Curriculum vitae. February 16, 2023.

PERSONAL INFORMATION

Name: Matti Lassas
Date of birth: 1969. Nationality: Finnish
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• EDUCATION

1996 PhD in Mathematics (University of Helsinki, Finland)
1992 Master of Science in Mathematics (University of Helsinki, Finland)
1988 Finnish Matriculation Exam (requirement for starting university studies)

• CURRENT POSITIONS

2009–	Professor of Applied Mathematics Department of Mathematics and Statistics, University of Helsinki, Finland
2014-2023	Academy professorship in Academy of Finland (A 5-year research position with funding for a research group). Nomination for two periods, 2014-2018 and 2019-2023.
2018-2025	Director of the Centre of Excellence on Inverse Modelling and Imaging, funded by the Academy of Finland. The Centre studies pure and applied mathematics and computational physics and consists of 19 principal investigators and their research groups in 7 universities.

• PREVIOUS POSITIONS

2014-2017	Director of the Centre of Excellence on Inverse Problems Research of the Inverse Problems, funded by Academy of Finland.
2010	Research professor at Mathematical Sciences Research Institute (MSRI) at Berkeley (August-November).
2004–2008	Professor of Mathematics at Helsinki University of Technology.
2002–2004	Research Fellow of Academy of Finland.
2001	Member of Inverse problems research semester at Mathematical Sciences Research Institute (MSRI) at Berkeley (August-December).
1998–1999	Visiting scholar at University of Washington (September-June).
1998–2001	Postdoctoral fellowship of Academy of Finland.

• MEMBERSHIP OF ORGANIZATIONS AND SCIENTIFIC ACADEMIES

2020-	Member of *The Finnish Society of Sciences and Letters*, since 2020.
2012-	Member of *Finnish Academy of Science and Letters*, since 2012.
	Member of AMS, SIAM, EMS, IPIA, Finnish Mathematical Society, Finnish Inverse Problems Society.

• SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

PhD Students: Kenrick Bingham (PhD 2005), Tapio Helin (PhD 2010), Pekka Tietäväinen (PhD 2011), Lauri Oksanen (PhD 2012), Esa Niemi (PhD 2015, co-supervisor S. Siltanen), Hanne Kekkonen (PhD 2016, co-supervisor T. Helin), Teemu Saksala (PhD 2017), Jussi Korpela (PhD 2022), Antti Kujanpää (PhD 2022), Lauri Ylinen (PhD 2023), Elli Karvonen (current PhD student), Salla-Maria Latva-Äijö (current PhD student), Anna Suomenrinne-Nordvik (current PhD student), Jonne Nyberg (current PhD student). The underlined former students are tenured/tenure track professors.
Post docs: Matias Dahl, Katya Krupchyk, Roberta Bosi, Henrik Kettunen, Matteo Santacesaria, Luca Ratti, Tony Liimatainen, Zhidong Zhang, Emilia Blåsten, Teemu Tyni, Jinpeng Lu.

- **ORGANIZATION OF SCIENTIFIC MEETINGS**

2022	Co-chair of the organizing committee of the conference Inverse problems in analysis and geometry, Helsinki.
2021	Chair of the organizing committee of Inverse problems and non-linearity (by zoom in 2021) and its pre-conference (by zoom in 2020), Helsinki and Jyväskylä.
2019	Member of the organizing committee of Applied Inverse problems 2019 conference (AIP 2019), Grenoble, France.
2019	Co-chair of the organizing committee of Helsinki Inverse Problems Summer School 2019
2018	Member of organizing committee of the 9th International Conference on Inverse Problems and Related Topics, ICIP2018, Singapore.
2018	Member of organizing committee of the conference 150 years of Finnish Mathematical Society, Helsinki, Finland.
2017	Member of organizing committee of the Applied Inverse Problems 2017, Hangzhou, China.
2015	Member of organizing committee of Inverse problems trimester, Institut Henri Poincare (IHP), Paris, France.
2016	Member of scientific committee of URSI Electromagnetic Theory Symposium conference.
2015	Member of organizing committee of Applied Inverse Problems 2015 conference (AIP 2015) at Helsinki, Finland.
2014	Chair of organizing committee of Distinguished lectures on inverse problems conference at Helsinki, Finland.
2011	Chair of the organizing committee the starting workshop at Newton Institute program on Inverse Problems, Cambridge, UK.
2009	Member of program comittee of the conference Applied Inverse Problems AIP 2009, Vienna.
2008	Chairman of the organizing committee of Finnish Mathematical Days 2008.

- **INSTITUTIONAL RESPONSIBILITIES**

2023	Vice-president of the Inverse Problems International Association (IPIA).
2023-	Member of executive committee of IPIA.
2019-	The representative of the Finnish Mathematical Society in the International Council for Industrial and Applied Mathematics (ICIAM).
2018	Representative of Finland in the General Assembly of the International Mathematical Union.
2011-2016	President of the Finnish Mathematical Society.
2010-2021	Member of steering committee of the Inverse Problems International Association (IPIA).
2007-2010	Member of the Advisory board of IPIA.

- **EDITORIAL POSITIONS**

Editor of the journal *Communications on Analysis and Computation*, AIMS, Journal will be launched in 2023.
Editor of the journal *SIAM Journal on Applied Mathematics*, SIAM, 2023-
Editor of the journal *Research in Mathematical Sciences*, Springer, 2022-
Editor of the journal *Inverse Problems and Imaging*, AIMS, 2012-
Guest editor of special issue of *Journal of Mathematical Biology* on inverse problems, published in 2013.
Editor of the journal *Abstract and Applied Analysis*, 2012-
Managing editor of the journal *Inverse Problems and Imaging* (founding managing editor), in 2006-2011.

- **SELECTED INVITED PRESENTATIONS.**

- Invited section talk in the International Congress of Mathematicians, ICM2018, in the section of Control Theory and Optimization, Rio de Janeiro, Brazil.
- Two plenary talks and one invited 50-minute talks in the years 2018, 2019, 2020 in Mathematics + X Symposiums (funded by Simon's foundation), where the application topic X varies from geophysics to machine learning.

- Plenary talk in the conference Inverse Problems, Imaging and PDEs, at the Institute of Advanced Study, Hong Kong University of Science and Technology, Hong Kong.
- An invited 60-minute talk at the General Relativity & AdS/CFT conference, Fields Institute, Toronto.
- Plenary talk at Inverse Problems and Imaging Conference at the Institut Henri Poincare, Paris, 2014.

- **PRIZES AND AWARDS.**

E.J. Nyström Prize of the Finnish Society of Sciences and Letters in 2020. *Calderón prize* of International Inverse Problems Association (IPIA) in 2007. *Väisälä prize* of Finnish Academy of Science and Letters for achievements on mathematics in 2004. *Rolf Nevanlinna doctoral thesis award* for the best doctoral thesis in mathematics in Finland in 1995.

- **EXPERIENCE IN SCIENTIFIC PROJECT MANAGING**

2023-2025	Director and PI of the Centre of Excellence on Inverse Modelling and Imaging of the Academy of Finland.
2019-2023	PI of the project Research on non-linear inverse problems (funding for academy professor's research group), Academy of Finland.
2018-2022	Director and PI of the Centre of Excellence on Inverse Modelling and Imaging of the Academy of Finland.
2014–2018	PI of the project Inverse Problems: Mathematical analysis and applications. Funding for academy professor's research group (Academy of Finland)
2014-2017	Director and PI of the Centre of Excellence on Inverse Problems Research of the Inverse Problems.
2014-2016	PI of the research project funding Gunther Uhlmann's Finnish Distinguished Professorship (Academy of Finland).
2012–2016	PI of the project Computational and mathematical models for electromagnetic wave interaction with complex material structures, Academy of Finland.
2011–2014	PI of the project Sparsity and Inverse Problems in Infinite Dimensional Models, Academy of Finland.
2008–	Team leader in the Finnish Center of Excellence on the Inverse Problems funded by of the Academy of Finland.
2005–2008	PI of project in consortia Inverse problems and reliability of measurements funded by Finnish National Technology Agency.
2004–2007	PI of project in consortia studying 3D X-ray tomography funded by PaloDex Group and Tekes.
2002–2005	PI of the project Inverse problems (Academy of Finland).
2000–2004	PI of the project Geometrical Methods in Anisotropic Inverse Problems (Academy of Finland).
2002–2004	PI of project in a consortia Statistical methods in radiology funded byTekes, GE Healthcare, Invers Ltd.

- **SECELCTED PUBLICATIONS IN 2012-2022**

[1] Y. Kurylev, M. Lassas, L. Oksanen, G. Uhlmann: Inverse problem for Einstein-scalar field equations. *Duke Mathematical Journal* 171(2022), 3215-3282, 67 pp.

[2] X. Chen, M. Lassas, L. Oksanen, G. Paternain: Detection of Hermitian connections in wave equations with cubic non-linearity. To appear in *Journal of European Mathematical Society (JEMS)*. Preprint arXiv:1902.05711, 43 p.

[3] M. Puthawala, K. Kothari, M. Lassas, I. Dokmanic, M. de Hoop: Globally Injective ReLU Networks. To appear in *Journal of Machine Learning Research (JMLR)*. Preprint arXiv:2006.08464 2020, 38 p.

[4] M. de Hoop, M. Lassas, C. Wong: Deep learning architectures for nonlinear operator functions and nonlinear inverse problems. *Mathematical Statistics and Learning* 4 (2021), European Mathematical Society, no. 1-2, 1-86, 86 p.

[5] A. Feizmohammadi, M. Lassas, L. Oksanen: Inverse problems for non-linear hyperbolic equations with disjoint sources and receivers. *Forum of Mathematics, Pi* 9 (2021), Paper No. e10, 52 pp.

[6] C. Fefferman, S. Ivanov, Y. Kurylev, M. Lassas, H. Narayanan: Reconstruction and interpolation of manifolds I: The geometric Whitney problem. *Foundations of Computational Mathematics* 20 (2020), 1035-1133, 98 p.
[7] C. Fefferman, S. Ivanov, M. Lassas, H. Narayanan: Reconstruction of a Riemannian manifold from noisy intrinsic distances. *SIAM Journal on Mathematics of Data Science 2* (2020), 770-808.
[8] M. Lassas, G. Uhlmann, Y. Wang: Inverse problems for semilinear wave equations on Lorentzian manifolds. *Communications in Mathematical Physics* 360 (2018), no. 2, 555–609.
[9] Y. Kurylev, M. Lassas, G. Uhlmann: Inverse problems for Lorentzian manifolds and non-linear hyperbolic equations. *Inventiones Mathematicae* 212 (2018), no. 3, 781-857.
[10] A. Greenleaf, Y. Kurylev, M. Lassas, U. Leonhardt, G. Uhlmann: Schrödinger's Hat: Electromagnetic, acoustic and quantum amplifiers via transformation optics. *Proceedings of the National Academy of Sciences (PNAS)* 109 (2012), no. 26, 10169–10174.

Books and book chapters.
A. Kachalov, Y. Kurylev, M. Lassas: *Inverse boundary spectral problems.* Monographs and Surveys in Pure and Applied Math.123, Chapman Hall/CRC-press, 2001, xi+290 pp.
M. Lassas, M. Salo, G. Uhlmann: *Wave imaging.* Chapter in Handbook of Mathematical Methods in Imaging, O. Scherzer (Ed.), Springer-Verlag, 2015, Vol. 1, 1205-1252, 47 pp.

Patents: US Patent US 11163210 B2 - Arithmetic-logical unit with synchronized laser(s). Tuomo Von Lerber, Franko Kuppers, Matti Lassas, Klaus Hofmann. November 2, 2021.
US Patent US 20130096425 A1 - System and method for data reconstruction in soft-field tomography. K. Uutela, M. Lassas, P. Ola, S. Siltanen, V. Kolehmainen. April 18, 2013.
In addition to these, 3 US patents on medical imaging in 2007-2011.

- **PUBLICATION SYNOPSIS.**

My complete list of publications is on my web site,
https://www.mv.helsinki.fi/home/lassas/publications.html
The publication list contains 149 papers which have appeared or been accepted in refereed international journals, 39 papers in edited collections or conference proceedings, and 5 US patents.
Pure math. journals: Adv. Math., Amer. J. Math., Anal. & PDE, Ann. Sci. École Norm. Sup., Bulletin of AMS, Comm. PDE, CPAM, Duke Math. J., Forum Mathematics Pi, Found. in Comput. Math., Inventiones Math., IMRN, J. Anal. Math., J. Diff. Eq., JEMS, J. Funct. Anal., J. Reine Angew. Math., J. Spectral theory, Math. Res. Lett., Math. Ann., Trans. AMS.
Applied math. journals: Comm. Math. Phys., Inverse Problems, Inverse Problems Imag., J. Math. Pures Appl., J. Math. Imag. Vision, M^3AS, Nonlinearity, PNAS, Pure Appl. Anal., SIAM J. Appl. Dyn. Systems, SIAM J. Appl. Math., SIAM J. Data Anal., SIAM J. Discrete Math., SIAM J. Imag. Sci., SIAM J. Math. Anal., SIAM J. Sci. Comput., SIAM Rev.
Machine learning journals and conferences: COLT, ICML, JMLR, NeurIPS, Math. Statistics and Learning.
Physics journals: J. Comp. Phys., New J. Phys., Physica D, Phys. Med. Biol.,
Phys. Rev. E, Phys. Rev. Lett., Optics Express, IEEE Trans. Med. Imag., IEEE Journal of Selected Topics in Quantum Electronics, IEEE Trans. Remote Sensing, Scientific reports.
Number of citations: 4226 (ISI web of science) and 8944 (Google Scholar).
H-index: 34 (ISI web of science) and 48 (Google Scholar).

Public outreach

Our research on invisibility cloaking and electromagnetic wormholes has been discussed in the news sections of general scientific journals:
Schrödinger's Hat Uses Invisibility to Measure Quantum World, *Wired* (31 May 2012).
Matter waves: Cloaking matters, *Nature Physics* 5, 16 (Jan 2009).
Optics: Watch your back, *Nature* 451, 27-27 (02 Jan 2008).
Metamaterials: Lost in space, *Nature Photonics* 2, 11-11 (01 Jan 2008).
Envision This: Mathematicians Design Invisible Tunnel, *Scientific American* (May 4, 2007).

Light wormholes could wire space invisibly, *Nature* 450, (14 Nov 2007).