

# Amlan Banaji

Curriculum Vitae

Email: afb8 “at” st-andrews.ac.uk

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 extensively 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. 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](#)

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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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## PRIZE

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2019: **Postgraduate Gray Prize** for the best taught postgraduate 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 17 talks (listed at [amlan-banaji.github.io/talks](https://amlan-banaji.github.io/talks)) at conferences and seminar series including:

- [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

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- **Teaching undergraduate tutorials at the University of St Andrews:**  
2019 – 2021: MT2502 Analysis (8 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 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.*
  - 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: Associate Member of the [Institute of Mathematics and its Applications](#) (AMIMA)
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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