List of Publications

A: Peer-reviewed scientific articles

Copies of all publications can be found on my personal homepage:
`www.hauptmann-research.net`
The 10 most important publications are marked by **bold year** of publication.

A.1 Journal publications

2024 A. Hauptmann, S. Mukherjee, C. B. Schönlieb, F. Sherry. Convergent regularization in inverse problems and linear plug-and-play denoisers. *Foundations of Computational Mathematics*, 1-34.

2024 M., Meghdoot, P. Hirvi, I. Nissilä, A. Hauptmann, J. Ripoll, and D. E. Singh. Diffuse optical tomography of the brain: effects of inaccurate baseline optical parameters and refinements using learned post-processing. *Biomedical Optics Express* 15, 4470 – 4485.

2024 J. Poimala, B. Cox, A. Hauptmann. Compensating unknown speed of sound in learned fast 3D limited-view photoacoustic tomography. *Photoacoustics* 37, 100597.

2024 L. Marata, OLA. López, A. Hauptmann, H. Djelouat, H. Alves. Joint Activity Detection and Channel Estimation for Clustered Massive Machine Type Communications. *IEEE Transactions on Wireless Communications* 23, 5473 – 5487.

2024 A. Manninen, M. Mozumder, T. Tarvainen, A. Hauptmann. Sparsity promoting reconstructions via hierarchical prior models in diffuse optical tomography. *Inverse Problems and Imaging*, 18, 113 – 137.

2023 W. Herzberg, A. Hauptmann, SJ. Hamilton Domain independent post-processing with graph U-nets: Applications to Electrical Impedance Tomographic Imaging *Physiological Measurement*, 44, 125008.

2023 A. Arjas, MJ. Sillanpää, A. Hauptmann, Sequential model correction for nonlinear inverse problems. *SIAM Journal on Imaging Science*.

2023 S. Springer, A. Glielmo, A. Senchukova, T. Kauppi, J. Suuronen, L. Roininen, H. Haario, A. Hauptmann. Reconstruction and segmentation from sparse sequential X-ray measurements of wood logs. *Applied Mathematics for Modern Challenges*, 1, 1 – 20.

2023 E. Maneas, A. Hauptmann, EJ. Alles, W. Xia, S. Noimark, AL. David, S. Arridge, AE. Desjardins. Enhancement of instrumented ultrasonic tracking images using deep learning. *International Journal of Computer Assisted Radiology and Surgery*, 18, 395 – 399.

2022 R. Barbano, J. Leuschner, M. Schmidt, A. Denker, A. Hauptmann, P. Maass, B. Jin. An Educated Warm Start For Deep Image Prior-Based Micro CT Reconstruction. *IEEE Transactions on Computational Imaging*, 8, 1210 – 1222.

2022 R. Barbano, Z. Kereta, A. Hauptmann, S. Arridge, B. Jin. Unsupervised Knowledge-Transfer for Learned Image Reconstruction. *Inverse Problems*, 38, 104004.

2022 E. Maneas, A. Hauptmann, EJ. Alles, W. Xia, S. Noimark, AL. David, S. Arridge, AE. Desjardins. Enhancement of instrumented ultrasonic tracking images using deep learning. *International Journal of Computer Assisted Radiology and Surgery*, 2022.

2022 S. Ross, A. Arjas, I. Virtanen, M. Sillanpää, L. Roininen, A. Hauptmann. Hierarchical Deconvolution for Incoherent Scatter Radar Data. *Atmospheric Measurement Techniques*, 15, 3843–3857.

2022 S. Arridge, P. Fernsel, A. Hauptmann. Joint Reconstruction and Low-Rank Decomposition for Dynamic Inverse Problems. *Inverse Problems and Imaging*, 16, 483–523.

2022 A. Arjas, EJ. Alles, E. Maneas, S. Arridge, AE. Desjardins, MJ. Sillanpää, A. Hauptmann. Neural Network Kalman filtering for 3D object tracking from linear array ultrasound data. *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, 69, 1691–1702.

2022 M. Mozumder, A. Hauptmann, I. Nissilä, S. Arridge, T. Tarvainen. A model-based iterative learning approach for diffuse optical tomography. *IEEE Transactions on Medical Imaging*, 41, 1289–1299.

2022 B. Mathew, A. Hauptmann, J. Léon, MJ. Sillanpää. NeuralLasso: Neural Networks Meet Lasso in Genomic Prediction *Frontiers in Plant Science*, 13:800161.

2022 E. Maneas, A. Hauptmann, EJ. Alles, W. Xia, T. Vercauteren, S. Ourselin, AL. David, S. Arridge, and AE. Desjardins. Deep Learning for Instrumented Ultrasonic Tracking: From synthetic training data to *in vivo* application. *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, 69, 543–552.

2021 W. Herzberg, D. Rowe, A. Hauptmann, and S. Hamilton. Graph Convolutional Networks for Model-Based Learning in Nonlinear Inverse Problems. *IEEE Transactions on Computational Imaging*, 7, 1341–1353.

2021 M. Burger, A. Hauptmann, T. Helin, N. Hyvönen, JP. Puska. *Sequentially optimized projections in X-ray imaging*, 37, 075006.

2021 A. Hauptmann and D. Smyl. Fusing electrical and elasticity imaging. *Philosophical Transactions of the Royal Society A*, 379 (2200), 20200194.

2021 D. Smyl, TN. Tallman, D. Liu, A. Hauptmann. An efficient Quasi-Newton method for nonlinear inverse problems via learned singular values. *IEEE Signal Processing Letters*, 28, 748–752.

2021 D. Smyl, TN. Tallman, JA. Black, A. Hauptmann, D. Liu. Learning and correcting non-Gaussian model errors. *Journal of Computational Physics*, 432, 110152.

2021 S. Lunz, A. Hauptmann, T. Tarvainen, CB. Schönlieb, S. Arridge. On Learned Operator Correction in Inverse Problems. *SIAM Journal on Imaging Sciences*, 14(1), 92–127.

2021 JFPJ. Abascal, N. Ducros, S. Rit, PA. Rodesch, T. Broussaud, S. Bussod, P. Douek, A. Hauptmann, S. Arridge, F. Peyrin. Material Decomposition in Spectral CT using deep learning: A Sim2Real transfer approach. *IEEE Access*, 9, 25632–25647.

2021 A. Hauptmann, J. Adler, S. Arridge, O. Öktem. Multi-Scale Learned Iterative Reconstruction. *IEEE Transactions on Computational Imaging*, 6, 843–856.

2020 C. Bench, A. Hauptmann, B. Cox. Towards accurate quantitative photoacoustic imaging: learning vascular blood oxygen saturation in 3D. *Journal of Biomedical Optics*, 25(8), 085003.

2020 JA. Steeden, M. Quail, A. Gotschy, K. Mortensen, A. Hauptmann, S. Arridge, R. Jones, and V. Muthurangu. Rapid Whole-Heart CMR with Single Volume Super-resolution. *Journal of Cardiovascular Magnetic Resonance*, 22, 56.

2020 A. Arjas, A. Hauptmann, MJ. Sillanpää. Estimation of dynamic SNP-heritability with Bayesian Gaussian process models. *Bioinformatics*, 36, 3795–3802.

2020 S. Arridge, A. Hauptmann. Networks for Nonlinear Diffusion Problems in Imaging. *Journal of Mathematical Imaging and Vision*, 62, 471–487.

2019 S. Hamilton, A. Hänninen, A. Hauptmann, V. Kolehmainen. Beltrami-Net: Domain Independent Deep D-bar Learning for Absolute Imaging with Electrical Impedance Tomography (a-EIT). *Physiological Measurement*, 40, 074002.

2019 A. Hauptmann, S. Arridge, F. Lucka, V. Muthurangu, J. Steeden. Real-time cardiovascular MR with spatio-temporal artifact suppression using deep learning-proof of concept in congenital heart disease. *Magnetic Resonance in Medicine*, 81, 1143–1156. (Editor's pick)

2019 A. Hauptmann, M. Ikehata, H. Itou, S. Siltanen. Revealing cracks inside conductive bodies by electric surface measurements. *Inverse Problems*, 35, 025004.

2018 S. Hamilton and A. Hauptmann. Deep D-bar: Real time Electrical Impedance Tomography Imaging with Deep Neural Networks. *IEEE Transactions on Medical Imaging*, 37(10), 2367–2377.

2018 A. Hauptmann, F. Lucka, M. Betcke, N. Huynh, B. Cox, P. Beard, S. Ourselin, and S. Arridge, Model based learning for accelerated, limited-view 3D photoacoustic tomography. *IEEE Transactions on Medical Imaging*, 37(6), 1382–1393.

2017 M. Burger, H. Dirks, L. Frerking, A. Hauptmann, T. Helin, and S. Siltanen. A Variational Reconstruction Method for Dynamical X-ray Tomography based on Physical Motion Models. *Inverse Problems*, 33(12), 124008.

2017 A. Hauptmann. Approximation of full-boundary data from partial-boundary electrode measurements. *Inverse Problems*, 33(12), 125017.

2017 M. Alsaker, S. Hamilton, and A. Hauptmann. A Direct D-bar Method for Partial Boundary Data Electrical Impedance Tomography with A Priori Information. *Inverse Problems and Imaging*, 11(3), pp. 427–454.

2017 A. Hauptmann, S. Santacesaria, S. Siltanen. Direct inversion from partial-boundary data in electrical impedance tomography. *Inverse Problems*, 33(2), 025009.

2014 S. Hamilton, A. Hauptmann, and S. Siltanen. A Data-Driven Edge-Preserving D-bar Method for Electrical Impedance Tomography. *Inverse Problems and Imaging*, 8(4), pp. 1053–1072.

2014 K. Hämäläinen, L. Harhanen, A. Hauptmann, A. Kallonen, E. Niemi, and S. Siltanen. Total variation regularization for large-scale X-ray tomography. *International Journal of Tomography and Simulation*, 25(1), pp. 1–25.

A.2 Scientific reviews

2023 S. Mukherjee, A. Hauptmann, O. Öktem, M. Pereyra, CB. Schönlieb. Learned Reconstruction Methods With Convergence Guarantees: A survey of concepts and applications. *IEEE Signal Processing Magazine*, 40, 164–182.

2022 A. Gallet, S. Rigby, T. N. Tallman, X. Kong, I. Hajirasouliha, A. Liew, D. Liu, L. Chen, A. Hauptmann, and D. Smyl. Structural engineering from an inverse problems perspective. *Proceedings of the Royal Society A*, 478, 20210526.

2021 J. Montalt-Tordera, V. Muthurangu, A. Hauptmann, JA. Steeden. Machine learning in Magnetic Resonance Imaging: Image reconstruction. *Physica Medica*, 83, 79–87.

2020 A. Hauptmann, B. Cox. Deep Learning in Photoacoustic Tomography: Current approaches and future directions. *Journal of Biomedical Optics,* 25(11), 112903.

A.3 Book chapters

2021 A. Hauptmann, O. Öktem, CB. Schönlieb. Image reconstruction in dynamic inverse problems with temporal models. Chapter in *Handbook of Mathematical Models and Algorithms in Computer Vision and Imaging.*

A.4 Conference and workshop papers

2024 A. Hauptmann, M. Al-Rubaye, MT. Nieminen, MAK. Brix. A Multi-Filter and Multi-Scale U-Net for Cone-Beam Computed Tomography with Hardware Constraints. *2024 IEEE International Conference on Acoustics, Speech, and Signal Processing Workshops (ICASSPW 2024).*

2023 HY. Tan, S. Mukherjee, J. Tang, A. Hauptmann, CB. Schönlieb. Robust Data-Driven Accelerated Mirror Descent. IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2023).

2021 S. Bussod, JFP. Abascal, S. Arridge, A. Hauptmann, C. Chappard, N. Ducros, F. Peyrin. Convolutional Neural Network for Material Decomposition in Spectral CT scans. *28th European Signal Processing Conference (EUSIPCO 2020)*, 1259–1263.

2020 R. Barbano, Z. Kereta, C. Zhang, A. Hauptmann, S. Arridge, B. Jin. Quantifying Sources of Uncertainty in Deep Learning-Based Image Reconstruction, *NeurIPS 2020 Deep Inverse Workshop.*

2020 A. Arjas, L. Roininen, M. Sillanpää, A. Hauptmann. Blind hierarchical deconvolution. *IEEE International Workshop on Machine Learning and Signal Processing (MLSP)*, 1–6.

2020 J. Abascal, N. Ducros, V. Pronina, S. Bussod, A. Hauptmann, S. Arridge, P. Douek, F. Peyrin. Material Decomposition problem in spectral CT: A transfer deep learning approach. *2020 IEEE 17th International Symposium on Biomedical Imaging Workshops (ISBI Workshops).*

2019 N. Djurabekova, A. Goldberg, A. Hauptmann, D. Hawkes, G. Long, F. Lucka, and M. Betcke. Application of Proximal Alternating Linearized Minimization (PALM) and inertial PALM to dynamic 3D CT. *15th International Meeting on Fully Three-Dimensional Image Reconstruction in Radiology and Nuclear Medicine*, 1107208.

2018 Hauptmann, B. Cox, F. Lucka, N. Huynh, M. Betcke, P. Beard, S. Arridge. Approximate k-space models and Deep Learning for fast photoacoustic reconstruction. *In International workshop on Machine Learning for Medical Image Reconstruction.* Lecture Notes in Computer Science, 11074. Springer, Cham.

G: Theses

2017 A. Hauptmann. Advances in D-bar methods for partial boundary data electrical impedance tomography. Ph.D. thesis, University of Helsinki.

2012 A. Hauptmann. Local computerized tomography and total variation regularization. M.Sc. thesis, Technical University of Munich.

2010 A. Hauptmann. Adaptive dG(r)-approaches for ordinary differential equations (original in German: Adaptive dG(r)-Verfahren für gewöhnliche Differential-gleichungen). B.Sc. thesis, Technical University of Munich.

I.1: Audiovisual material

2019 A. Hauptmann and V. Muthurangu. Artifact Suppression using Deep Learning.
YouTube: https://www.youtube.com/watch?v=-W534HLF-Eg

2017 A. Hauptmann, V. Kolehmainen, N. M. Mach, T. Savolainen, A. Seppänen and S. Siltanen. Electrical Impedance Tomography data measurement.
YouTube: https://www.youtube.com/watch?v=65Zca_1Y8

2017 T. A. Bubba, A. Hauptmann, S. Huotari, J. Rimpeläinen and S. Siltanen. X-ray tomography of lotus root.
YouTube: https://www.youtube.com/watch?v=eWwD_EZuzBI

I.2: Open science

Accompanying code for publications on GitHub:
https://github.com/asHauptmann

2018 Author for the FIPS Computational Blog:
https://blog.fips.fi/author/andreas/

2017 A. Hauptmann, V. Kolehmainen, M. Mach, T. Savolainen, A. Seppänen, S. Siltanen. Open 2D Electrical Impedance Tomography data archive. *Zenodo*. DOI: 10.5281/zenodo.1203914
See also: http://www.fips.fi/datasetpage.php

2016 T. Bubba, A. Hauptmann, S. Huotari, J. Rimpeläinen, and S. Siltanen. Tomographic X-ray data of a lotus root slice filled with different chemical elements. *Zenodo*. DOI: 10.5281/zenodo.1254204
See also: http://www.fips.fi/datasetpage.php