

# Amlan Banaji

Curriculum Vitae

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Website: [amlan-banaji.github.io](https://amlan-banaji.github.io)

PhD student in Mathematics at St Andrews

Nationality: UK

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## RESEARCH INTERESTS

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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.

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## PUBLICATIONS AND PREPRINTS

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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. *Metric spaces where geodesics are never unique*  
To appear in the **American Mathematical Monthly**. [arXiv](#)
4. A. Banaji and I. Kolossváry. *Intermediate dimensions of Bedford–McMullen carpets with applications to Lipschitz equivalence*  
Submitted. [arXiv](#)
5. A. Banaji. *Generalised intermediate dimensions*  
Submitted. [arXiv](#)
6. A. Banaji and J. M. Fraser. *Assouad type dimensions of infinitely generated self-conformal sets*  
Submitted. [arXiv](#)
7. A. Banaji and H. Chen. *Dimensions of popcorn-like pyramid sets*  
Submitted. [arXiv](#)

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## EDUCATION

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**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 1<sup>st</sup> 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)*

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## SELECTED PRIZES

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

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## TALKS

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I have given 23 talks (listed at [amlan-banaji.github.io/talks](https://amlan-banaji.github.io/talks)) at conferences and seminar series including:

- 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, 3/5/22, 12/10/21, 20/4/21, 30/6/20)
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## EXPERIENCE

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- **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

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- 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

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- 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

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