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List of Publications

11.10.2024

Articles in refereed scientific journals

1. Sahlström T, Lähivaara T, Tarvainen T, Simultaneous estimation of electrical conductivity and permittivity in quantitative thermoacoustic tomography, *Inverse Problems,* Submitted.
2. Kangasniemi J, Mozumder M, Pulkkinen A, Tarvainen T, Stochastic Gauss-Newton method for estimating absorption and scattering in optical tomography with the Monte Carlo method for light transport, *Biomedical Optics Express,* 15(8):4925-4942, 2024.
3. Hänninen N, Pulkkinen A, Arridge S, Tarvainen T, Estimating absorption and scattering in quantitative photoacoustic tomography with an adaptive Monte Carlo method for light transport*, Inverse Problems and Imaging,* 18(5):1052-1077, 2024.
4. Afkham BM, Knudsen K, Rasmussen AK, Tarvainen T, A Bayesian approach for consistent reconstruction of inclusions, *Inverse Problems*, 40:045004, 2024.
5. Suhonen M, Pulkkinen A, Tarvainen T, Single-stage approach for estimating optical parameters in spectral quantitative photoacoustic tomography, *Journal of the Optical Society of America A,* 41(3):527-542, 2024.
6. Tarvainen T, Cox B, Quantitative photoacoustic tomography: modelling and inverse problems, *Journal of Biomedical Optics,* 29(S1):S11509, 2024 (Invited review).
7. Manninen A, Mozumder M, Tarvainen T, Hauptmann A, Sparsity promoting reconstructions via hierarchical prior models in diffuse optical tomography, *Inverse Problems and Imaging,* 18(1):113-137, 2024.
8. Koponen E, Leskinen J, Tarvainen T, Pulkkinen A, Background-oriented schlieren sensitivity in terms of geometrical parameters of measurement setup, *The Journal of the Acoustical Society of America*, 154(6): 3726-3736, 2023.
9. Xu W, Leskinen J, Sahlström T, Happonen E, Tarvainen T, Lehto V-P, Assembly of fluorophore J-aggregates with nanospacer onto mesoporous nanoparticles for enhanced photoacoustic imaging, *Photoacoustics*, 33:100552, 2023.
10. Sahlström T, Tarvainen T, Utilizing variational autoencoders in the Bayesian inverse problem of photoacoustic tomography, *SIAM Journal on Imaging Sciences*, 16(1):89-110, 2023 (the article was selected in SIAM High Impact Article Collection on Machine Learning in 2024).
11. Mozumder M, Leskinen J, Tarvainen T, Utilising nanosecond sources in diffuse optical tomography, *Measurement Science and Technology,* 34:025901, 2023.
12. Mozumder M, Hauptmann A, Nissilä I, Arridge SR, Tarvainen T, A model-based iterative learning approach for diffuse optical tomography, *IEEE Transactions on Medical Imaging*, 41(5):1289-1299, 2022.
13. Hänninen N, Pulkkinen A, Arridge S, Tarvainen T, Adaptive stochastic Gauss-Newton method with optical Monte Carlo for quantitative photoacoustic tomography, *Journal of Biomedical Optics*, 22(8):083013, 2022.
14. Koponen E, Leskinen J, Tarvainen T, Pulkkinen A, Nonlinear estimation of pressure projection of ultrasound fields in background-oriented schlieren imaging, *Journal of the Optical Society of America A*, 39(4):552-562, 2022.
15. Sahlström T, Pulkkinen A, Leskinen J, Tarvainen T, Computationally Efficient Forward Operator for Photoacoustic Tomography Based on Coordinate Transformations*, IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, 68(6):2172-2182, 2021.

16. Lunz S, Hauptmann A, Tarvainen T, Schönlieb C-B, Arridge S, On learned operator correction in inverse problems, *SIAM Journal on Imaging Sciences*, 14(1):92-127, 2021.
17. Mozumder M, Tarvainen T, Evaluation of temporal moments and Fourier transformed data in time-domain diffuse optical tomography, *Journal of the Optical Society of America A,* 37(12):1845-1856, 2020.
18. Leino A, Lunttila T, Mozumder M, Pulkkinen A, Tarvainen T, Perturbation Monte Carlo method for quantitative photoacoustic tomography, *IEEE Transactions on Medical Imaging*, 39(19):2985-2995, 2020.
19. Sahlström T, Pulkkinen A, Tick J, Leskinen J, Tarvainen T, Modelling of errors due to uncertainties in ultrasound sensor locations in photoacoustic tomography, *IEEE Transactions on Medical Imaging,* 39(6)**:** 2140-2150, 2020.
20. Hänninen N, Pulkkinen A, Leino A, Tarvainen T, Application of diffusion approximation in quantitative photoacoustic tomography in the presence of low-scattering regions, *Journal of Quantitative Spectroscopy and Radiative Transfer,* 250:107065, 2020.
21. Xu W, Leskinen J, Tick J, Happonen E, Tarvainen T, Lehto V-P, Black mesoporous silicon as a contrast agent for LED-based 3D photoacoustic tomography, *ACS Applied Materials & Interfaces,* 12: 5456-5461, 2020.
22. Mozumder M, Tarvainen T, Time-domain diffuse optical tomography utilizing truncated Fourier series approximation, *Journal of the Optical Society of America A,* 37(2):182-191, 2020.
23. Tick J, Pulkkinen A, Tarvainen T, Modelling of errors due to speed of sound variations in photoacoustic tomography using a Bayesian framework, *Biomedical Physics & Engineering Express,* 6:015003, 2020.
24. Koponen E, Leskinen J, Tarvainen T, Pulkkinen A, Ultrasound field characterization using synthetic schlieren tomography, *The Journal of the Acoustical Society of America*, 145(4):2470-2479, 2019.
25. Leino AA, Pulkkinen A, Tarvainen T, ValoMC: A Monte Carlo software and MATLAB toolbox for simulating light transport in biological tissue, *OSA Continuum,* 2(3):957-972, 2019.
26. Hänninen N, Pulkkinen A, Tarvainen T, Image reconstruction with reliability assessment in quantitative photoacoustic tomography, *Journal of Imaging,* 4:148, 2018.
27. Tick J, Pulkkinen A, Lucka F, Ellwood R, Cox BT, Kaipio JP, Arridge SR, Tarvainen T, Three dimensional photoacoustic tomography in Bayesian framework, *The Journal of the Acoustical Society of America,* 144(4):2061-2071, 2018 (the article was selected as a Technical Area Pick for Biomedical Acoustics in 2018).
28. Raumonen P, Tarvainen T, Segmentation of vessel structures from photoacoustic images with reliability assessment, *Biomedical Optics Express*, 9(7):2887-2904, 2018.
29. Nykänen O, Pulkkinen A, Tarvainen T, Quantitative photoacoustic tomography augmented with surface light measurements, *Biomedical Optics Express,* 8(10):4380-4395, 2017.
30. Tamminen J, Tarvainen T, Siltanen S, The D-bar method for diffuse optical tomography: a computational study, *Experimental Mathematics,* 26(2):225-240, 2017.
31. Toivanen J, Tarvainen T, Huttunen JMJ, Savolainen T, Pulkkinen A, Orlande HRB, Kaipio JP, Kolehmainen V, Thermal tomography utilizing truncated Fourier series approximation of the heat diffusion equation, *International Journal of Heat and Mass Transfer*, 108:860 -867, 2017.
32. Pulkkinen A, Cox BT, Arridge SR, Goh H, Kaipio JP, Tarvainen T, Direct estimation of optical parameters from photoacoustic time series in quantitative photoacoustic tomography, *IEEE Transactions on Medical Imaging,* 35(11):2497-2508, 2016.
33. Hannukainen A, Hyvönen N, Majander H, Tarvainen T, Efficient inclusion of total variation type priors in quantitative photoacoustic tomography, *SIAM Journal on Imaging Sciences*, 9(3):1132-1153, 2016.
34. Tick J, Pulkkinen A, Tarvainen T, Image reconstruction with uncertainty quantification in photoacoustic tomography, *The Journal of the Acoustical Society of America,* 139:1951-1961, 2016.
35. Mozumder M, Tarvainen T, Arridge S, Kaipio JP, D'Andrea C, Kolehmainen V, Approximate marginalization of absorption and scattering in fluorescence diffuse optical tomography, *Inverse Problems and Imaging,* 10(1):227-246, 2016.
36. Mozumder M, Tarvainen T, Seppänen A, Nissilä I, Arridge SR, Kolehmainen V, A nonlinear approach to difference imaging in diffuse optical tomography, *Journal of Biomedical Optics,* 20(10):105001, 2015.

37. Pulkkinen A, Cox BT, Arridge SR, Kaipio JP, Tarvainen T, Quantitative photoacoustic tomography using illuminations from a single direction, *Journal of Biomedical Optics,* 20(3):036015, 2015.
38. Lehtikangas O, Tarvainen T, Kim AD, Arridge SR, Finite element approximation of the radiative transport equation in a medium with piece-wise constant refractive index, *Journal of Computational Physics,* 282:345-359, 2015.
39. Koponen J, Huttunen T, Tarvainen T, Kaipio JP, Bayesian Approximation Error Approach in Full-Wave Ultrasound Tomography, *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, 61(10):1627-1637, 2014.
40. Pulkkinen A, Kolehmainen V, Kaipio JP, Cox BT, Arridge SR, Tarvainen T, Approximate marginalization of unknown scattering in quantitative photoacoustic tomography, *Inverse Problems and Imaging,* 8(3): 811-829, 2014.
41. Toivanen JM, Tarvainen T, Huttunen JMJ, Savolainen T, Orlande HRB, Kaipio JP, Kolehmainen V, 3D thermal tomography with experimental measurement data, *International Journal of Heat and Mass Transfer*, 78:1126-1134, 2014.
42. Mozumder M, Tarvainen T, Kaipio JP, Arridge SR, Kolehmainen V, Compensation of modeling errors due to unknown domain boundary in diffuse optical tomography, *Journal of the Optical Society of America A,* 31(8):1847-1855, 2014.
43. Pulkkinen A, Cox BT, Arridge SR, Kaipio JP, Tarvainen T, A Bayesian approach to spectral quantitative photoacoustic tomography, *Inverse Problems,* 30:065012, 2014.
44. Tarvainen T, Pulkkinen A, Cox BT, Kaipio JP, Arridge SR, Bayesian image reconstruction in quantitative photoacoustic tomography, *IEEE Transactions on Medical Imaging*, 32(12): 2287-2298, 2013.
45. Mozumder M, Tarvainen T, Arridge SR, Kaipio JP, Kolehmainen V, Compensation of optode sensitivity and position errors in diffuse optical tomography using the approximation error approach, *Biomedical Optics Express*, 4(10): 2015–2031, 2013.
46. Saratoon T, Tarvainen T, Cox BT, Arridge SR, A gradient-based method for quantitative photoacoustic tomography using the radiative transfer equation, *Inverse Problems*, 29:075006, 2013 (the article was selected as an insights article of *Inverse Problems*).
47. Pulkkinen A, Tarvainen T, Truncated Fourier-series approximation of the time-domain radiative transfer equation using finite elements, *Journal of the Optical Society of America A,* 30(3):470-478, 2013.
48. Lehtikangas O, Tarvainen T, Hybrid forward-peaked-scattering-diffusion approximations for light propagation in turbid media with low-scattering regions, *Journal of Quantitative Spectroscopy and Radiative Transfer,* 116:132-144, 2013.
49. Toivanen JM, Kolehmainen V, Tarvainen T, Orlande HRB, Kaipio JP, Simultaneous estimation of spatially distributed thermal conductivity, heat capacity and surface heat transfer coefficient in thermal tomography, *International Journal of Heat and Mass Transfer*, 55: 7958–7968, 2012.
50. Heiskala J, Kolehmainen V, Tarvainen T, Kaipio JP, Arridge SR, Approximation error method can reduce artifacts due to scalp blood flow in optical brain activation imaging, *Journal of Biomedical Optics,* 17(9):096012, 2012.
51. Tarvainen T, Cox BT, Kaipio JP, Arridge SR, Reconstructing absorption and scattering distributions in quantitative photoacoustic tomography, *Inverse Problems,* 28:084009, 2012 (the article was selected as highlights of *Inverse Problems* in 2012).
52. Lehtikangas O, Tarvainen T, Kim AD, Modeling boundary measurements of scattered light using the corrected diffusion approximation, *Biomedical Optics Express,* 3:552-571, 2012.
53. Tarvainen T, Kolehmainen V, Arridge SR, Kaipio JP, Image reconstruction in diffuse optical tomography using the coupled radiative transport – diffusion model, *Journal of Quantitative Spectroscopy and Radiative Transfer,* 112:2600-2608, 2011.
54. Mohan PS, Tarvainen T, Schweiger M, Pulkkinen A, Arridge SR, Variable order spherical harmonics expansion scheme for the radiative transport equation using finite elements, *Journal of Computational Physics*, 230:7364–7383, 2011.

55. Kolehmainen V, Tarvainen T, Arridge SR, Kaipio JP, Marginalization of uninteresting parameters in inverse problems – application to diffuse optical tomography, *International Journal for Uncertainty Quantification,* 1(1):1-17, 2011.
56. Tarvainen T, Kolehmainen V, Kaipio JP, Arridge SR, Corrections to linear methods for diffuse optical tomography using approximation error modelling, *Biomedical Optics Express,* 1(1):209-222, 2010.
57. Lehtikangas O, Tarvainen T, Kolehmainen V, Pulkkinen A, Arridge SR, Kaipio JP, Finite element approximation of the Fokker-Planck equation for diffuse optical tomography, *Journal of Quantitative Spectroscopy and Radiative Transfer,* 111(10):1406-1417, 2010.
58. Tarvainen T, Kolehmainen V, Pulkkinen A, Vauhkonen M, Schweiger M, Arridge SR, Kaipio JP, An approximation error approach for compensating for modelling errors between the radiative transfer equation and diffusion approximation in diffuse optical tomography, *Inverse Problems,* 26:015005(18pp), 2010 (the article was selected as highlights of *Inverse Problems* in 2010).
59. Kolehmainen V, Schweiger M, Nissilä I, Tarvainen T, Arridge SR, Kaipio JP, Approximation errors and model reduction in three-dimensional diffuse optical tomography, *Journal of the Optical Society of America A,* 26(10):2257-2267, 2009.
60. Tarvainen T, Vauhkonen M, Arridge SR, Gauss-Newton reconstruction method for optical tomography using the finite element solution of the radiative transfer equation, *Journal of Quantitative Spectroscopy and Radiative Transfer,* 109:2767-2778, 2008.
61. Arridge SR, Dorn O, Kaipio JP, Kolehmainen V, Schweiger M, Tarvainen T, Vauhkonen M, Zacharopoulos A, Reconstruction of subdomain boundaries of piecewise constant coefficients of the radiative transfer equation from optical tomography data, *Inverse Problems*, 22:2175-2196, 2006.
62. Arridge SR, Kaipio JP, Kolehmainen V, Schweiger M, Somersalo E, Tarvainen T, Vauhkonen M, Approximation errors and model reduction with an application in optical diffusion tomography, *Inverse Problems*, 22:175-195, 2006 (the article was selected as highlights of *Inverse Problems* in 2006 and as part of the 25th Anniversary Highlights of *Inverse Problems* in August 2010).
63. Tarvainen T, Vauhkonen M, Kolehmainen V, Kaipio JP, Finite element model for the coupled radiative transfer equation and diffusion approximation, *International Journal for Numerical Methods in Engineering*, 65(3):383-405, 2006.
64. Tarvainen T, Vauhkonen M, Kolehmainen V, Arridge SR, Kaipio JP, Coupled radiative transfer equation and diffusion approximation model for photon migration in turbid medium with low-scattering and non-scattering regions, *Physics in Medicine and Biology*, 50:4913-4930, 2005.
65. Nissilä I, Noponen T, Kotilahti K, Tarvainen T, Schweiger M, Lipiäinen L, Arridge SR, Katila T, Instrumentation and calibration methods for the multichannel measurement of phase and amplitude in optical tomography, *Review of Scientific Instruments*, 76(4):044302, 2005.
66. Tarvainen T, Kolehmainen V, Vauhkonen M, Vanne A, Gibson AP, Schweiger M, Arridge SR, Kaipio JP, Computational calibration method for optical tomography, *Applied Optics*, 44(10):1879-1888, 2005.
67. Tarvainen T, Vauhkonen M, Kolehmainen V, Kaipio JP, Hybrid radiative-transfer-diffusion model for optical tomography, *Applied Optics*, 44(6):876-886, 2005.
68. Vilhunen T, Kaipio, JP, Vauhkonen PJ, Savolainen T, Vauhkonen M, Simultaneous reconstruction of electrode contact impedances and internal electrical properties, I: Theory, *Measurement Science and Technology*, 13:1848-1854, 2002.
69. Heikkinen LM, Vilhunen T, West RM, Vauhkonen M, Simultaneous reconstruction of electrode contact impedances and internal electrical properties, II: Laboratory experiments, *Measurement Science and Technology*, 13:1855-1861, 2002.
70. Vilhunen T, Heikkinen LM, Savolainen T, Vauhkonen PJ, Lappalainen R, Kaipio JP, Vauhkonen M, Detection of faults in resistive coatings with an impedance-tomography-related approach, *Measurement Science and Technology*, 13:865-872, 2002.

Articles in refereed scientific edited volumes and conference proceedings

1. Sahlström T, Tarvainen T, Deep learning in photoacoustic tomography utilizing 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.
2. Suhonen M, Pulkkinen A, Tarvainen T, One-step estimation of spectral optical parameters in quantitative photoacoustic tomography, *in Proc. SPIE 12631, Opto-Acoustic Methods and Applications in Biophotonics VI*, C. Kim, J. Laufer, V. Ntziachristos, and R.J. Zemp Eds., 126310D, 2023.
3. Mozumder M, Leskinen J, Tarvainen T, Diffuse optical tomography setup using a nanosecond laser, In *Proc. SPIE 12628, Diffuse Optical Spectroscopy and Imaging IX,* D. Contini, Y. Hoshi, and T.D. O'Sullivan Eds., 1262820, 2023.
4. Sahlström T, Tarvainen T, Utilizing 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.
5. Hänninen N, Pulkkinen A, Arridge S, Tarvainen T, Image reconstruction in quantitative photoacoustic tomography using adaptive optical Monte Carlo, In *Proc. SPIE 12379, Photons Plus Ultrasound: Imaging and Sensing 2023*, A.A. Oraevsky and L.V. Wang Eds., 1237916, 2023.
6. Mozumder M, Hauptmann A, Arridge SR, Tarvainen T, Diffuse optical tomography utilizing model-based learning, in *Biophotonics Congress: Biomedical Optics (Translational, Microscopy, OCT, OTS, BRAIN)*, JTu3A.10, Optica Publishing Group, 2022.
7. Sahlström T, Pulkkinen A, Leskinen J, Tarvainen T, 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.
8. Pulkkinen A, Leino A, Lunttila T, Mozumder M, Tarvainen T, Perturbation Monte Carlo in quantitative photoacoustic tomography, in *Proc. SPIE 11923, Opto-Acoustic Methods and Applications in Biophotonics V*, C. Kim, J. Laufer, R. J. Zemp Eds., 119230B, 2021.
9. Hänninen N, Pulkkinen A, Leino A, Tarvainen T, Compensating modeling errors of diffusion approximation in quantitative photoacoustic tomography using a Bayesian approach, in *Proc. SPIE 11923, Opto-Acoustic Methods and Applications in Biophotonics V*, C. Kim, J. Laufer, R. J. Zemp Eds., 1192309, 2021.
10. Mozumder M, Tarvainen T, Fourier transform provides computational advantages for time-domain diffuse optical tomography, *in Proc. SPIE 11920, Diffuse Optical Spectroscopy and Imaging VIII*, D. Contini, Y. Hoshi, and T.D. O'Sullivan Eds., 119200Z, 2021.
11. Mozumder M, Tarvainen T, A truncated Fourier-transform based approach for time-domain diffuse optical tomography, *in Biophotonics Congress: Biomedical Optics 2020 (Translational, Microscopy, OCT, OTS, BRAIN), OSA Technical Digest*, JTh2A.8, Optical Society of America, 2020.
12. Sahlström T, Pulkkinen A, Tick J, Leskinen J, Tarvainen T, 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.
13. Leskinen J, Pulkkinen A, Tick J, Tarvainen T, Photoacoustic tomography setup using LED illumination, In *Proc. of SPIE11077, Opto-Acoustic Methods and Applications in Biophotonics IV*, V. Ntziachristos and R. Zemp Eds., 110770Q, 2019.
14. Koponen E, Leskinen J, Tarvainen T, Pulkkinen A, Characterization of ultrasound fields using a potential optical flow based synthetic schlieren tomography, in *Imaging and Applied Optics 2019 (COSI, IS, MATH, pcAOP),* OSA Technical Digest (Optical Society of America), MW4D.4, 2019.
15. Tarvainen T, Sahlström T, Tick J, Pulkkinen A, Modelling of errors and uncertainties in photoacoustic tomography using a Bayesian framework, in *Imaging and Applied Optics 2019 (COSI, IS, MATH, pcAOP),* OSA Technical Digest (Optical Society of America), MW4D.2, 2019.
16. Tick J, Pulkkinen A, Lucka F, Ellwood R, Cox BT, Arridge SR, Tarvainen T, Photoacoustic image reconstruction in Bayesian framework, in *Proc. of SPIE 10494, Photons Plus Ultrasound: Imaging and Sensing 2018*, A.A. Oraevsky, L.V. Wang Eds., 1049450, 2018.

17. Tick J, Pulkkinen A, Tarvainen T, Image reconstruction and uncertainty quantification in photoacoustic tomography, in Proceedings *Imaging and Applied Optics 2017 (3D, AIO, COSI, IS, MATH, pcAOP)*, MTu1C.1, 2017.
18. Tick J, Pulkkinen A, Tarvainen T, Photoacoustic image reconstruction with uncertainty quantification, *IFMBE Proceedings*, H. Eskola et al Eds., 65:113-116, 2017.
19. Tarvainen T, Pulkkinen A, Cox BT, Arridge SR, Utilising the radiative transfer equation in quantitative photoacoustic tomography, in *Proc. of SPIE 10064, Photons Plus Ultrasound: Imaging and Sensing 2017*, A.A. Oraevsky, L.V. Wang Eds., 100643E, 2017.
20. Pulkkinen A, Cox BT, Arridge SR, Kaipio JP, Tarvainen T, Estimation and uncertainty quantification of optical properties directly from the photoacoustic time series, in *Proc. of SPIE 10064, Photons Plus Ultrasound: Imaging and Sensing 2017*, A.A. Oraevsky, L.V. Wang Eds., 100643N, 2017.
21. Tick J, Pulkkinen A, Tarvainen T, Bayesian approach to image reconstruction in photoacoustic tomography, in *Proc. of SPIE 10064, Photons Plus Ultrasound: Imaging and Sensing 2017*, A.A. Oraevsky, L.V. Wang Eds., 100643M, 2017.
22. Pulkkinen A, Cox BT, Arridge SR, Kaipio JP, Tarvainen T, Bayesian parameter estimation in spectral quantitative photoacoustic tomography, in *Proc. SPIE 9708, Photons Plus Ultrasound: Imaging and Sensing 2016*, A.A. Oraevsky and L.V. Wang Eds., 97081G, 2016.
23. Tarvainen T, Pulkkinen A, Cox BT, Kaipio JP, Arridge SR, Image reconstruction with noise and error modelling in quantitative photoacoustic tomography, in *Proc. SPIE 9708, Photons Plus Ultrasound: Imaging and Sensing 2016*, A.A. Oraevsky and L.V. Wang Eds., 97083Q, 2016.
24. Mozumder M, Tarvainen T, Arridge SR, Kaipio JP, Kolehmainen V, Compensation of optode position and sensitivity errors in diffuse optical tomography, in *Biomedical Optics*, BM3A.76 2014.
25. Koponen J, Huttunen T, Tarvainen T, Kaipio JP, Approximation error method for full-wave tomography, in *Proceedings of Meetings on Acoustics (POMA),* 19:075004, 2013.
26. Tarvainen T, Pulkkinen A, Cox BT, Kaipio JP, Arridge SR, Image reconstruction in quantitative photoacoustic tomography using the radiative transfer equation and the diffusion approximation, *Proc. SPIE* 8800, *Opto-Acoustic Methods and Applications*, V. Ntziachristos and C.P. Lin Eds., 880006, 2013.
27. Tarvainen T, Kolehmainen V, Lehtikangas O, Kaipio JP, Arridge SR, Utilising the coupled radiative transfer – diffusion model in diffuse optical tomography, in *Proc. SPIE 8799, Diffuse Optical Imaging IV,* P. Taroni and H. Dehghani Eds*.,* 879907, 2013.
28. Lehtikangas O, Tarvainen T, Utilizing Fokker-Planck-Eddington approximation in modeling light transport in tissues-like media, in *Proc. SPIE 8799, Diffuse Optical Imaging IV,* P. Taroni and H. Dehghani Eds*.,* 879908, 2013.
29. Pulkkinen A, Tarvainen T, Approximating the time-domain radiative transfer equation using truncated Fourier series, in *Proc. SPIE 8799, Diffuse Optical Imaging IV,* P. Taroni and H. Dehghani Eds*.,* 87990U, 2013.
30. Saratoon T, Tarvainen T, Arridge SR, Cox BT, 3D quantitative photoacoustic tomography using the δ-Eddington approximation, in *Proc. SPIE 8581, Photons Plus Ultrasound: Imaging and Sensing 2013,* A.A. Oraevsky and L.V. Wang Eds*.,* 85810V, 2013.
31. Lehtikangas O, Tarvainen T, Kim AD, "Modeling light propagation in tissues using the corrected diffusion approximation", in Biomedical Optics and Digital Holography and Three-Dimensional Imaging (Optical Society of America, Washington, DC, 2012), BTu3A.4.
32. Kolehmainen V, Schweiger M, Nissilä I, Tarvainen T, Arridge SR, Kaipio JP, "Approximation errors and model reduction in three-dimensional diffuse optical tomography", in Biomedical Optics and Digital Holography and Three-Dimensional Imaging (Optical Society of America, Washington, DC, 2012), BTu3A.5.
33. Tarvainen T, Kolehmainen V, Arridge SR, Kaipio JP, "Utilising approximation error modelling in linear reconstruction in diffuse optical tomography", in Biomedical Optics and Digital Holography and Three-Dimensional Imaging (Optical Society of America, Washington, DC, 2012), BTu3A.41.

34. Cox B, Tarvainen T, Arridge S, Multiple illumination quantitative photoacoustic tomography using transport and diffusion models, *in Tomography and Inverse Transport Theory, Contemporary Mathematics,* 559:1-12, Amer. Math. Soc., 2011.
35. Lehtikangas O, Tarvainen T, Kolehmainen V, Pulkkinen A, Arridge SR, Kaipio JP, "Finite element solution of the Fokker-Planck equation for diffuse optical tomography", in Biomedical Optics (BIOMED)/Digital Holography and Three-Dimensional Imaging (DH) on CD-ROM (The Optical Society, Washington, DC, 2010), BSuE1.
36. Tarvainen T, Kolehmainen V, Pulkkinen A, Vauhkonen M, Schweiger M, Arridge SR, Kaipio JP, "Approximation error approach for compensating modelling errors in optical tomography", in Biomedical Optics (BIOMED)/ Digital Holography and Three-Dimensional Imaging (DH) on CD-ROM (The Optical Society, Washington, DC, 2010), BSuD48.
37. Tarvainen T, Vauhkonen M, Arridge SR, "Image reconstruction in optical tomography using the finite element solution of the radiative transfer equation", in Biomedical Optics (BIOMED)/ Digital Holography and Three-Dimensional Imaging (DH) on CD-ROM (The Optical Society, Washington, DC, 2010), BSuD17.
38. Tarvainen T, Vauhkonen M, Kolehmainen V, Kaipio JP, Arridge SR, Utilizing the radiative transfer equation in optical tomography, *PIERS Online,* 4(6):655-660, 2008.
39. Kervella M, Tarvainen T, Humeau A, L'Huillier JP, Computational hybrid models for photon migration in biological tissues, in *Proceedings of the 5th WSEAS Int. Conf. on System Science and Simulation in Engineering*, pp. 172-177, Tenerife, Canary Islands, Spain, December 16-18, 2006.
40. Kolehmainen V, Arridge SR, Kaipio JP, Schweiger M, Somersalo E, Tarvainen T, Vauhkonen M, Approximation errors and model reduction in optical tomography, in Proceedings of the 28th IEEE EMBS Annual International Conference, New York City, USA, August 30 - Sept 3, 2006.
41. Tarvainen T, Vauhkonen M, Kolehmainen V, Heiskala J, Arridge SR, Kaipio JP, "Modeling photon migration in tissues with the coupled radiative transfer equation and diffusion approximation", in Biomedical Optics 2006 Technical Digest (Optical Society of America, Washington, DC, 2006), SH49.
42. Vauhkonen M, T. Tarvainen, V. Kolehmainen, Kaipio JP, "Finite element approximations for the radiative transfer equation", in Biomedical Optics 2006 Technical Digest (Optical Society of America, Washington, DC, 2006), SH47.
43. Tarvainen T, Vauhkonen M, Kolehmainen V, Kaipio JP, Coupled radiative transfer equation and diffusion approximation, in *Proc. SPIE Vol. 5859 Photon migration and diffuse-light imaging II*, K. Licha and R. Cubeddu, Eds., pp.262-270, 2005.
44. Vilhunen T, Kolehmainen V, Vauhkonen M, Vanne A, Gibson A, Schweiger M, Arridge SR, Kaipio JP, "Computational calibration method for optical tomography", in Biomedical Topical Meetings on CD-ROM (The Optical Society of America, Washington, DC, 2004), ThD3.
45. Vauhkonen M, Vilhunen T, Kolehmainen V, Kaipio JP, "Utilizing the radiative transfer equation in optical tomography", in Biomedical Topical Meetings on CD-ROM (The Optical Society of America, Washington, DC, 2004), WF48.
46. Vilhunen T, Kolehmainen V, Vauhkonen M, Kaipio JP, A source model for optical diffusion tomography, *Proceedings of 3rd World Congress on Industrial Process Tomography*, pp. 110-114, The Virtual Centre for Industrial Process Tomography, 2003.
47. Vilhunen T, Vauhkonen M, Kolehmainen V, Kaipio JP, "Linking the radiative transfer equation and the diffusion approximation", in Biomedical Topical Meetings (The Optical Society of America, Washington, DC, 2002), SuB1-1.

Book chapters

1. Goh H, Sahlström T, Tarvainen T, Utilising uncertainty quantification variational autoencoders in inverse problems with applications in photoacoustic tomography, In T. Bubba, Editor*, Data-driven models in inverse problems,* De Gruyter, In press.

2. Hauptmann A, Tarvainen T, Model-based reconstructions for quantitative imaging in photoacoustic tomography, In W. Xia, Editor, *Biomedical Photoacoustics: Technology and Applications,* Springer*,* pages 133-153, 2024.
3. Tarvainen T, Quantitative photoacoustic tomography in Bayesian framework, In R. Ramlau and O. Scherzer Eds., *Radon Transform -The First 100 Years and Beyond*, De Gruyter, ISBN 978-3-11-055941-5 (print) 978-3-11-056085-5 (PDF) 978-3-11-055951-4 (EPUB), pages 239-271, 2019.
4. Vauhkonen M, Tarvainen T, Lähivaara T, Inverse Problems, In S. Pohjolainen, Editor, *Mathematical Modelling,* Springer, pages 207-227, 2016.
5. Arridge SR, Kaipio JP, Kolehmainen V, Tarvainen T, Optical Imaging*,* In O. Scherzer, Editor, *Handbook of Mathematical Methods in Imaging*, Springer Reference, Springer (New York), pages 735-780, (DOI: 10.1007/978-0-387-92920-0_17), 2011.

Articles in professional journals

1. Tarvainen T, Ihmisen kuvantaminen valoa käyttäen, In *Arkhimedes – Journal of Physics and Mathematics,* The Finnish Physical Society, the Finnish Mathematical Society and the Physical Society in Finland, 2:14-19, 2016.

Theses (monographs)

1. Tarvainen T, Computational Methods for Light Transport in Optical Tomography, PhD thesis, University of Kuopio, Kuopio, Finland, 2006.
2. Vilhunen T, Determining Dielectric Properties of Biological Tissue (In Finnish), MSc thesis, University of Kuopio, Kuopio, Finland, 2000.

Invention disclosures

1. Time-domain diffuse optical tomography system based on nanosecond scale pulse illuminations, UEF Dnro 1330/02.08.02.01/2021, 27.8.2021.
2. MATLAB-toolbox for simulating light transport using Monte Carlo method, UEF Dnro 323.02.07.03.01.18, 26.2.2018.
3. Photoacoustic tomography system based on LED illumination, UEF Dnro 407/02.07.03.01/2018, 19.3.2018.

Software

1. ValoMC - A Monte Carlo software for simulating light transport https://inverselight.github.io/ValoMC/