

Curriculum Vitae

Alex Rutar

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Personal Information

Institution University of Jyväskylä
Email alex@rutar.org
Website <https://rutar.org>
Citizenship Canadian
Languages English (native), French (reading)

Academic work experience

Fall 2026 **Junior Fellow, Institut Mittag-Leffler, Djursholm, Sweden**
Semester program “Interactions between fractal geometry, harmonic analysis, and dynamical systems”

2026–2028 **NSERC Postdoctoral Fellow, University of British Columbia, Vancouver, Canada**

May 2026 **Early Career Researcher, IMPAN, Warsaw, Poland**
Simons Semester “Continued Fractions, Fractals, Ergodic theory and Dynamics”

2024–2026 **Postdoctoral Researcher, University of Jyväskylä, Jyväskylä, Finland**
Funded by Tuomas Orponen’s Academy of Finland Grant

Education

2020-2024 **PhD in Mathematics, University of St Andrews, St Andrews, Scotland**
Advisors: Kenneth Falconer and Jonathan Fraser
Thesis: *Assouad-type dimensions and the local geometry of fractal sets*

2016–2020 **Bachelor of Mathematics, University of Waterloo, Waterloo, Canada**
Major: Pure Mathematics, Minor: Combinatorics and Optimization
GPA: 95.7/100

Funding

2024	\$140,000	NSERC Postdoctoral Fellowship
2022	\$105,000	NSERC CGS-D
2020	£66,080	EPSRC Doctoral Funding

Scholarships and Awards

2023	£6,000	Cecil King Travel Scholarship , London Math Society
2020	£73,000	Handsel Scholarship , University of St Andrews
2020	\$1,000	Pure Math Undergraduate Research Prize , University of Waterloo
2019	\$4,500	NSERC Undergraduate Research Award , Government of Canada
2018	\$4,500	NSERC Undergraduate Research Award , Government of Canada
2016	\$20,000	W. T. Tutte National Scholarship , University of Waterloo
2016	\$5,000	President's Scholarship , University of Waterloo
2016	\$2,500	Rutherford Scholarship , Government of Alberta
2016	\$0	Governor General's Bronze , Government of Alberta

Publications

1. (with Haipeng Chen, Amlan Banaji, and Wen Wang) *Attainable forms of lower spectra*. arXiv Preprint, 30 pp.
2. (with Vilma Orgoványi) *Two-scale branching functions and inhomogeneous attractors*. arXiv Preprint, 35 pp.
3. (with David Beltran, Joris Roos, and Andreas Seeger) *A fractal local smoothing problem for the wave equation*. Bull. Lond. Math. Soc. **57** (2025), 3667–3690
4. (with Richárd Balka and Vilma Orgoványi) *On the uniformity and size of microsets*. To appear in: Proc. Roy. Soc. Edinburgh Sect. A
5. (with Roope Anttila) *Fibre stability for dominated self-affine sets*. arXiv Preprint, 39 pp.
6. (with Antti Käenmäki) *Tangents and slices of self-affine carpets*. arXiv Preprint, 35 pp.
7. (with Antti Käenmäki) *Regularity of non-autonomous self-similar sets*. Math. Proc. Camb. Philos. Soc. **179** (2025), 623–648
8. (with Amlan Banaji) *Lower box dimension of infinitely generated self-conformal sets*. arXiv Preprint, 35 pp.
9. (with Amlan Banaji, Jonathan Fraser, and István Kolossváry) *Assouad spectrum of Gatzouras–Lalley carpets*. Adv. Math **484** (2026), Paper No. 110707, 46 pp.
10. (with Antti Käenmäki) *Tangents of invariant sets*. arXiv Preprint, 19 pp.
11. (with Amlan Banaji and Sascha Troscheit) *Interpolating with generalized Assouad dimensions*. J. Geom. Anal. **35** (2025), Paper No. 270, 57 pp.
12. (with Andrew Mitchell) *Multifractal analysis of measures arising from random substitutions*. Comm. Math. Phys. **405** (2024), Paper No. 63, 44 pp.
13. (with Jonathan Fraser) *Assouad-type dimensions of overlapping self-affine sets*. Ann. Fenn. Math. **49** (2024), 3–21
14. *Attainable forms of Assouad spectra*. Indiana Univ. Math. J. **73** (2024), 1331–1356
15. (with Amlan Banaji) *Attainable forms of intermediate dimensions*. Ann. Fenn. Math. **47** (2022), 939–960
16. *A multifractal decomposition for self-similar measures with exact overlaps*. arXiv Preprint, 61 pp.
17. (with Kathryn Hare) *Local dimensions of self-similar measures satisfying the Finite Neighbour Condition*. Nonlinearity **35** (2022), 4876–4904

18. *Geometric and combinatorial properties of self-similar multifractal measures*. Ergodic Theory Dyn. Syst. **43** (2023), 2028–2072
19. (with Kathryn Hare and Kevin Hare) *When the Weak Separation Condition implies the Generalized Finite Type Condition*. Proc. Amer. Math. Soc. **149** (2021), 1555–1568

Conferences and Presentations

I have given over 48 presentations, including 33 invited seminars, 12 contributed conference talks, 1 colloquium talk, and 1 minicourse. You can find a complete list [on my webpage](#).

Other Skills

\LaTeX	typesetting and package development
Rust	library development, text-based interfaces, command-line tools
git	version control, project management for research and software development
Python	software development, numerical computation, symbolic computation, graphical tools
Mathematica	functional programming, algorithm implementation for research papers, visualization
HTML / CSS	web development, webpage design