

# Curriculum Vitae

Tuomas Sahlsten

## Personal details and the date of the CV

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*Date of the CV:* March 11, 2022

## 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, Universi-  
ties UK and Advance HE, United Kingdom.  
<https://www.advance-he.ac.uk/fellowship/fellowship>

## Language skills

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

## Current employment

- 09.2021 – present *Senior Lecturer*, Department of Mathematics and Systems Analy-  
sis, Aalto University, Finland. Tenured. Teaching and Research  
contract. Stage III in the research career model.

## Previous work experience

- 09.2017 – 08.2021 *Lecturer in Pure Mathematics*, Department of Mathematics, University of Manchester, UK. Tenured. Teaching and Research contract. 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

- 2018 Hosted in my group in the University of Manchester and helped to prepare Dr Clifford Gilmore’s postdoctoral grant (€13,000) on “*Applications of Linear Dynamics in Ergodicity and Quantum Ergodicity*” from *Magnus Ehrnrooth Foundation*, Finland.
- 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.
- 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
- 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)

## Research supervision and leadership experience

- PhD students Supervision of 4 PhD students. 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. Co-supervisor of *Clément Hege* during 2018–2020.
- Postdocs In 2018 Hosted Magnus Ehrnrooth Research Fellowship for Dr *Clifford Gilmore* in the University of Manchester in my group on quantum chaos on large random surfaces.

## Research output

In total 19 peer-reviewed publications with 10 most important and cited ones chronologically:

- (1) T. Sahlsten, C. Stevens: *Fourier transforms of expanding maps on Cantor sets*  
**American Journal of Mathematics** (2022), to appear in print
- (2) J. Li, T. Sahlsten: *Trigonometric series and self-similar sets*  
**Journal of the European Mathematical Society** (2022), 24(1), 341–368
- (3) 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
- (4) J. Li, T. Sahlsten: *Fourier transform of self-affine measures*  
**Advances in Mathematics** (2020), 374, 107349
- (5) J. Fraser, T. Sahlsten: *On the Fourier analytic structure of the Brownian graph*  
**Analysis & PDE** (2018), 11, 115–132
- (6) E. Le Masson, T. Sahlsten: *Quantum ergodicity and Benjamini-Schramm convergence of hyperbolic surfaces*  
**Duke Mathematical Journal** (2017), 166, no. 18, 3425–3460.
- (7) T. Jordan, T. Sahlsten: *Fourier transforms of Gibbs measures for the Gauss map*  
**Mathematische Annalen** (2016), 364, 3–4, pp 983–1023
- (8) A. Ferguson, J. Fraser, T. Sahlsten: *Scaling scenery of  $(\times m, \times n)$  invariant measures*  
**Advances in Mathematics** (2015), 268, 564–602
- (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) J. Fraser, T. Orponen, T. Sahlsten: *On Fourier analytic properties of graphs*  
**International Mathematics Research Notices (IMRN)** (2014): 2730–2745

Full list of publications available in <https://orcid.org/0000-0001-5625-5481> and submitted preprints in arXiv: [https://arxiv.org/a/sahlsten\\_t\\_1.html](https://arxiv.org/a/sahlsten_t_1.html).

## 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>).
- Further courses and workshops: Workshop HUMEL0187: *Teaching Online with Collaborate Ultra* (Uni Manchester, 2021), Workshop TMS86: *Giving Feedback Effectively* (Uni Manchester, 2021), Course TACC140: *Academic Advising* (Uni Manchester, 2021), *University Pedagogics* (5 credits, Uni Helsinki, 2011)

### *Teaching, curriculum development and academic advising experience:*

- Lectured and developed the Foundation year 5 credits 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.
- 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 thesis projects, and 4 PhD students
- Personal academic advisor for 20-40 (depending on the year) of under- and postgraduate students in University of Manchester, UK, the number varies between 20-40 depending on the year.

### Other key academic merits

PhD examination	<ul style="list-style-type: none"> <li>• Internal Examiner of Jonathan Chapman's PhD thesis in 2021 at the University of Manchester, UK</li> <li>• Pre-examined Dr Eino Rossi's PhD thesis in 2017 at the University of Helsinki, Finland</li> </ul>
Grant reviews	Grant reviewer for Israel Mathematical Society and involved in a grant review for Austrian Mathematical Society.
Article refereeing	Regular referee for journals <i>Acta Math.</i> , <i>GAFA</i> , <i>Proc. LMS</i> , <i>Adv. Math.</i> and various others.
Administrative roles	<i>Programme Tutor (Director) of the MSc in Pure Mathematics</i> in the University of Manchester, UK. Managing the MSc in Pure Mathematics programme and curriculum design. Organiser of Pure Mathematics Colloquium and Analysis and Dynamics seminar in Manchester and Bristol.

- Organised events
- *Workshop on Random Surfaces*, September 2020, University of Manchester, UK.
  - *Analysis Aspects of Dynamics* international conference, 16 – 18. May 2018, Imperial College London, UK (funded by Imperial College and LMS)
  - *Projection and Slicing Theorems in Fractal Geometry* international conference, 17 – 18. July 2014, University of Bristol, UK (funded by Heilbronn Institute and LMS)
  - *Workshop on Fractals* (local organiser), 8 – 12. June 2014, The Hebrew University of Jerusalem, Israel.
- Significant lectures
- Plenary talks in international conferences:
- *Fractals and Related Fields IV*, Porquerolles, France
- Invited lectures in international conferences:
- *Fractal Geometry and Dynamics*, Mittag-Leffler Institute, Sweden, 2016
  - *27th Nordic Congress of Mathematicians*, Stockholm University, Sweden, 2016
  - *Finnish Mathematical Days*, University of Turku, Finland, 2015
  - *Workshop on Fractals*, The Hebrew University of Jerusalem, Israel, 2014
  - *Dynamics and Numbers*, The Max Planck Institute, Bonn, Germany, 2013
  - *XXII Rolf Nevanlinna Colloquium*, University of Helsinki, Finland

### Scientific and societal impact

- 2018– Running 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:  
<https://www.youtube.com/channel/UC1DWustDKcBtof--y6LFYEQ>  
 Done in collaboration with an expert video designer in the Manchester area and with PhD students and postdocs in our group.