Teaching 2: Curriculum Design and Assessment — Spring 2020
Introduction to University Teaching 1: Supporting Student Learning — Autumn 2019