

Peer-reviewed scientific articles

Journal articles

1. J. Kultima, R. Ramlau, T. Sahlström and T. Tarvainen, Fast reconstruction approaches for photoacoustic tomography with smoothing Sobolev/Matérn priors, *Inverse Problems and Imaging*, doi:10.3934/ipi.2026015, 2026.
2. T. Sahlström, T. Lähivaara and T. Tarvainen, Simultaneous estimation of electrical conductivity and permittivity in quantitative thermoacoustic tomography, *Inverse Problems*, 41:035015, 2025.
3. W. Xu, J. Leskinen, T. Sahlström, E. Happonen, T. Tarvainen and V.-P. Lehto, Assembly of fluorophore J-aggregates with nanospacer onto mesoporous nanoparticles for enhanced photoacoustic imaging, *Photoacoustics*, 33:100552, 2023.
4. T. Sahlström and T. Tarvainen, Utilizing variational autoencoders in the Bayesian inverse problem of photoacoustic tomography, *SIAM Journal of Imaging Sciences*, 16(1):89-110, 2023 (article was chosen in the "SIAM High Impact Article Collection of frequently downloaded and highly cited articles on machine learning in 2024").
5. T. Sahlström, A. Pulkkinen, J. Leskinen and T. Tarvainen, Computationally efficient forward operator for photoacoustic tomography based on coordinate transformations, *IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control*, 6(8):2172-2182, 2021.
6. T. Sahlström, A. Pulkkinen, J. Tick, J. Leskinen and T. Tarvainen, Modeling of errors due to uncertainties in ultrasound sensor locations in photoacoustic tomography, *IEEE Transactions on Medical Imaging*, 39(6):2140-2150, 2020.

Chapters in peer-reviewed research books

1. H. Goh, T. Sahlström and T. Tarvainen, Utilizing uncertainty quantification variational autoencoders in inverse problems with applications in photoacoustic tomography, In T. Bubba, Editor, *Data-driven Models in Inverse Problems*, De Gruyter, 31:414-436, 2025.

Peer-reviewed conference proceedings

1. T. Sahlström and T. Tarvainen, Utilising variational autoencoders in photoacoustic tomography, In *Proc. SPIE 12379, Photons Plus Ultrasound: Imaging and Sensing 2023*, A.A. Oraevsky and L.V. Wang Eds., 1237914, 2023.
2. T. Sahlström and T. Tarvainen, Deep learning in photoacoustic tomography utilising variational autoencoders, In *Proc. SPIE 12631, Opto-Acoustic Methods and Applications in Biophotonics VI*, C. Kim, J. Laufer, V. Ntziachristos, and R. J. Zemp Eds., 1263108, 2023 (article was chosen as a hot topic in the [European Conferences of Biomedical Optics 2023](#)).
3. T. Sahlström, A. Pulkkinen, J. Tick, J. Leskinen and T. Tarvainen, Computationally efficient forward model for photoacoustic tomography, In *Proc. SPIE 11923, Opto-Acoustic Methods and Applications in Biophotonics V*, C. Kim, J. Laufer, and R.J. Zemp Eds., 1192308, 2021.
4. T. Sahlström, A. Pulkkinen, J. Tick, J. Leskinen and T. Tarvainen, Modelling of uncertainties in ultrasound sensor locations in photoacoustic tomography, In *Proc. SPIE 11240, Photons Plus Ultrasound: Imaging and Sensing 2020*, A.A. Oraevsky and L.V. Wang Eds., 112402L, 2020.

Non-refereed scientific articles

Preprints

1. K. Puronhaara, T. Sahlström, A. Hauptmann and T. Tarvainen, Utilising a learned forward operator in the inverse problem of photoacoustic tomography, Submitted, *arXiv preprint*,

arXiv:2603.21655, 2026.

2. T. Sahlström and T. Tarvainen, Estimation of Dielectric Parameters from Ultrasound Waves in Quantitative Thermoacoustic Tomography, Submitted, *arXiv preprint*, arXiv:2511.06278, 2025.

Conference proceedings

1. T. Sahlström, T. Lähivaara and T. Tarvainen, Estimation of dielectric parameters in quantitative thermoacoustic tomography, In *European Conferences on Biomedical Optics 2025*, Tu2A.40, 2025.
2. G. Tang, F. Lucka, T. Sahlström, B. Cox, T. Tarvainen and J. Laufer, Comparative Analysis of Acoustic Reconstruction Methods for Chromophore and Oxygenation Quantification in Limited-View 3D Quantitative Photoacoustic Tomography, In *European Conferences on Biomedical Optics 2025*, S4D.2, 2025.

Theses

1. T. Sahlström, *Computational methods for modelling and inverse problem of photoacoustic tomography*, PhD thesis, University of Eastern Finland, Kuopio, Finland, 2023.
2. T. Sahlström, *Approximation error modelling in photoacoustic tomography*, MSc thesis, University of Eastern Finland, Kuopio, Finland, 2019.