

Tanja Tarvainen  
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## CURRICULUM VITAE

23.5.2025

<https://uefconnect.uef.fi/en/person/tanja.tarvainen/>

### PERSONAL INFORMATION

Full name: Tarvainen (born Vilhunen), Tanja Maarit  
Gender, children: Female, married, 1 child (Roni, born 30.11.2006)  
ResearcherID: A-1477-2009  
ORCID: 0000-0002-7919-4033

### DATE AND PLACE OF BIRTH, NATIONALITY, CURRENT RESIDENCE

Date and place of birth: 19.5.1974, Siilinjärvi, Finland  
Citizenship: Finland  
Current residence: Kuopio, Finland

### EDUCATION AND DEGREES AWARDED

2009 Docent, *Optical tomography*, University of Kuopio, Department of Physics, Finland, 1.12.2009  
2006 PhD, "Computational Methods for Light Transport in Diffuse Optical Tomography", Department of Physics, University of Kuopio, Finland, 27.10.2006  
2000 MSc, "Determining the dielectric properties of biological tissues", Department of Applied Physics, University of Kuopio, 6.11.2000  
1993 Matriculation, 5.6.1993, Siilinjärven lukio

### LINGUISTIC SKILLS

Native language: Finnish  
Other language skills: English (fluent), German (basic), Swedish (basic)

### CURRENT POSITION

2021– Professor (Computational imaging and modelling), Department of Technical Physics, University of Eastern Finland, Finland  
2024– Director of the University of Eastern Finland's strategic Research Community on Computational Modelling, Imaging and Data Science (COMMIT)  
2021–2026 Visiting Professor, Department of Computer Science, University College London, UK  
2019– Head of the Biomedical Optical Imaging and Ultrasound Laboratory, Department of Technical Physics, University of Eastern Finland, Finland

### PREVIOUS POSITIONS

2021 Vice head of the Department of Applied Physics, University of Eastern Finland, Finland  
2007–2021 Research Associate (part-time 4/2008–4/2021), Department of Computer Science, University College London, UK  
2017–2020 Associate Professor (tenure track), Department of Applied Physics, University of Eastern Finland, Finland  
2016 Senior researcher, Department of Applied Physics, University of Eastern Finland, Finland  
2011–2015 Academy Research Fellow, Department of Applied Physics, University of Eastern Finland, Finland  
2008–2010 Academy postdoctoral researcher, Department of Physics, University of Kuopio, Finland  
2001–2006 Researcher, Department of Physics, University of Kuopio, Finland

## CAREER BREAKS

18.11.2006–30.11.2007 Maternity leave (12 months)

## RESEACRH FUNDING AND GRANTS

2024-2027	Ministry of Education and Culture, Director of the “Doctoral Education Pilot for Mathematics of Sensing, Imaging and Modelling (DREAM)” (funding granted for the UEF 4.3 M€ and for the consortium 25.5 M€, additional research funding for the UEF 2M€)
2024-2031	Research Council of Finland, Director of a Flagship project “Flagship of Advanced Mathematics for Sensing, Imaging and Modelling (FAME)”, 1.6 M€ UEF, 8 M€ consortium (2024-2027)
2023-2027	MSCA-DN, “COMputatioNal Imaging as a training Network for Smart biomedical dEVICES (CONcISE)”, 286 488 €
2021–2026	ERC CoG, “Quantitative tomography using coupled physics of waves (QUANTOM)”, 2 M€.
2018–2025	Academy of Finland, Team leader in the “Centre of Excellence in Inverse Modelling and Imaging”, 118 109 € (2018-2020), 94 700 € (2020-2022), 200 505 € (2023-2025)
2018–2021	Academy of Finland, Consortium PI of the RADDESS Academy Programme project “Nanotheranostics based on light”, 349 472 €
2017–2021	Jane and Aatos Erkko Foundation, 500 000 € “Quantitative imaging using light and sound”.
2011–2014	University of Eastern Finland, 270 000 €, strategic funding of the University of Eastern Finland (Innovative Research Initiatives –projects), “Computational methods for quantitative photoacoustic tomography”
2011–2015	Academy of Finland, 750 000 €, post and research costs of an Academy Research Fellow, “Modelling and reconstruction in three dimensional optical imaging”
2008–2010	Academy of Finland, 189 000 €, postdoctoral research project, “Modelling approaches to the forward and inverse problem of optical tomography”
2000–	Smaller research and travel grants from various foundations, approximately 100 000 €

## RESEARCH OUTPUT

**Publications** Articles in peer-reviewed international scientific journals: 70  
Articles in refereed scientific edited volumes and conference proceedings: 48  
Book chapters: 5  
Articles in professional journals: 1

**Software** ValoMC - A Monte Carlo software for simulating light transport  
<https://inverselight.github.io/ValoMC/>

**Invention disclosures:** 3

## SUPERVISION OF POSTDOCTORAL FELLOWS, GRADUATE AND UNDERGRADUATE STUDENTS

**Postdocs** Jenni Poimala (2024-), Konstantin Tamarov (2024-), Teemu Sahlström (2024-), Niko Hänninen (2024-), Meghdoot Mozumder (2018-), Jarkko Leskinen (2017-2021), Aleksi Leino (2017-2019), Aki Pulkkinen (2012-2018)

**PhD students** Markus Tolvanen “Applications of photoacoustic tomography in biomedicine”, in progress  
Karoliina Puronhaara “Surrogate modelling in thermoacoustic tomography”, in progress  
Jarjish Rahaman “Modelling and image reconstruction for smart diffuse optical tomography”, in progress  
Marcos Obando (Centrum Wiskunde & Informatica (CWI), secondary supervision) “Sequential optimal experimental design for single-pixel image reconstruction using reinforcement learning”, in progress  
Miika Suhonen “Photoacoustic tomography in a heterogeneous medium”, in progress  
Jonna Kangasniemi “Utilising the radiative transfer equation in optical tomography”, in progress

Eero Koponen (secondary supervision) "Background-oriented schlieren imaging for measuring ultrasound fields", 2024.

Teemu Sahlström "Computational methods for modelling and inverse problem of photoacoustic tomography", 2023

Niko Hänninen "Image reconstruction and uncertainty quantification in quantitative photoacoustic tomography", 2023

Aksel Kaastrup Rasmussen (Technical University of Denmark, secondary supervisor) "On deterministic and statistical consistency for nonlinear inverse ", 2023

Jenni Tick "Image reconstruction and modelling of uncertainties in photoacoustic tomography", 2019 (Jenni Tick was awarded with the Finnish Inverse Prize for an excellent PhD thesis completed during 2019)

Jussi Toivanen "Thermal tomography", 2016 (Jussi Toivanen's dissertation was awarded "with distinction")

Meghdoot Mozumder "Image reconstruction with error modelling in diffuse optical tomography", 2015

Ossi Lehtikangas "Approximations and hybrid models for modeling light propagation in biological tissues", 2014

**MSc students** Eemeli Muurainen (2024), Karoliina Puronhaara (2024), Suvi Källman (2022), Anssi Manninen (2022), Miika Suhonen (2022), Teemu Sahlström (2019), Antti Mikkonen (2019), Olli Nykänen (2015), Hwan Goh (2014), Jenni Tick (2014), Eppu Manninen (2014), Timothy Dennis (2010), Ossi Lehtikangas (2010)

## TEACHING EXPERIENCE

**Lectures** Optimization, Finite element methods, Modelling II, Scientific presentation in physics

**Short courses** "Photoacoustic imaging" at Ultrasound techniques in medicine -course  
"Computational inverse problems with applications in optical tomography" in International Summer School on Inverse Problems, May 25-29, 2015, Helsinki, Finland

**Exercises** Statistical inverse problems, Mathematical modelling, Finite element methods, Optimization, Estimation theory, Modelling II, Physics A, Physics III

**Laboratory** Project works in physics and in scientific computing  
Physics laboratory works for physics students and bioscience students  
Radiation protection demonstrations for bioscience students, medical students and high school students

## Pedagogical training

2012 Research supervision course, University of Eastern Finland, 2012

2006 Sample lecture, approved with grade good, University of Kuopio, Finland

2006 Pedagogics in University Education 1 & 2 (4 credit points), University of Kuopio, Finland

2005 Basics studies in education (15 credit points), University of Joensuu, Finland

## AWARDS AND HONOURS

### Publications with distinction

article selected in SIAM High Impact Article Collection on Machine Learning in 2024

article selected as a Technical Area Pick for Biomedical Acoustics of *The Journal of the Acoustical Society of America* in 2018

3 articles selected as the highlights of *Inverse Problems* in 2006, 2010, 2012

article selected as insights of *Inverse Problems* in 2013

article selected into 25<sup>th</sup> Year Anniversary Collection of *Inverse Problems*

**Fellowships**

2011–2015 Academy Research Fellow, Academy of Finland, Finland  
2008–2010 Postdoctoral Researcher, Academy of Finland, Finland

**OTHER KEY ACADEMIC MERITS****Examiner/opponent of a doctoral dissertation**

Elisabetta Avanzi (Politecnico di Milano, 2024)  
Leah Wilk (University of Amsterdam, 2023)  
Mari Lehti-Polojärvi (Tampere University, 2023)  
Antoine Capart (Aix-Marseille University, 2023)  
Ciaran Bench (University College London, UK, 2022)  
Juuso Ketola (University of Oulu, Finland, 2021)  
Bjørn Christian Skov Jensen (Technical University of Denmark, Denmark, 2020)  
Alexander Beigl (University of Vienna, Austria, 2020)  
Hari Nortunen (Tampere University of Technology, Finland, 2018)  
Roman Hochuli (University College London, UK, 2016)  
Martti Kalke (University of Helsinki, Finland, 2014)

**Pre-examiner of a doctoral dissertation**

Omprakash Gottam (IIT Kanpur, India, 2022)  
Nishigandha R Patil (IIT Kanpur, India, 2022)  
Prabodh Kumar Pandey (IIT Kanpur, India, 2020)  
Tiina Näsi (Aalto University School of Science, Finland, 2013)

**Evaluator of a title of docent**

Joonas Ilmavirta (Tampere University, 2023)

**Expert evaluator in recruitment**

2025 Member of the assessment committee for a professor position at the Tampere University, Finland  
2019 Member of the assessment committee for a tenure track position at the Tampere University, Finland  
2019 Member of the assessment committee for a researcher position at the Technical University of Denmark, Denmark

**Peer review of funding applications**

2017– ERC-StG (2023)  
German Research Foundation (2022)  
Austrian Science Fund (2017, 2021)  
National Science Centre Poland (2020)  
H2020-MSCA-IF (2019, 2018)  
The Netherlands Organisation for Health Research and Development (2017)  
Austrian Academy of Sciences (2017)  
Czech Science Foundation (2017)

**Memberships and positions of trust in scientific communities**

2024– Member of the Steering Committee of the “Eurasian Association on Inverse Problems”  
2010–2022 Member of the board (vice president 2019–2022) of the “Finnish Inverse Problems Society”  
2017–2020 Member of the board of the “Finnish Physical Society”  
2001– Member of the scientific societies: “Society for Industrial and Applied Mathematics, SIAM”, “Inverse Problems International Association IPIA”, “SPIE, the International Society for Optics and Photonics”, “Finnish Inverse Problems Society”, “Photonics Finland”, “Finnish Physical Society”, “Finnish Society of Medical Physics and Medical Engineering”

### **Memberships in national or international expert, evaluation or steering groups and other expert roles**

2022–2027	Member of the “Cooperation forum for scientific computing and data management”, Ministry of Education and Culture, Finland
2020–	Collaborator in CUQI - Computational Uncertainty Quantification for Inverse Problems, DTU Compute, Denmark
2018–	Member of the board of the “Finnish Centre of Excellence in Inverse Modelling and Imaging”, Finland
2019	Member of the selection committee for the 2020 SIAG/UQ Early Career Prize, Society for Industrial and Applied Mathematics
2017–2020	Member of the Finnish National Committee of International Union for Pure and Applied Physics
2016–2018	Member of the “Cooperation forum for scientific computing”, Ministry of Education and Culture, Finland
2012–2017	Member of the board of the “Finnish Centre of Excellence in Inverse Problems Research”, Finland
2011–2015	Member of the board of the “Inverse Problems Doctoral Program”, Finland
2011–2015	Supervisor in the “Finnish Doctoral Program in Computational Sciences”, Finland

### **Memberships in editorial committees for scientific and professional publication series and journals**

2024–	Member of the editorial board of the <i>Photoacoustics</i> journal
2023–	Member of the editorial board of the <i>SIAM Journal on Imaging Sciences</i>
2021–	Member of the editorial board of the <i>Inverse Problems</i> journal
2019–2020	Member of the International Advisory Panel of the <i>Inverse Problems</i> journal
2019–2024	Member of the editorial board of the <i>Journal of Imaging</i>

### **Referee for scientific publications**

2005–	Reviewer for over 200 papers in the following 45 international scientific journals: <i>Inverse Problems</i> , <i>Inverse Problems and Imaging</i> , <i>Journal of Inverse and Ill-Posed Problems</i> , <i>International Journal for Numerical Methods in Engineering</i> , <i>Inverse Problems in Science and Engineering</i> , <i>SIAM Journal on Imaging Sciences</i> , <i>Journal of Mathematical Imaging and Vision</i> , <i>Electronic Transactions on Numerical Analysis</i> , <i>Applied Mathematics in Science and Engineering</i> , <i>IEEE Transactions on Medical Imaging</i> , <i>Measurement Science and Technology</i> , <i>Journal of Quantitative Spectroscopy and Radiative Transfer</i> , <i>Biomedical Optics Express</i> , <i>Optics Express</i> , <i>Optics Letters</i> , <i>Journal of the Optical Society of America A</i> , <i>Applied Optics</i> , <i>Journal of Biomedical Optics</i> , <i>Physics in Medicine and Biology</i> , <i>Medical Physics</i> , <i>Journal of Optics</i> , <i>Optical Engineering</i> , <i>Biomedical Physics and Engineering Express</i> , <i>Photoacoustics</i> , <i>Applied Physics Letters</i> , <i>IET Image Processing</i> , <i>IEEE Transactions on Computational Imaging</i> , <i>IEEE Photonics Journal</i> , <i>IEEE Transactions on Magnetics</i> , <i>IEEE Photonics Technology Letters</i> , <i>IEEE Journal of Biomedical and Health Informatics</i> , <i>IEEE Sensors Journal</i> , <i>IEEE Access</i> , <i>International Journal of Thermal Sciences</i> , <i>Journal of Mathematical Analysis and Applications</i> , <i>Communications in Computational Physics</i> , <i>Computational Optimization and Algorithms</i> , <i>Journal of Statistical Distributions and Applications</i> , <i>Journal of Selected Topics in Quantum Electronics</i> , <i>Journal of Biophotonics</i> , <i>Journal of Imaging</i> , <i>Quantitative Imaging in Medicine and Surgery</i> , <i>Journal of Micro/Nanolithography MEMS and MOEMS (JM3)</i> , <i>Journal of Innovative Optical Health Sciences</i> , <i>Mechanics of Advanced Materials and Structures</i> , <i>PLOS ONE</i> , <i>Physica Scripta</i> , <i>Chemical Engineering Research and Design</i> , <i>Advances in Mechanical Engineering</i>
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### **Administrative or working group positions in institutes of higher education and research organisations**

2025–	Member of the Tenure Track committee of the Faculty of Science, Forestry and Technology, University of Eastern Finland
2019–2024	Member of the board of the Center of Photonics Sciences, University of Eastern Finland
2010–	Member of the board of the Department of Technical Physics, University of Eastern Finland

2013–2021	Member of the teaching work group of the Department of Applied Physics, University of Eastern Finland
2013–2018	Organiser of the Department of Applied Physics Seminar Series on Computational Physics, University of Eastern Finland
2014	Founder of the network of women researchers of the Finnish Inverse Problems Society
2008	Founder of the network of women researcher of the Department of Applied Physics, University of Eastern Finland

## **ORGANISING SCIENTIFIC CONFERENCES**

### **Organising scientific meetings**

2025	Workshop “Inverse Problems in Applications”, May 6–7, 2025, Kuopio, Finland
2025	Workshop “Quantitative Photoacoustic Imaging – from Theory to Applications”, March 18-20, 2025, Kuopio, Finland
2022	Inverse Days 2022 - on the Occasion of the 60th Birthday of Professor Jari Kaipio Conference, December 12-16, 2022, Kuopio, Finland
2022	Workshop “Second Finnish Workshop on Radiative Transfer”, May 10-11, 2022, Kuopio, Finland
2019	Summer school “Finnish Summer School on Inverse Problems”, June 3-7, 2019, Helsinki, Finland
2019	Workshop “Finnish Workshop on Radiative Transfer”, May 6-7, 2019, Helsinki, Finland
2012	Summer school “Summer School on Computational Methods for Inverse Problems in Imaging”, June 11-15, 2012, Kuopio, Finland

### **Memberships in scientific committees of scientific conferences**

2025	Applied Inverse Problems, July 28 – August 1, 2025, Rio de Janeiro, Brazil
2025	Opto-Acoustic Methods and Applications conference in the European Conferences on Biomedical Optics, June 22-26, 2025, Munich, Germany
2024	SIAM Conference on Imaging Science, May 28-31, 2024, Atlanta, Georgia, U.S.A.
2024	Optica Biomedical Optics Congress, April 7-10, 2024, Fort Lauderdale, Florida, U.S.A.
2023	Opto-Acoustic Methods and Applications conference in the European Conferences on Biomedical Optics, June 25-26, 2023, Munich, Germany
2023	The Isaac Newton Institute for Mathematical Sciences programme “Rich and nonlinear tomography - a multidisciplinary approach”, January 1 – June 30, 2023, Cambridge, UK
2022	Optica Biomedical Optics Congress, April 24-27, 2022, Fort Lauderdale, Florida, U.S.A.
2022	SIAM Conference on Uncertainty Quantification, April 12-15, 2022, Atlanta, Georgia, U.S.A.
2021	Opto-Acoustic Methods and Applications conference in the European Conferences on Biomedical Optics, June 20-24, 2021, Munich, Germany
2020	OSA Biomedical Optics Congress, Optical Tomography and Spectroscopy meeting, April 20-23, 2020, Organised as an all-virtual web conference format due to COVID-19
2019	OSA Imaging and Applied Optics Congress, Mathematics in Imaging topical meeting, June 24 – 27, 2019, Munich, Germany
2018	Mathematics in Imaging, part of OSA Imaging and Applied Optics Congress, June 25 - 28, 2018, Orlando, Florida, USA

### **Organising mini-symposia in scientific conferences**

2025	Imaging using coupled physics, together with Niko Hänninen and Teemu Sahlström, in <i>Applied Inverse Problems</i> , July 28 – August 1, 2025, Rio de Janeiro, Brazil.
2022	Uncertainty Quantification and Diffusion Driven Tomography, together with Kim Knudsen and Tapio Helin, in <i>SIAM Conference on Imaging Science</i> , March 21-25, 2022, Virtual conference.
2019	Uncertainty quantification in imaging, together with Tapio Helin and Nuutti Hyvönen, in <i>International Congress on Industrial and Applied Mathematics</i> , July 15-19, Valencia, Spain

- 2018 Imaging with light and sound, together with Felix Lucka, in *SIAM Conference on Imaging Science*, June 5 -8, 2018, Bologna, Italy
- 2015 Optical Imaging using light: from theory to application, together with Teresa Correia, in *Applied Inverse Problems* conference, May 25 -29, 2015, Helsinki, Finland
- 2013 Tomography Based on the Radiative Transfer Equation, together with Simon Arridge and Arnold D Kim, in *Applied Inverse Problems* conference, July 1-5, 2013, Daejeon, Korea

## INVITED LECTURES

### Invited plenary, keynote and other important lectures

- 2025 "Utilising Monte Carlo method for light transport in optical imaging", in *International Conference of Scale Space and Variational Methods in Computer Vision*, May 18–22, 2025, Totnes, Devon, UK.
- 2025 "Utilising the radiative transfer equation in optical tomography" in *Computational Techniques and Imaging Innovations in the Age of AI*, April 1-2, 2025, London, UK.
- 2023 "Tomography using light and sound" in *RICAM Colloquium*, October 5, 2023, RICAM, Linz, Austria.
- 2022 "Modelling and inverse problem in diffuse optical tomography and quantitative photoacoustic tomography", in *Biophotonics Congress: Biomedical Optics*, April 24-27, 2022, Fort Lauderdale, Florida, USA.
- 2021 "Tomography using light and sound" in *Optics and Photonics Days*, December 1-3, 2021, Turku, Finland
- 2019 "Modelling of errors in photoacoustic tomography" in *CIRM Conference on Mathematical and Numerical Approaches for Multi-Wave Inverse Problems*, April 1-5, 2019, Marseille, France
- 2017 "Bayesian approach to photoacoustic tomography", in *IMA Conference on Inverse Problems from Theory to Application*, September 19-21, 2017, Cambridge, UK
- 2016 "Bayesian approach to quantitative photoacoustic tomography" in *New trends in Hybrid Ultrasonic Imaging*, March 7-10, 2016, Orléans, France
- 2014 "A Bayesian approach to quantitative photoacoustic tomography" in *Distinguished Lectures on Inverse Problems*, August 4-8, 2014, Helsinki, Finland

Invited lectures in international conferences and workshops: 22

Invited lectures in mini-symposia of international conferences: 15

Invited lectures in seminar series: 9

Invited minicourses: 1

## SOCIETAL IMPACT

- 2024 Research featured in SPIE news 11.1.2024, <https://spie.org/news/optical-aspects-of-quantitative-photoacoustic-tomography>
- 2022 Research featured in Tekniikan maailma magazine 9.2.2022 <https://tekniikanmaailma.fi/lehti/4a-2022/algoritmi-muuttaa-datan-kuvaksi/>
- 2021 Invited lecture "Laskennallinen kuvantaminen" in *Datahallinnan ja laskennan kehittämisohjelman päätösseminaari*, Ministry of Education and Culture, CSC – IT Center for Science, December 13, 2021
- 2021 Research featured in Tekniikka & Talous magazine 26.8.2021 <https://www.tekniikkatalous.fi/uutiset/uusi-laaketieteellinen-kuvantamismenetelma-yhdistaa-valon-ja-ultraaanen-ja-sopii-jopa-keskosvauvoille-talta-nayttavat-silla-kuvatut-hiiren-aivot/d53d9a11-17e7-47ac-9b1e-80d84520b27a>