Louis Yudowitz - Curriculum Vitae

Personal Information

Email: yudowitz@kth.se
Website: `lmyudowitz.github.io`
Nationality: United States of America/United Kingdom
Languages: English

Current Research Interests

Nonlinear partial differential equations, geometric flows (primarily Ricci flow), Einstein manifolds, minimal surfaces.

Education

2019-2023 **PhD in Mathematics** at Queen Mary University of London. Supervisor: Reto Buzano.

2018-2019 **Master of Advanced Study in Mathematics (MASt)** at the University of Warwick.

2015-2018 **BSc Mathematics and Computer Science** at King's College London.

Academic Employment

2023-Present **Postdoctoral Researcher**, KTH Royal Institute of Technology.

- Involved teaching responsibilities and supervision of master's students. See later sections for more details.

2019-2023 **Teaching Assistant**, Queen Mary University of London.

- See "Courses Taught" section for more details.

Awards and Grants

Nov. 2024 **Royal Swedish Academy of Sciences Grant**: New Collapsed Ancient Solutions to Mean Curvature Flow Through Gluing, *SEK 23000*.

May 2022 **QMUL School of Mathematical Sciences Presentation Prize (2nd place)**: "Refined Compactness Theorems for Gradient Shrinking Ricci Solitons".

June 2021 **QMUL Ann Cook Prize for Best Poster (1st place)**: "Bubble Tree Convergence of Ricci Solitons".

2019-2023 **Queen Mary University of London Faculty of Science and Engineering Research Studentship**.

Publications and Preprints

Yudowitz, Louis. *Semi-Continuity of the Morse Index for Ricci Shrinkers.* Preprint. arXiv: 2408.10751. Submitted.

Kröncke, Klaus; Yudowitz, Louis. *Dynamical Stability and Instability of Poincaré–Einstein Manifolds.* Calc. Var. PDE. Vol. 64, No. 31 (2024).

Buzano, Reto; Yudowitz, Louis. *Bubble Tree Convergence and Local Diffeomorphism Finiteness for Gradient Ricci Shrinkers.* Math. Z. Vol. 304, No. 7 (2023).

Buzano, Reto; Yudowitz, Louis. *Gaussian Upper Bounds for the Heat Kernel on Evolving Manifolds.* J. London Math. Soc. Vol. 108, No. 5, pp. 1747-1768 (2023).

Conference Talks

Dec. 2024 Joint meeting of the NZMS, AustMS and AMS Special Session on Differential Geometry and Geometric Analysis: "Dynamical Stability and Instability of Poincaré–Einstein Manifolds".

Dec. 2024 Joint meeting of the NZMS, AustMS and AMS Special Session on Recent Advances in Geometric PDEs: "Semi-Continuity of the Morse Index for Ricci Shrinkers".

Dec. 2024 Joint meeting of the NZMS, AustMS and AMS Special Session on Engagement with Mathematics Through Communication and Outreach: "A "Soft" Framework for Designing Outreach About Mathematical Thinking".

July 2024 Junior Meeting Einstein Geometry and Special Holonomy: "Dynamical Stability and Instability of Poincaré–Einstein Manifolds".

Oct. 2023 The Crazy World of Arthur L. Besse: A Workshop on Einstein Manifolds: "Bubble

Tree Convergence of Shrinking Ricci Solitons".

July 2023 Workshop on Einstein Spaces and Special Geometry, Institut Mittag-Leffler: "Bubble Tree Convergence of Shrinking Ricci Solitons".

Sept. 2022 9th Heidelberg Laureate Forum: "Bubble Tree Convergence and Diffeomorphism Finiteness of Gradient Ricci Shrinking Solitons".

Seminar Talks

Dec. 2024 ANU Partial Geometric Analysis Seminar: "Semi-Continuity of the Morse Index for Ricci Shrinkers".

Nov. 2024 Monash University Analysis Seminar: "Semi-Continuity of the Morse Index for Ricci Shrinkers".

Nov. 2024 Deakin University School of IT Colloquium: "Ricci Flow, the Poincaré Conjecture, and Bubbles".

Nov. 2024 UNSW Pure Math Seminar: "Ricci Flow, the Poincaré Conjecture, and Bubbles".

Oct. 2024 KTH/SU Master's Seminar in Mathematics: "Ricci Flow, the Poincaré Conjecture, and Bubbles".

Feb. 2024 KTH Differential Geometry and General Relativity Seminar: "Perelman Functionals for a Class of Intrinsic Geometric Flows".

Jan. 2024 University of Copenhagen Geometry Seminar: "Dynamical Stability and Instability of Poincaré–Einstein Manifolds".

Jan. 2024 KTH Differential Geometry and General Relativity Seminar: "Dynamical Stability and Instability of Poincaré–Einstein Manifolds".

Oct. 2023 KTH Differential Geometry and General Relativity Seminar: "Semi-Continuity of the Morse Index for Ricci Shrinkers".

May 2023 Ghent Methusalem Junior Seminar: "Bubble Tree Convergence of Shrinking Ricci Solitons".

Jan. 2023 KTH Differential Geometry and General Relativity Seminar: "Bubble Tree Convergence of Gradient Ricci Shrinking Solitons".

Nov. 2022 Brunel University Math and Statistics Colloquium: "Ricci Flow, the Poincaré Conjecture, and Bubbles".

Oct. 2022 KIT Geometric Analysis Seminar: "Bubble Tree Convergence of Gradient Ricci Shrinking Solitons".

Jan. 2022 KCL/UCL Junior Geometry Seminar: "Bubble Tree Convergence of Gradient Ricci Shrinking Solitons".

Nov. 2021 Queen Mary Internal Postgraduate Seminar (QuIPS): "Ricci Flow and the Poincaré Conjecture".

Programming Skills

Languages known: Java, Mathematica, Python, R.

Courses Taught

KTH Royal Institute of Technology:

Differential Geometry, Spring Semester, 2024/2025.

Calculus in Several Variables, Fall Semester, 2023/2024 and 2024/2025.

QMUL:

Probability and Statistics I, Fall Semester 2022/2023.

Calculus II, Spring Semester 2021/2022.

Actuarial Mathematics I, Fall Semester 2021/2022 and 2022/2023.

Vectors and Matrices, Spring Semester 2019/2020.

Organization of Seminars

KTH Royal Institute of Technology:

2024-Present Weekly Research Seminar: *Differential Geometry and General Relativity.* Co-organized with Klaus Kröncke and Markus Wolff.

Supervision of Master's Students

KTH Royal Institute of Technology:

2023-2024 Axel Båvegård (in collaboration with Nordea Bank Abp). *Comparing Performance of Retrieval-Augmented Generative Models, a Case Study.*

2023-2024 Hugo Walles Granberg (in collaboration with Nordea Bank Abp). *Comparing Performance of Retrieval-Augmented Generative Models, a Case Study.*

2023-2024 Tora Olsson (in collaboration with the Karolinska Institutet). *Implementation, Optimization and Evaluation of Deep Learning Algorithms for Olfactory Bulb Segmentation.*

Supervision of Bachelor's Students

2024-2025 Filip Enstedt. *On the Isoperimetric Problem in Flat and Curved Spaces.*

Outreach and Service

2024-Present **KTH Matteklubben Tutor**

- Helped run a weekend matteklubben (math club) at KTH for middle and high school aged students where they were introduced to mathematical topics not normally encountered in their regular classes.

2022-Present **Designing and Running "Soft" Outreach Workshops**

- Worked on creating outeach events for all ages that teach elements on mathematical thinking rather than specific results or techniques. This is in an effort to engage with people without much experience or who are disinclined to engage with mathematical content.
- The entire process is currently been done in collaboration with researchers at the University of New South Wales in Sydney, Australia, as well as members of the Vetenskapens Hus in Stockholm, Sweden, with the intent to expand in the future.

2022-2023 **Math Circle Head Tutor and Organizer**

- Participated in math circles as a tutor for students aged 11-18.
- Focused on developing problem solving skills and enjoyment of math by working through various sorts of problems (e.g. area, modular arithmetic, combinatorics).

- Organized and led a math circle at Queen Mary University of London during the 2022/2023 academic year.

2021-2023 **QMUL Undergraduate Seminar Organizer**

- Helped run and organize a seminar to expose Queen Mary undergraduate students with the following aims:
  1. Expose them to topics they might not see during their degree and allow them to give talks on their own mathematical interests.
  2. Give advice on further studies and jobs.
  3. Create a space where students can interact with the rest of the department in a more casual manner.
- Was officially recognized by the QMUL Math Department for enhancing undergraduate engagement.

2017-2018 **King's Factor Tutor at King's College London**

- Taught A-level students (Years 12 and 13), primarily from less advantaged backgrounds, and introduced them to higher level mathematical problems not normally seen during A-levels.
- Guided students through problems taken from past MAT and STEP papers.

2015-Present **Private Tutor for UK (GCSE and A-level) and US (AP level) Students**

- Taught both groups and individuals in preparation for GCSE/A-level/AP exams.
- Subjects taught: Chemistry, Mathematics, Physics, Statistics.

Other

2023-Present **Reviewer for zbMATH Open**.

2023-Present **Associate Fellow of the Higher Education Academy, UK**.

- Recognition of evidence-based teaching methods and professional standards.

2022-Present **Member of the London Mathematical Society**.

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