Tapio Helin

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CONTACT INFORMATION

School of Engineering Science
LUT University
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DEGREES

Docent   September 2019

Docent at the University of Helsinki in the field of Applied mathematics.

Docent   June 2016

Docent at the Aalto University School of Science in the field of Mathematics.

Doctor of Science in Technology   April 2010

Faculty of Information and Natural Sciences, Aalto University, School of Science and Technology. Major: mathematics. Minor: material physics. Thesis: *Discretization and Bayesian modeling in inverse problems and imaging* (pass with distinction).

Master of Science in Technology   October 2004

Department of Engineering Physics and Mathematics, Helsinki University of Technology.

CURRENT POSITION

Professor (tenured)   11/2022-

Professor of Applied Mathematics at LUT University, School of Engineering Science.

Academy Research Fellow   09/2018–11/2023

Academy Research Fellow project "Uncertainty quantification in non-linear inverse problems" funded by the Academy of Finland. Extensions due to parental leave.

WORK EXPERIENCE

Associate Professor (tenure track)   01/2019-11/2022

Applied Mathematics at LUT University, School of Engineering Science.

Visiting Associate   01/2020–06/2020

California Institute of Technology, Department of Computational and Mathematical Sciences.

Parental leave   roughly 1 year between 2011 and 2018

Postdoctoral researcher and University researcher   01/2012–08/2018

Department of Mathematics and Statistics, University of Helsinki
01/2018-08/2018: University Researcher in the project "Atmospheric mathematics"
09/2014-12/2017: postdoctoral research project "Waves in stochastic inverse problems" funded by the Academy of Finland
01/2012-08/2014: postdoctoral position in the ERC Advanced Grant project of prof. Lassi Päivärinta.

Research scientist   10/2009–12/2011

Johann Radon Institute (RICAM), Austrian Academy of Sciences. *Postdoctoral position in an In-Kind project for European Southern Observatory (ESO): "Mathematical algorithms and software for ELT adaptive optics."*

Major current funding and recognition

- PI in the Doctoral Education Pilot for Mathematics of Sensing, Imaging and Modelling (DREAM)

- PI in the Flagship of Advanced Mathematics for Sensing, Imaging and Modelling (FAME). Coordinator of the FAME research program on "Uncertainty quantification and machine learning".

- Invited to second stage in the ERC Consolidator Grant call 2022

- PI in the Centre of Excellence on Inverse Modelling and Imaging for 2023-2025 (318 318 €)

- Academy Project funding "New frontiers in Bayesian optimal experimental design for inverse problems" for 2022-2026 (643 310 €, consortium with Aalto University)

- LUT Doctoral School funding for one doctoral student for 2021-2025

Past funding and recognition

- Academy Research Fellow project "Uncertainty quantification in non-linear inverse problems" during 2018-2023 for own funding (499 999€) and research costs (370 000€)

- Funding for ELT instrumentation contribution ("Adaptive optics in MICADO instrument") for 2021-2022. (70 000€)

- Project funding from the European Southern Observatory ("Inverse problems and deep learning in adaptive optics") for 2019-2020. (35 000€)

- Three-year research grant (2016-2018) from University of Helsinki for "Stochastic inverse problems in atmospheric tomography" (143 673€). The grant was directed towards young researchers (2-10 years since PhD thesis). Out of all 239 proposals 17 (7.1 %) were funded.

- Research grant for the project "Bayesian inverse problems in Banach spaces" in cooperation with the research group of Prof. Martin Burger at Westfälische Wilhelms-University Münster, Germany, 2015-2017 (19 560€)

- Postdoctoral researcher's project "Waves in stochastic inverse problems" (399 672€), Academy of Finland, 2014-2017.

- Finnish Inverse Prize for an outstanding doctoral thesis, Finnish Inverse Problem Society, 2010 (2 000€)

- Travel grants (total 8 200€) from the Emil Aaltonen foundation, Vilho, Yrjö and Kalle Väisälä foundation and Helsingin Sanomat 100 year's anniversary fund between 2006 and 2008

Current group and past supervision

My current research group consists of **four post doctoral researchers** (Chuntao Cheng, Abhishake Rastogi, Duc-Lam Duong and Tommi Heikkilä) and **six doctoral students** (Ville-Petteri Manninen, Sofia Mäkinen, Rodrigo Rojo Garcia, Fabian Schneider; as second supervisor: Olivier Dondjio Nguefack and Angelina Senchukova).

Past supervision includes:

- Post doctoral advising of Hanz Cheng (04/2022-08/2024), Jalo Nousiainen (07-12/2023), Vesa Kaarnioja (08/2020-07/2022), Remo Kretschmann (09/2019-09/2021), Mikael Laaksonen (03-12/2019), Zhidong Zhang (09/2017-12/2018, currently Assistant professor at Sun Yat-Sen University, China) and Matthew Dunlop (08-12/2018)

- Supervisor of the doctoral thesis of Hanne Kekkonen (UH, 09/2016, currently Assistant Professor at TU Delft) and Jalo Nousiainen (LUT, 06/2023).

- Supervisor of 14 MSc theses at LUT (2019-2024) and 2 MSc thesis at UH (2018-2020).

- Supervisor of the 8 bachelor thesis at LUT (2020-2024) and 9 bachelor theses at UH (2016-2018).

Teaching activities

- "(BM10A0300) Bachelor thesis and seminar", (10cr), Spring 2024, LUT University

- "(BM20A7300) Functional analysis", (5cr), Spring 2021 and Autumns 2021-2023, LUT University

- "(BM20A7400) Introduction to inverse problems", (5cr) Autumns 2020-2023, LUT University

- "(BM20A6200) Inverse problems in normed spaces", (6cr) Autumn 2019, LUT University

- "Non-parametric maximum a posteriori estimators in Bayesian inversion" (mini-course), August 2018, University of Oulu.

- "(MAST31402) Bayesian inversion" (10+5cr), Spring 2018, UH (including a 5cr project work)

- "(57760) Bayesian inversion" (10+5cr) jointly with Samuli Siltanen, Spring 2016, UH

Duties as a scientific expert

- Member of Program Committee for the conference SIAM Uncertainty Quantification 2024

- Vice-president of the Finnish Inverse Problems Society since 2023 (member of the board since 2021)

- Examiner of the doctoral thesis of Lea Föcke (FAU University, Germany) and Mary Nanfuka (Makerere Univeristy, Uganda) 2021, Frederieke Miesner (University of Bremen, Germany) 2018 and Remo Kretschmann (University of Duisburg–Essen) 2019

- Reviewer for the Chilean National Science and Technology Commission and Austrian FWF (Österreichischer Wissenschaftsfonds).

- Referee for 13 different international mathematics and statistics journals including e.g. Inverse Problems, SIAM Journal on Mathematical Analysis, Annals of Statistics, SIAM Journal of Uncertainty quantification and Statistics and Computing.

- Member of the Academy Club for Young Scientists at Finnish Academy of Sciences and Letters for academic year 2014–2015

Institutional responsibilities at LUT University

- Head of the Bachelor Degree Program "Computational Engineering" (11/2022-)

- Member of the executive team of the Department of Computational Engineering (2019-)

- Head of a selection committee in a LUT tenure track recruitment (Spring 2021)

- Member of a selection committee in a LUT tenure track recruitment (Autumn 2020, Spring 2024)

- Member of a LUT Strategy working group for scientific excellence and open science (Autumn 2019)