

Amlan Banaji

Curriculum Vitae

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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. Intermediate dimensions of infinitely generated attractors (*with J. M. Fraser*)
To appear in Transactions of the American Mathematical Society. [arXiv](#)
2. Attainable forms of intermediate dimensions (*with A. Rutar*)
Annales Fennici Mathematici 47 (2022) 939–960. [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](#)

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)*

PRIZE

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

TALKS

I have given 18 talks (listed at amlan-banaji.github.io/talks) at conferences and seminar series including:

- [Fractals and Related Fields IV](#) (Porquerolles, France, September 2022)
 - [Geometry of Deterministic and Random Fractals](#) (Budapest University of Technology and Economics, June 2022)
 - [Junior Ergodic Theory Meeting](#) (ICMS, Edinburgh (March 2022) and online (March 2021))
 - [Workshop on affine and overlapping iterated function systems](#) (Bristol, May 2022)
 - [Dynamics and Group Geometry Early Researchers Seminar \(DAGGER\)](#) (Warwick, May 2022 and March 2021)
 - [Analysis Seminar](#) (St Andrews, May 2022, October 2021 and June 2020)
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EXPERIENCE

- **Teaching undergraduate tutorials at the University of St Andrews:**
2019–2022: MT2502 Analysis (10 groups total)
2021: MT2505 Abstract Algebra (2 groups)
2020: MT1003 Pure and Applied Mathematics (2 groups)
 - 2018 onwards: **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.*
 - 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: Associate Member of the [Institute of Mathematics and its Applications](#) (AMIMA)
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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