

LIAM STUART

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EMPLOYMENT

University of St Andrews Research Fellow in Mathematics, Sep 2022 – Mar 2023

I was recently an EPSRC funded Research Fellow and part of the analysis research group at the University of St Andrews.

My research is focused on fractal geometry and dynamical systems, and I'm also interested in hyperbolic geometry.

EDUCATION

University of St Andrews PhD in Mathematics, Sep 2019- Jan 2023

My PhD was funded by the University of St Andrews and was supervised by Professor Jonathan Fraser and Regius Professor Kenneth Falconer. My research was primarily focused on studying Sullivan's dictionary, a framework connecting hyperbolic geometry and rational maps, from the perspective of fractals and dimension theory.

Thesis title: Limit sets, Julia sets and Sullivan's dictionary: a dimension theoretic analysis.

University of St Andrews MMath Mathematics, Sep 2015- Jun 2019

First Class Honours Degree

Module grades are on a 20 point scale with 16.5 or more representing a first class standard.

Modules included:

- Fractal Geometry (19.0)
- Real and Abstract Analysis (19.0)
- Lie Algebras (19.6)
- Groups (19.8)

Honours Average: 18.0

Final Year Project (19.0): The Keakey Problem and Related Conjectures.

An exploration of the Keakey conjecture, including partial results and a detailed look at analogues of the conjecture, also involving research into the methods used.

Supervisor: Professor Jonathan Fraser

Open University, Aug 2013- Aug 2015

Modules:

- Exploring Mathematics (Distinction)

- Pure Mathematics (Distinction)

Millburn Academy, Aug 2009- Aug 2015

Advanced Highers: Mathematics (A), Chemistry (A), Physics (A)

PUBLICATIONS

- Refined horoball counting and conformal measure for Kleinian group actions (with Jonathan M. Fraser). **Annales Academiae Scientiarum Fennicae-Mathematica (to appear)**. Preprint available at arXiv:2202.09178, 21 pages.
- Assouad type dimensions of parabolic Julia sets (with Jonathan M. Fraser). Preprint, arXiv:2203.04943, 26 pages.
- The Assouad spectrum of Kleinian limit sets and Patterson-Sullivan measure (with Jonathan M. Fraser). **Geometriae Dedicata**, **217**, **1**. 32 pages.
- A new perspective on the Sullivan dictionary via Assouad type dimensions and spectra (with Jonathan M. Fraser). **Bulletin of the American Mathematical Society, (to appear)**. Preprint available at arXiv:2007.15493, 14 pages.

WORK EXPERIENCE

Mathematics Tutor, School of Mathematics and Statistics, University of St Andrews, Sep 2019-Dec 2022

I have done tutoring for the following modules at St Andrews:

- MT1001 – Introductory Mathematics
- MT1002 - Mathematics
- MT2502 – Analysis
- MT2505 – Abstract Algebra

Student feedback regarding tutoring is divided into 4 categories:

- The class/activity was well organised (organisation)
- The significance of the class/activity for the module was clear (significance)
- The material used in the class/activity was well explained (explanation)
- I was able to contact the staff member if I needed to (availability)

Each category is rated on a scale of 1-5, with 1 being the best.

	organisation	significance	explanation	availability
MT2502 (Autumn 2019)	1.5	1.61	1.39	1.33
MT2505 (Spring 2020)	-	-	-	-
MT2502 (Autumn 2020)	1.75	1.69	1.81	1.75
MT1002 (Spring 2021)	2.07	1.87	1.87	1.8
MT2502 (Autumn 2021)	1	1	1	1
MT1002 (Spring 2022)	1.5	1.5	1.5	1.5
MT1001 (Autumn 2022)	1.83	1.83	1.83	1.83

Teaching Assistant at Millburn Academy, May 2016- Jul 2016

Duties included assisting students of various levels with their mathematical studies whilst being supervised by the classroom teachers.

Marked work of students during classroom periods.

CONFERENCE/WORKSHOPS ATTENDED

- Fractals and Related Fields IV, Porquerolles, France, 3/9/22-9/9/22
- Postgraduate Interdisciplinary Mathematical Symposium (PIMS), The Burn (Edzell), UK, 11/04/22-13/04/22
- Junior Ergodic Theory Meeting, Edinburgh, UK, 28/03/22-31/03/22
- Postgraduate Interdisciplinary Mathematical Symposium (PIMS), The Burn (Edzell), UK, 29/1/20-31/2/20
- Fractals workshop, University of St. Andrews, 02/09/19

TALKS GIVEN

- Analysis group intro: Edzell, Postgraduate Interdisciplinary Mathematical Symposium (PIMS), 11/04/22
- Refined horoball counting for Kleinian group actions: Edinburgh, Junior Ergodic Theory Meeting, 30/03/22
- Refined horoball counting for Kleinian group actions: University of St. Andrews, Pure Postgraduate Seminar, 28/02/22
- Refined horoball counting for Kleinian group actions: University of St Andrews, Analysis Seminar, 16/11/21
- Sullivan's dictionary and Assouad-type dimensions: Bristol (Online), 03/06/21
- A perspective on Sullivan's dictionary via Assouad-type dimensions: Pure Postgraduate Seminar (Online), 15/02/21
- Limit sets of Kleinian Groups: Postgraduate Interdisciplinary Mathematical Symposium (PIMS) (Online), 26/01/21
- The Sullivan dictionary from the perspective of dimension theory: University of St. Andrews, Analysis Seminar, 06/10/20
- The Assouad spectrum of Kleinian limit sets: University of St. Andrews, Analysis Seminar, 25/02/20
- Kleinian Limits Sets: University of St. Andrews, Pure Postgraduate Seminar, 17/02/20
- Hyperbolic Geometry and Limit Sets: University of St. Andrews, Research Day, 23/01/20

MEMBERSHIPS

Nov 2020-Present: Edinburgh Mathematical Society

REVELANT SKILLS

Computing Skills: LaTeX and Python mathematics software.

Microsoft Office (Word, Powerpoint, Excel), Moodle, MMS.

REFERENCES

Regius Professor Kenneth Falconer

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