

Amlan Banaji

Curriculum Vitae

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Website: amlan-banaji.github.io

PhD student in Mathematics at St Andrews

Nationality: UK

RESEARCH INTERESTS

I am primarily interested in the geometry and dimension theory of fractal sets and measures. I have worked with fractals generated by conformal and non-conformal iterated function systems. Much of my research has focused on interpolating between different notions of dimension. I am interested in finding connections between fractal geometry and other areas of mathematics.

PUBLICATIONS AND PREPRINTS

1. Attainable forms of intermediate dimensions (*with A. Rutar*)
Annales Fennici Mathematici 47 (2022) 939–960. [arXiv](#)
2. Intermediate dimensions of infinitely generated attractors (*with J. M. Fraser*)
To appear in *Transactions of the American Mathematical Society*. [arXiv](#)
3. Metric Spaces where Geodesics are Never Unique
To appear in the *American Mathematical Monthly*. [arXiv](#)
4. Intermediate dimensions of Bedford–McMullen carpets with applications to Lipschitz equivalence (*with I. Kolossváry*)
Submitted. [arXiv](#)
5. Assouad type dimensions of infinitely generated self-conformal sets (*with J. M. Fraser*)
Submitted. [arXiv](#)
6. Generalised intermediate dimensions
Submitted. [arXiv](#)
7. Dimensions of popcorn-like pyramid sets (*with H. Chen*)
Submitted. [arXiv](#)

EDUCATION

University of St Andrews
2019–present

PhD Mathematics (in progress)

Topic: Fractal geometry and dimension theory

With the [Analysis Research Group](#)

Supervisors: Prof. Jonathan Fraser (primary), Prof. Kenneth Falconer

Fully funded by the [Leverhulme Trust](#)

University of St Andrews
2018–2019

MSc Mathematics, Distinction

GPA: 19.5/20. Ranked 1st in the Faculty of Science and Medicine

Dissertation:

[Solvability of Partial Differential Equations on Fractal Domains](#)

(Score: 19.1/20, supervised by [Professor Kenneth Falconer](#))

University of Cambridge,
King's College
2015–2018

BA (Hons) Mathematics

Selected Part II courses: Linear Analysis, Analysis of Functions, Topics in Analysis, Differential Geometry, Riemann Surfaces, Logic and Set Theory

Thomas Tallis Sixth Form
2013–2015

A-Levels:

Mathematics(A), Further Mathematics(A*), Physics(A*), Chemistry(A*), History(A), Extended Project Qualification(A*, equivalent to half an A level)*

SELECTED PRIZES

2019: **Postgraduate Gray Prize** for the best MSc student in the Faculty of Science and Medicine at the University of St Andrews.

TALKS

I have given 22 talks (listed at amlan-banaji.github.io/talks) at conferences and seminar series including:

- Mathematics Research Day (St Andrews, 1/12/22)
 - Szenzhen Technology University Mathematics Colloquium, (China (online), inaugural talk, 22/10/22)
 - Fractals and Related Fields IV (Porquerolles, France, 5/9/22)
 - Geometry of Deterministic and Random Fractals (Budapest University of Technology and Economics, 30/6/22)
 - Junior Ergodic Theory Meeting (ICMS, Edinburgh (30/3/22) and online (19/3/21))
 - Workshop on affine and overlapping iterated function systems (Bristol, 11/5/22)
 - Dynamics and Group Geometry Early Researchers Seminar (DAGGER) (Warwick, 30/5/22 and 1/3/21)
 - Analysis Seminar (St Andrews, 3/5/22, 12/10/21, 20/4/21, 30/6/20)
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EXPERIENCE

- **Teaching undergraduate tutorials at the University of St Andrews:**
Most recent student feedback score: 1.5 on a scale from 1 to 5 (where 1 is highest).
2019–2022: MT2502 Analysis (10 groups total)
2021: MT2505 Abstract Algebra (2 groups)
2020: MT1003 Pure and Applied Mathematics (2 groups)
 - 2018–present: **Tutoring** mathematics (undergraduate, A level and STEP) with G5 Education, Oxford Exclusif Tutorial Agency, PhD Tutors, Sishu Chinese School, and privately.
 - 2018: LMS-funded **Cambridge Summer Research in Mathematics (SRIM) project** on Leray-Schauder Topological Degree Theory and its applications to Partial Differential Equations.
 - 2017: internship at market research company Kantar TNS, working as a **data scientist** for the social media team, using Python.
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SERVICE

- 2022: **Referee** for *Proc. Roy. Soc. Edinburgh Sect. A* and *J. Math. Anal. Appl.*
 - 2022: **Organiser** of St Andrews Analysis Reading Group
 - 2021: **Co-organiser** of the Postgraduate Interdisciplinary Mathematics Symposium (PIMS), St Andrews.
 - 2019–2021: **Treasurer** of St Andrews Mindfulness Society.
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MEMBERSHIP OF PROFESSIONAL BODIES

- 2022–present: London Mathematical Society
 - 2020–present: Edinburgh Mathematical Society
 - 2019–present: Institute of Mathematics and its Applications
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INTERESTS AND SKILLS

- **Languages:** English (native), German (conversational, A* at GCSE), Hindi (conversational)
- **Music:** Piano (grade 8), Clarinet (toured Canada and Venice)
- **Sport:** running, badminton, chess