

Amlan Banaji

Curriculum Vitae

Email: A.F.Banaji “at” lboro.ac.uk

Research Associate in Fractal Geometry at Loughborough University’s mathematics department.

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Nationality: UK

RESEARCH INTERESTS

My main research interests relate to the geometry and dimension theory of fractal sets and measures. I have worked with fractals generated by conformal and non-conformal iterated function systems. I am currently interested in Fourier decay of fractal measures, and interpolating between different notions of dimension. I am interested in finding connections between fractal geometry and other areas of mathematics.

PUBLICATIONS AND PREPRINTS

1. A. Banaji and J. M. Fraser. *Intermediate dimensions of infinitely generated attractors* **Transactions of the American Mathematical Society** 376 (2023), 2449–2479. [arXiv](#)
2. A. Banaji and A. Rutar. *Attainable forms of intermediate dimensions* **Annales Fennici Mathematici** 47 (2022), 939–960. [arXiv](#)
3. A. Banaji. *Generalised intermediate dimensions*
To appear in **Monatshefte für Mathematik**. [arXiv](#)
4. A. Banaji. *Metric spaces where geodesics are never unique*
To appear in the **American Mathematical Monthly**. [arXiv](#)
5. A. Banaji and H. Chen. *Dimensions of popcorn-like pyramid sets*
To appear in the **Journal of Fractal Geometry**. [arXiv](#)
6. A. Banaji and J. M. Fraser. *Assouad type dimensions of infinitely generated self-conformal sets*
Submitted. [arXiv](#)
7. A. Banaji and I. Kolossváry. *Intermediate dimensions of Bedford–McMullen carpets with applications to Lipschitz equivalence*
Submitted. [arXiv](#)
8. A. Banaji, A. Rutar and S. Troscheit. *Interpolating with generalized Assouad dimensions*
Submitted. [pdf](#)

EDUCATION

University of St Andrews
2019–present

PhD Mathematics

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

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 at least 30 talks (see <https://amlan-banaji.github.io/files/BanajiTalks.pdf>) at conferences and seminar series including:

- Fractal Geometry (celebrating Prof. Kenneth Falconer's 70th birthday, ICMS, Edinburgh, 4/7/23)
 - Multifractal analysis and self-similarity (CIRM, Marseille, 30/6/23)
 - Diophantine Approximation, Dynamics, and Fractals (Exeter, 22/6/23)
 - Thermodynamic Formalism: Non-additive Aspects and Related Topics (Będlewo, 16/5/23)
 - Ergodic Theory and Dynamical Systems Seminar (Bristol, 13/3/23)
 - Analysis Seminar (Edinburgh, 13/3/23)
 - One World Fractals (online, 18/1/23)
 - 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, 22/3/23, 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)
 - 2018–2022: **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.
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SERVICE

- 2023–present: **Co-organiser** of the Loughborough University Dynamical Systems Seminar
 - 2022–present: **Referee** for *Proc. Roy. Soc. Edinburgh Sect. A* and *Colloq. Math.* 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