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CURRICULUM VITAE

11.10.2024

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” (funding granted for the UEF 4.3 M€ and for the consortium 25.5 M€)

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: 69
Articles in refereed scientific edited volumes and conference proceedings: 47
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), Aleksii Leino (2017-2019), Aki Pulkkinen (2012-2018)

PhD students 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 (in progress), 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 25th 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

2017 Reviewer of the Year for *Inverse Problems* journal for 2017 (selected by the editorial board)

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

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

- 2022–2024 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 *Photoacoustics* journal
- 2023– Member of the editorial board of the *SIAM Journal on Imaging Sciences*
- 2021– Member of the editorial board of the *Inverse Problems* journal
- 2019–2020 Member of the International Advisory Panel of the *Inverse Problems* journal
- 2019– Member of the editorial board of the *Journal of Imaging*

Referee for scientific publications

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

Administrative or working group positions in institutes of higher education and research organisations

- 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

- 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, Rio de Janeiro, Brazil
- 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

- 2022 Uncertainty Quantification and Diffusion Driven Tomography, together with Kim Knudsen and Tapio Helin, in *SIAM Conference on Imaging Science*, March 21-25, 2022, Virtual conference.
- 2019 Uncertainty quantification in imaging, together with Tapio Helin and Nuutti Hyvönen, in *International Congress on Industrial and Applied Mathematics*, 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 lectures

- 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: 21

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 kehittämissohjelman 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-ultraanen-ja-sopii-jopa-keskosvauvoille-talta-nayttavat-silla-kuvatut-hiiren-aivot/d53d9a11-17e7-47ac-9b1e-80d84520b27a>