Curriculum Vitae
Tyni, Teemu (Assistant professor, Docent)

August 12, 2026

University of Oulu, Finland
Applied and Computational Mathematics

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Education

Lappeenranta-Lahti University of Technology
Title of Docent, April 2025.
University of Oulu
PhD. in Applied mathematics, 2018.
MSc. in Applied mathematics, 2015.
B.S. in Mathematics, 2013.
Dissertation: "Direct and inverse scattering problems for perturbations of the biharmonic operator"
Opponent: Prof. David Colton (Univ. of Delaware, USA)

Current employment

Research Unit of Applied and Computational Mathematics, University of Oulu, Finland
Assistant Professor, July 2023–present
Visiting researcher at the University of Helsinki 2023–present

Selected previous work experience

Dept. of Mathematics, University of Toronto, Canada
Post-doctoral fellow, August 2021 – June 2023.
Contact: Professor Spyros Alexakis
Dept. of Mathematics and Statistics, University of Helsinki, Finland
Post-doctoral researcher, 2019-2021.
Contact: Professor Matti Lassas
Dept. of Math. Sciences, University of Oulu, Finland
Post-doctoral researcher, 2018-2019.
PhD. student, 2015-2018.
Contact: Professor Valery Serov, Docent Markus Harju
Sodankylä geophysical observatory, Finland
Researcher, 2014
Contact: Professor Lassi Roininen
Dept. of Physics, University of Oulu, Finland
Research assistant at electron spectroscopy group, 2013
Contact: Dr. Lauri Hautala

Research funding

1. My research group is part of the FAME Flagship of Research Council of Finland with funding of 67600€ by Reseach Council of Finland and 43750€ by University of Oulu (2024–2027)

https://www.aka.fi/en/about-us/whats-new/press-releases/2023/research-council-of-finland-selects-four-new-finnish-flagships/

2. My research group is part of the DREAM doctoral education pilot with funding of approximately 72250€/year for 3 years (2025–2027).
   https://www.oulu.fi/en/research/graduate-school/doctoral-education-pilot
3. I was awarded 200000€ research project grant by the Emil Aaltonen foundation (Emil Aaltosen säätiö) in 2023
   https://emilaaltonen.fi/projektiapurahat-2023/
4. I received 32500€ personal research fund from the Emil Aaltonen foundation (Emil Aaltosen säätiö) in 2021
   https://emilaaltonen.fi/wp-content/uploads/2021/05/saajaluettelo.pdf
5. I was awarded a four (4) year funding towards the completion of my PhD research in 2015 by Exactus (University of Oulu, Doctoral programme in Exact Sciences). The amount of funding corresponded to full salary for four years.

Selected recent scientific talks

1. Invited talk at IPMS2026 (Malta)
   https://www.ipms-conference.org/ipms2026/
2. Conference talk at AIP2023 (Göttingen, Germany)
   http://www.aip2023.com/program/
3. Invited talk at IWOTA2023 (Helsinki, Finland)
   https://www.helsinki.fi/en/conferences/iwota2023/program
4. Invited talk at International Zoom Inverse Problems seminar in February 2022, (University of California, Irvine, USA)
   https://sites.uci.edu/inverse/teemu-tyni-university-of-toronto/
5. Invited talk at Inverse Problems and Nonlinearity online conference in August 2021, (Jyväskylä, Finland)
   https://www.jyu.fi/science/en/maths/research/inverse-problems/inverse-problems-and-nonlinearity-2020

PhD supervision

MSc. Suvi Takalahti (on-going 2024-present, on Emil Aaltonen project grant)
MSc. Khaoula El Maddah (on-going 2025-present, in DREAM doctoral pilot)

Master's thesis supervision

MSc. Manu Holmberg, (co-supervisor with prof. Matti Lassas) completed in 2020

Teaching

ITEE., University of Oulu
Lecturer (coordinator), Differential Equations 2024-present
Lecturer (coordinator), Mathematical structures for computer science 2023
Dept. of Math., University of Toronto
Instructor (Lecturer), Calculus 2 (MAT136) 2022-23

Instructor (Lecturer), Calculus 1 (MAT135) 2021-22
Dept. of Math. and Statistics, University of Helsinki
Teaching assistant, Partial differential equations 2021 (Zoom)
Lecturer, Inverse Problems II: Tomography and regularization 2020
Lecturer, Mathematics everywhere (MOOC) 2020
Lecturer, Latex course (online course) 2020
Lecturer, Recap of high school math. (online course) 2020
Lecturer, Inverse Problems II: Tomography and regularization 2019
Unit of Math. Sciences, University of Oulu
Lecturer, Introduction to LaTeX 2018–19
Teaching assistant, Complex analysis II 2018
Lecturer, Laboratory exercises in physics 1, Intro. to LaTeX 2018–19
Teaching assistant, Operator theory and integral equations 2017
Teaching assistant, Series and the integral 2017
Teaching assistant, Derivative 2016
Teaching assistant, A second course in differential equations 2015
Teaching assistant, Introduction to real functions 2015–16
Teaching assistant, Introduction to mathematical deduction 2015–16

Awards

- I received the Finnish Inverse Prize (2000€) for my PhD work in 2018.
  https://www.fips.fi/fipsprize.php

Other academic merits

1. I am a member of the board (treasurer) of Finnish Inverse Problems Society
   https://www.fips.fi/governors.php
2. I am an active referee for the journals: Inverse Problems, Inverse Problems & Imaging, SIAM Journal on Applied Mathematics, and Inverse Problems in Science & Engineering.
3. Organizing conferences:
   - Main organizer of Living the DREAM -seminar 2026 in Oulu.
   - With prof. Hauptmann I was a main organizer of "Inverse Days, 2024" in Oulu.
   - I organized a minisymposium at the "Applied Inverse Problems AIP2023" conference at Göttingen, Germany, 2023.
     http://www.aip2023.com/program/
   - I organized a minisymposium at the "Inverse Problems: Modeling and Simulations" conference at Malta, 2022.
     https://www.ipms-conference.org/ipms2022/m27
   - I was part in organizing committee of the online conference "Inverse Problems and Nonlinearity", Helsinki 2020.
     https://www.jyu.fi/science/en/maths/research/inverse-problems/inverse-problems-and-nonlinearity-2020

- I took significant part in the organizing committee of the conference “Inverse Days, 2017” in Oulu.

List of publications

June 12, 2026

Tyni, Teemu

Please find the up-to-date list of publications on my personal web page:
https://www.mv.helsinki.fi/home/tyniteem/research/

Peer-reviewed scientific articles

1. Lin Y-H, Tyni T, and Zimmerman P, *Optimal Runge approximation for nonlocal wave equations and unique determination of polyhomogeneous nonlinearities*, Calc. Var. Partial Differ. Equ., **64**:280, 2025.

2. Lassas M, Liimatainen T, Potenciano-Machado L, and Tyni T, *Stability and Lorentzian geometry for an inverse problem of a semi-linear wave equation*, Anal. PDE, **18**:5, 1065–1118, 2025. DOI: apde.2025.18.1065

3. Lin Y-H, Tyni T, and Zimmerman P, *Well-posedness and inverse problems for semilinear nonlocal wave equations*, Nonl. anal., **247**, 113601, 2024. DOI: j.na.2024.113601

4. Alexakis S., Stinchcombe, A., and Tyni T. *A boundary integral equations approach to electrical impedance tomography: experiments on the KTC2023 data*, AIMS Appl. Math. Mod. Chal., **2**:2, 228–242, 2024. DOI: 10.3934/ammc.2024006

5. Tyni T, Stinchcombe A R, and Alexakis S, *A boundary integral equation method for the complete electrode model in electrical impedance tomography with tests on real-world data*, SIAM J. Imag. Sci, **17**:1, 2024. DOI: 10.1137/23M1585696

6. Covi G, Railo J, Tyni T, and Zimmerman P, *Stability estimates for the inverse fractional conductivity problem*, SIAM J. Math. Anal. **56**:2, 2024. DOI: 10.1137/22M1533542

7. Lassas M, Liimatainen T, Potenciano-Machado L, and Tyni T, *An inverse problem for a semi-linear wave equation: a numerical study*, Inv. Prob. Imag. **18**:1, 62–85, 2024. DOI: 10.3934/ipi.2023022

8. Lassas M, Liimatainen T, Potenciano-Machado L and Tyni T, *Uniqueness, reconstruction and stability for an inverse problem of a semi-linear wave equation*, J. Differ. Equ., **337**, 395-435, 2022. DOI:10.1016/j.jde.2022.08.010

9. Liimatainen T, Lin Y-H, Salo M and Tyni T, *Inverse problems for elliptic equations with fractional power type nonlinearities*, J. Differ. Equ., **306**, 189-219, 2022. DOI: 10.1016/j.jde.2021.10.015

10. Harju M, Kultima J, Serov V and Tyni T, *Two-dimensional inverse scattering for quasi-linear biharmonic operator*, Inverse Prob. Imag. **15**(5) 1015-1033, 2021. DOI: 10.3934/ipi.2021026

11. Brander T, Ilmavirta J, Piiroinen P and Tyni T, *Optimal recovery of a radiating source with multiple frequencies along one line*, Inverse Prob. Imag. **14**(6): 967-983, 2020. DOI: 10.3934/ipi.2020044

12. Tyni T, *Numerical results for Saito's uniqueness theorem in inverse scattering theory*, Inverse Problems, **35**(6), 065002, 2020. DOI: 10.1088/1361-6420/ab7d2d

13. Serov V and Tyni T, *Inverse medium problem for a singular contrast*, J. Math. Phys. **60**, 111508, 2019. DOI: 10.1063/1.5097915

14. Tyni T and Serov V, *Inverse scattering problem for quasi-linear perturbation of the biharmonic operator on the line*, Inverse Prob. Imag., **13**(1): 159–175, 2018. DOI: 10.3934/ipi.2019009

15. Tyni T, *Recovery of singularities from a backscattering Born approximation for a biharmonic operator in 3D*, Inverse Problems, **34**, 045007, 2018. DOI: 10.1088/1361-6420/aaaf7f

16. Tyni T and Serov V, *Scattering problems for perturbations of the multidimensional biharmonic operator*, Inverse Prob. Imag., **12**(1): 205–227, 2018. DOI: 10.3934/ipi.2018008

17. Tyni T and Harju M, *Inverse backscattering problem for perturbations of biharmonic operator*, Inverse Problems, **33**, 105002, 2017. DOI: 10.1088/1361-6420/aa873e

18. Serov V and Tyni T, *Inverse Scattering Problems for Perturbed Bi-harmonic Operator*, AIP Conference Proceedings 1776, 2016. DOI: 10.1063/1.4965410

19. Tyni T, Harju M and Serov V, *Recovery of singularities in fourth order operator on the line from limited data*, Inverse Problems, **32**, 075001, 2016. DOI: 10.1088/0266-5611/32/7/075001

Preprints

1. El Maddah K, Lassas M, Liimatainen T, Pohjola V, and Tyni T, *Reconstruction for an inverse scattering problem with a Kerr type nonlinearity*, Preprint arXiv:2606.13337, June, 2026.

2. El Maddah K, Lassas M, and Tyni T, *Numerical reconstruction of Schrödinger equations with quadratic nonlinearities*, Preprint arXiv:2512.16269, November, 2025.

3. Lassas M, Liimatainen T, Pohjola V, Tyni T, *Gaussian beam interactions and inverse source problems for nonlinear wave equations*, Preprint arXiv:2510.11494, October, 2025.

4. Harju M, Takalahti S, and Tyni T, *X-ray imaging from nonlinear waves: numerical reconstruction of a cubic nonlinearity*, Preprint arXiv:2509.11951, September, 2025.

5. Alexakis S, Isozaki H, Lassas M, and Tyni T, *Inverse scattering problems for non-linear wave equations on Lorentzian manifolds*, Preprint arxiv:2411.09354, November, 2024.

Theses

1. Tyni T, *Direct and inverse scattering problems for perturbations of the biharmonic operator*, Doctoral dissertation, Acta Universitatis Ouluensis. A, Scientiae rerum naturalium, 725, Oulu, 2018.

2. Tyni T, *Direct and inverse scattering problems for operator of order 4 on the line*, Master's thesis, Oulu, 2015.