Curriculum Vitae
Tuomas Sahlsten

Personal details and the date of the CV

Surname:	Sahlsten
First names:	Tuomas Valtteri Aleksis
Nationality:	Finnish
Address:	Department of Mathematics and Statistics, P.O. Box 68 (Pietari Kalmin katu 2b) FI-00014 University of Helsinki, Helsinki, Finland
Email:	`tuomas.sahlsten@helsinki.fi`
ORCID:	`https://orcid.org/0000-0001-5625-5481`
Website:	`https://www.mv.helsinki.fi/home/sahlsten/`
Date of the CV:	February 25, 2025

Degrees

11.2012	*PhD in Mathematics* (Fil. Toht.), University of Helsinki, Finland. Supervisor Prof Pertti Mattila, Thesis: *Fine Structure of Measures*
06.2009	*BSc & MSc in Mathematics* (LuK & FM), University of Helsinki, Finland. Minor subjects: Statistics and Computer Science. Supervisors Prof Pertti Mattila and Dr Ilkka Holopainen. Includes military service and mathematics teaching work in a school in 2007.
09.2006	*Finnish matriculation examination*, Leppävaaran Lukio, Espoo, Finland.

Other education and expertise

04.2021	*Fellow of the Higher Education Academy*, qualification in University Pedagogics, Evaluated by the University of Manchester, Universities UK and Advance HE, United Kingdom.

Language skills

Native language	*Finnish*
Other languages	Fluent in *English* and basics in *Swedish* and *Japanese*.

Current employment

09.2023 – 08.2028	*Associate Professor*, Department of Mathematics and Statistics, University of Helsinki, Finland. Tenure-track. Stage III in the research career model.
09.2022 – 08.2027	*Academy Research Fellow*, Research Council of Finland, 5 year personal fellowship.

Previous work experience

09.2021 – 08.2023	*Senior Lecturer*, Department of Mathematics and Systems Analysis, Aalto University, Finland. Tenured. Stage III in the research career model.
09.2017 – 08.2021	*Lecturer in Pure Mathematics*, Department of Mathematics, University of Manchester, UK. Tenured. Stage III in the research career model.
09.2015 – 08.2017	*Marie Curie Research Fellow*, School of Mathematics, University of Bristol, UK (Marie Curie Fellowship by the Horizon 2020, EU)
01.2014 – 08.2015	*Research Fellow*, Einstein Institute of Mathematics, The Hebrew University of Jerusalem, Israel (employed in M. Hochman's ERC starting grant, FP7, EU)
01.2013 – 12.2013	*Research Associate*, School of Mathematics, University of Bristol, UK (P.I. in an Emil Aaltonen foundation research grant)
09.2012 – 12.2012	*Project Researcher*, Department of Mathematical Sciences, University of Oulu, Finland (funded by a CoE in Academy of Finland)
07.2009 – 08.2012	*Doctoral Student*, University of Helsinki, Finland (funded by a CoE in Academy of Finland and three Emil Aaltonen personal grants)
12.2007 – 01.2008	*Mathematics Teacher*, preparing and teaching courses and exams, Jokela High School, Finland.

Research funding and grants

2022 – 2027	*Academy Research Fellowship* grant from Research Council of Finland for 5 years (total **€845,808**). Project title *"Quantum chaos of large and many body systems"*
2023 – 2027	*Start-up package* (total **€160,000**), University of Helsinki, Finland, a grant as a part of Associate Professor position in the University of Helsinki
2023 – 2025	*Dean's award* (total **€100,000**), School of Science, Aalto University, Finland, grant awarded for a highly ranked application for an ERC consolidator grant
2015 – 2017	*Marie Skłodowska-Curie Actions*, European Union, awarded a MSCA-IF Grant (total **€183,455**) *"Large Deviations and Measure Rigidity in Dynamics"* (LDMRD), nr. 655310, under the Horizon 2020 Programme. Hosted by University of Bristol, UK.
2010 – 2013	*Emil Aaltonen Foundation*, Finland, awarded three personal research grants (total **€68,300**). Hosted by the University of Helsinki, Finland (1.1.2010 - 30.8.2012), and University of Bristol, UK (1.1.2013 – 31.12.2013
2014, 2017	In 2014 *London Mathematical Society* and *Heilbronn Institute* grants (total **£8,000**) with Thomas Jordan and in 2017 *London Mathematical Society and Imperial College London* grants (total **£8,000**) with Davoud Cheraghi

Research output

Research interests in mathematics of quantum chaos of large and many-body systems, spectral geometry, harmonic analysis of fractal measures, hyperbolic dynamics and geometric measure theory. In total 20 peer-reviewed publications with 10 most important and cited ones (based on Google Scholar) chronologically:

(1) T. Sahlsten, C. Stevens: *Fourier transforms of expanding maps on Cantor sets*
   American Journal of Mathematics (2024), Volume 146, Number 4, pp. 945-982

(2) E. Le Masson, T. Sahlsten: *Quantum ergodicity for Eisenstein series on hyperbolic surfaces of large genus*
   Mathematische Annalen (2024), Volume 389, pages 845–898, (2024)

(3) J. Li, T. Sahlsten: *Trigonometric series and self-similar sets*
   Journal of the European Mathematical Society (2022), 24(1), 341–368

(4) G. Gilmore, E. Le Masson, T. Sahlsten, J. Thomas: *Short geodesic loops and L^p norms of eigenfunctions on large genus random surfaces*
   Geometric and Functional Analysis (GAFA) (2021), 31, 62–110

(5) J. Li, T. Sahlsten: *Fourier transform of self-affine measures*
   Advances in Mathematics (2020), 374, 107349

(6) J. Fraser, T. Sahlsten: *On the Fourier analytic structure of the Brownian graph*
   Analysis & PDE (2018), 11, 115-132

(7) E. Le Masson, T. Sahlsten: *Quantum ergodicity and Benjamini-Schramm convergence of hyperbolic surfaces*
   Duke Mathematical Journal (2017), 166, no. 18, 3425-3460.

(8) T. Jordan, T. Sahlsten: *Fourier transforms of Gibbs measures for the Gauss map*
   Mathematische Annalen (2016), 364, 3–4, pp 983–1023

(9) A. Käenmäki, T. Sahlsten, P. Shmerkin: *Dynamics of the scenery flow and geometry of measures*
   Proceedings of the London Mathematical Society (2015) 110, no. 5, 1248-1280

(10) A. Ferguson, J. Fraser, T. Sahlsten: *Scaling scenery of $(\times m, \times n)$ invariant measures*
   Advances in Mathematics (2015), 268, 564-602

Full list of publications available in

   `https://users.aalto.fi/~sahlstt1/documents/sahlsten_publ.pdf`

and submitted preprints in arXiv: `https://arxiv.org/a/sahlsten_t_1.html`.

Research supervision and leadership experience

I have managed research groups in the University of Manchester (2017-2021) and now in Aalto (2021-). The following people have been part of these in the past:

PhD students Supervision of 5 PhD students (as co-supervisor for 1). Main supervision of *Connor Stevens* (2017–2021), *Joe Thomas* (2018–2021) with Etienne Le Masson, and *Borys Kuca* (2018–2021) with Sean Prendiville and Donald Robertson. Was also co-supervisor of *Clément Hege* during 2018–2020. Currently main supervisor of *Kai Hippi* in Aalto University (2022-). New PhD student *Sampo Paukkonen* starting in 2023 in the University of Helsinki.

Postdocs   Supervisor for 5 postdocs. *Clifford Gilmore* (2018, Manchester), gained a Marie Curie fellowship and a permanent Faculty position after this. For Summer 2023 postdoc *Carsten Peterson*. For 2023-2024 *Félix Lequen* as 1 year postdoc in Aalto University. September 2024-August 2026 *Søren Mikkelsen* and *Gaétan Leclerc* in University of Helsinki.

Teaching merits

Pedagogical training:

- *Fellow of the Higher Education Academy* qualification in University Pedagogics given by AdvanceHE. The training and courses started in September 2017, completed in April 2021, University of Manchester, UK. Involved courses and workshops on university pedagogics, completing reflective reports and a portfolio based on my teaching in Manchester using student-, faculty and peer-reviews, teaching observations and reflections on practical applications of pedagogical methods from literature in my teaching and learning. (https://www.advance-he.ac.uk/fellowship/fellowship).
- *University Pedagogics* (5 credits, Uni Helsinki, 2011)

Teaching, curriculum development and academic advising experience:

- Lectured and developed the Master of Science 10 EU credits module *Riemannian Geometry* (2024) at University of Helsinki, Finland, taught half of this with Jinpeng Lu (5 credits)
- Lectured and developed the Foundation year 5 EU credits (24 hours) modules *Calculus IB* (2024) at University of Helsinki, Finland.
- Lectured and developed the Foundation year 5 EU credits (24 hours) modules *Foundations in Pure Mathematics* (2022) at Aalto University, Finland.
- Lectured and developed the Foundation year 5 EU credits (24 hours) modules *Differential and Integral Calculus II* (2022) at Aalto University, Finland.
- Lectured and developed the Foundation year 5 EU credits (24 hours) modules *Matrix calculus* (2021) at Aalto University, Finland.
- Lectured and developed the Foundation year 10 credits one semester course *Mathematics 0C2* (x4 times) in University of Manchester, UK. Went through curriculum revision in 2019 and switch to online learning in 2020.
- Created and lectured 4th year 15 credits one semester course *Analysis, Random Walks and Groups* (x3 times) in University of Manchester, UK. Switched to online learning in 2020. Lectured and renewed this course again in Aalto in 2023.
- Created *Metric Spaces* online module in Blackboard for MSc in Pure Mathematics.
- Created and lectured postgraduate 10 credits module *Additive Combinatorics and Ergodic Methods in Fractals*, University of Bristol, UK.
- In University of Helsinki led undergraduate supervision groups in *Mitta ja Integraali, Topologia, Reaalianalyysi I* and *Reaalianalyysi II* and in the University of Manchester, UK, led over multiple years supervision and tutorial groups for undergraduate students in *Foundations in Pure Mathematics B, Linear Algebra B, Real Analysis B,* Mathematics Foundation Year modules *Mathematics 1G1* and *Mathematics 0C2,* and *Analysis, Random Walks and Groups.*

- Temporary lecturer in Jokela High School, Finland. Teacher and lecturer for 3 courses: *Mathematical analysis*, *Geometry* and *Mathematics matriculation examination preparation course*. Designed and delivered the teaching sessions based on course material books and created the assignments and final exams.
- Supervisor of 4 BSc projects and involved in the design and supervision of 6 Master students, and main supervision duties with 3 different PhD students
- Personal academic advisor for 20-40 (depending on the year) of under- and postgraduate students in University of Manchester, UK

Other key academic merits

PhD examination	• Examiner of Gaétan Leclerc's PhD thesis in 2024 in Sorbonne University, France • Examiner of Jonathan Chapman's PhD thesis in 2021 at the University of Manchester, UK • Pre-examined Dr Eino Rossi's PhD thesis in 2017 at the University of Helsinki, Finland
Expert evaluation	Evaluation of Sascha Troscheit's Title of Docent (Adjunct Professorship) application for the University of Oulu in 2023
Grant reviews	Grant reviewer for Israel Mathematical Society and involved in a grant review for Austrian Mathematical Society.
Article refereeing	Referee for journals *Acta Math.*, *GAFA*, *Ann. Prob.*, *PTRF*, *Proc. LMS*, *Comm. Math. Phys.*, *Adv. Math.*, *IMRN*, *Math. Ann.*, *TAMS*, *J. Anal. Math.*, *Israel J. Math* and various others.
Administrative roles	*Programme Tutor of the MSc in Pure Mathematics* in the University of Manchester, UK, in 2019, where I managed the MSc in Pure Mathematics programme. Member of the *Spaces and Security committee* in the Univeristy of Helsinki (2024-). Organiser of Pure Mathematics Colloquium and Analysis and Dynamics seminar in Manchester and Bristol, and the Departmental Colloquium in the University of Helsinki (2025).
Event organisation	- *Institut Mittag-Leffler program: Interactions between fractal geometry, harmonic analysis and dynamical systems*, Sep 2026 - Dec 2026, Stockholm, Sweden, with M. Björklund, T. Orponen, P. Shmerkin and H. Wang - *Dynamical Systems, Number Theory, and Quantum Chaos: New connections and directions* conference, September 2024, University of Manchester, Finland, with A. Algom, S. Baker, T. Jordan, R. Schubert and Y. Smilansky - *Bridging the Physics and Mathematics of Quantum Many-Body Chaos* workshop, June 2024, University of Helsinki, Finland, with T. Elliott, Z. Papic - *Workshop on Random Surfaces*, Sep 8th 2020, online, with M. Magee - *Analysis Aspects of Dynamics* conference, 16 – 18. May 2018, Imperial College London, UK (funded by Imperial College and LMS), with D. Cheraghi

	- *Projection and Slicing Theorems in Fractal Geometry* conference, 17 − 18. July 2014, University of Bristol, UK (funded by Heilbronn Institute and LMS), with T. Jordan
	- *Workshop on Fractals* (local organiser), 8 − 12. June 2014, The Hebrew University of Jerusalem, Israel.
Research programs	- Mittag-Leffler institute: *Interactions between fractal geometry, harmonic analysis and dynamical systems*, Stockholm, Sweden, Sep-Dec 2026
	- Isaac Newton Institute, University of Cambridge, *Geometric spectral theory and applications*, UK, May-June 2026
Significant lectures	Invited lectures in major international conferences:
	- *Fractal Geometry and Stochastics 7*, Chemnitz, Germany, 2024
	- *Fractals and Related Fields IV*, Porquerolles, France, 2020 and 2022 (plenary talk)
	- *Fractal Geometry and Dynamics*, Mittag-Leffler Institute, Sweden, 2017
	- *27th Nordic Congress of Mathematicians*, Stockholm University, Sweden, 2016
	- *Dynamics and Numbers*, The Max Planck Institute, Bonn, Germany, 2013
	- *XXII Rolf Nevanlinna Colloquium*, University of Helsinki, Finland

Scientific and societal impact

2024	Gave interview for a podcast *Utelias Mieli* (Episode 48, 17th December, 2024) on topic *"Who understands a mathematician?"* (in Finnish in Spotify)
2024	Gave interview for Netta magazine with Samuli Siltanen
2018–2019	Ran a series of YouTube videos (vlog) on being a researcher and a mathematician, recording the progress of our research. Intended for Master and PhD students and postdocs. Channel link:

<div align="center">

`https://youtube.com/@tuomas.sahlsten`

</div>

Done in collaboration with an expert video designer in the Manchester area and with PhD students and postdocs in our group.