List of publications

Stefan Engblom

Submitted

[S1] A. T. Nordman, S. Engblom, and D. van der Spoel. Bayesian three-point water models, 2025.

[S2] E. Blom and S. Engblom. DLCM: a versatile multi-level solver for heterogeneous multicellular systems, 2025. Available at https://arxiv.org/abs/2402.01305.

Refereed

[R1] G. Menz and S. Engblom. Modelling population-level Hes1 dynamics: Insights from a multi-framework approach. *Bull. Math. Biol.*, 87(6):74, 2025. doi:10.1007/s11538-025-01447-9.

[R2] E. Blom and S. Engblom. Morphological stability for *in silico* models of avascular tumors. *Bull. Math. Biol.*, 86(7):75, 2024. doi:10.1007/s11538-024-01297-x.

[R3] R. Marin, H. Runvik, A. Medvedev, and S. Engblom. Bayesian monitoring of COVID-19 in Sweden. *Epidemics*, 45:100715, 2023. doi:10.1016/j.epidem.2023.100715.

[R4] S. Bronstein, S. Engblom, and R. Marin. Bayesian inference in Epidemics: linear noise analysis. *Math. Biosci. Eng.*, 20(2):4128–4152, 2023. doi:10.3934/mbe.2023193.

[R5] B. Kennedy, H. Fitipaldi, U. Hammar, et al. App-based COVID-19 syndromic surveillance and prediction of hospital admissions in COVID Symptom Study Sweden. *Nature Commun.*, 13(2110), 2022. doi:10.1038/s41467-022-29608-7.

[R6] J. Bull and S. Engblom. Distributed and adaptive fast multipole methods in three dimensions. *Commun. Comput. Phys.*, 30(4):959–984, 2021. doi:10.4208/cicp.OA-2020-0072.

[R7] J. Liu, S. Engblom, and C. Nettelblad. Flash X-ray diffraction imaging in 3D: a proposed analysis pipeline. *J. Opt. Soc. Amer. A*, 37:1673–1686, 2020. doi:10.1364/JOSAA.390384.

[R8] S. Engblom, R. Eriksson, and S. Widgren. Bayesian epidemiological modeling over high-resolution network data. *Epidemics*, 32:100399, 2020. doi:10.1016/j.epidem.2020.100399.

[R9] S. Widgren, P. Bauer, R. Eriksson, and S. Engblom. SimInf: An R package for data-driven stochastic disease spread simulations. *J. Stat. Softw.*, 91(12):1–42, 2019. doi:10.18637/jss.v091.i12.

[R10] J. Lindén, P. Bauer, S. Engblom, and B. Jonsson. Exposing interprocess information for efficient PDES of spatial stochastic systems on multicores. *ACM Trans. Model. Comput. Simul.*, 29(2): 11:1–11:25, 2019. doi:10.1145/3301500.

[R11] J. Liu, G. Schot, and S. Engblom. Supervised classification methods for flash X-ray single particle diffraction imaging. *Opt. Express*, 27(4):3884–3899, 2019. doi:10.1364/OE.27.003884.

[R12] S. Engblom. Stochastic simulation of pattern formation in growing tissue: a multilevel approach. *Bull. Math. Biol.*, 81:3010–3023, 2019. doi:10.1007/s11538-018-0454-y.

[R13] D. Arjmand, S. Engblom, and G. Kreiss. Temporal upscaling in micro magnetism via heterogeneous multiscale methods. *J. Comput. Appl. Math.*, 345:99–113, 2019. doi:10.1016/j.cam.2018.05.059.

[R14] S. Engblom, P. Lötstedt, and L. Meinecke. Mesoscopic modeling of random walk and reactions in crowded media. *Phys. Rev. E*, 98(3):033304, 2018. doi:10.1103/PhysRevE.98.033304.

[R15] S. Widgren, S. Engblom, U. Emanuelson, and A. Lindberg. Spatio-temporal modelling of verotoxigenic *Escherichia coli* O157 in cattle in Sweden: Exploring options for control. *Veterinary Res.*, 49(78), 2018. doi:10.1186/s13567-018-0574-2.

[R16] S. Engblom, D. B. Wilson, and R. E. Baker. Scalable population-level modelling of biological cells incorporating mechanics and kinetics in continuous time. *Roy. Soc. Open Sci.*, 5(8), 2018. doi:10.1098/rsos.180379.

[R17] P. Bauer, S. Engblom, S. Mikulovic, and A. Senek. Multiscale modelling via split-step methods in neural firing. *Math. Comput. Model. Dyn. Syst.*, 24(4):409–425, 2018. doi:10.1080/13873954.2018.1488740.

[R18] J. Liu, S. Engblom, and C. Nettelblad. Assessing uncertainties in X-ray single-particle three-dimensional reconstruction. *Phys. Rev. E*, 98(1):013303, 2018. doi:10.1103/PhysRevE.98.013303.

[R19] A. Goude and S. Engblom. A general high order two-dimensional panel method. *Appl. Math. Model.*, 60:1–17, 2018. doi:10.1016/j.apm.2018.02.010.

[R20] A. Chevallier and S. Engblom. Pathwise error bounds in multiscale variable splitting methods for spatial stochastic kinetics. *SIAM J. Numer. Anal.*, 56(1):469–498, 2018. doi:10.1137/16M1083086.

[R21] G. Christoffersson, J. Lomei, P. O'Callaghan, J. Kreuger, S. Engblom, and M. Phillipson. Vascular sprouts induce local attraction of proangiogenic neutrophils. *J. Leukocyte Biol.*, 102(3):741–751, 2017. doi:10.1189/jlb.1MA0117-018R.

[R22] S. Widgren, S. Engblom, P. Bauer, J. Frössling, U. Emanuelson, and A. Lindberg. Data-driven network modelling of disease transmission using complete population movement data: spread of VTEC O157 in Swedish cattle. *Veterinary Res.*, 47(81):1–17, 2016. doi:10.1186/s13567-016-0366-5.

[R23] S. Engblom and D. Lukarski. Fast Matlab compatible sparse assembly on multicore computers. *Parallel Comput.*, 56:1–17, 2016. doi:10.1016/j.parco.2016.04.001.

[R24] E. Blanc, S. Engblom, A. Hellander, and P. Lötstedt. Mesoscopic modeling of stochastic reaction-diffusion kinetics in the subdiffusive regime. *Multiscale Model. Simul.*, 14(2):668–707, 2016. doi:10.1137/15M1013110.

[R25] P. Bauer, S. Engblom, and S. Widgren. Fast event-based epidemiological simulations on national scales. *Int. J. High Perf. Comput. Appl.*, 30(4):438–453, 2016. doi:10.1177/1094342016635723.

[R26] L. Meinecke, S. Engblom, A. Hellander, and P. Lötstedt. Analysis and design of jump coefficients in discrete stochastic diffusion models. *SIAM J. Sci. Comput.*, 38:A55–A83, 2016. doi:10.1137/15M101110X.

[R27] A. Milias-Argeitis, S. Engblom, P. Bauer, and M. Khammash. Stochastic focusing coupled with negative feedback enables robust regulation in biochemical reaction networks. *J. R. Soc. Interface*, 12(113):1–10, 2015. doi:10.1098/rsif.2015.0831.

[R28] S. Engblom. Strong convergence for split-step methods in stochastic jump kinetics. *SIAM J. Numer. Anal.*, 53(6):2655–2676, 2015. doi:10.1137/141000841.

[R29] T. Ekeberg, S. Engblom, and J. Liu. Machine learning for ultrafast X-ray diffraction patterns on large-scale GPU clusters. *Int. J. High Perf. Comput. Appl.*, 29(2):233–243, 2015. doi:10.1177/1094342015572030.

[R30] S. Engblom. On the stability of stochastic jump kinetics. *Appl. Math.*, 5(19):3217–3239, 2014. doi:10.4236/am.2014.519300.

[R31] M. Holm, S. Engblom, A. Goude, and S. Holmgren. Dynamic autotuning of adaptive fast multipole methods on hybrid multicore CPU and GPU systems. *SIAM J. Sci. Comput.*, 36(4): C376–C399, 2014. doi:10.1137/130943595.

[R32] S. Engblom, M. Do-Quang, G. Amberg, and A-K. Tornberg. On diffuse interface modeling and simulation of surfactants in two-phase fluid flow. *Commun. Comput. Phys.*, 14(4):879–915, 2013. doi:10.4208/cicp.120712.281212a.

[R33] A. Goude and S. Engblom. Adaptive fast multipole methods on the GPU. *J. Supercomput.*, 63(3):897–918, 2013. doi:10.1007/s11227-012-0836-0.

[R34] B. Drawert, S. Engblom, and A. Hellander. URDME: a modular framework for stochastic simulation of reaction-transport processes in complex geometries. *BMC Syst. Biol.*, 6(76):1–17, 2012. doi:10.1186/1752-0509-6-76.

[R35] S. Engblom. On well-separated sets and fast multipole methods. *Appl. Numer. Math.*, 61(10):1096–1102, 2011. doi:10.1016/j.apnum.2011.06.011.

[R36] S. Engblom. Parallel in time simulation of multiscale stochastic chemical kinetics. *Multiscale Model. Simul.*, 8(1):46–68, 2009. doi:10.1137/080733723.

[R37] S. Engblom and L. Ferm and A. Hellander and P. Lötstedt. Simulation of stochastic reaction-diffusion processes on unstructured meshes. *SIAM J. Sci. Comput.*, 31(3):1774–1797, 2009. doi:10.1137/080721388.

[R38] S. Engblom. Spectral approximation of solutions to the chemical master equation. *J. Comput. Appl. Math.*, 229(1):208–221, 2009. doi:10.1016/j.cam.2008.10.029.

[R39] S. Engblom. Galerkin spectral method applied to the chemical master equation. *Commun. Comput. Phys.*, 5(5):871–896, 2009.

[R40] P. Deglaire, S. Engblom, O. Ågren, and H. Bernhoff. Analytical solutions for a single blade in vertical axis turbine motion in two-dimensions. *Eur. J. Mech. B Fluids*, 28(4):506–520, 2009. doi:10.1016/j.euromechflu.2008.11.004.

[R41] S. Engblom. Computing the moments of high dimensional solutions of the master equation. *Appl. Math. Comput.*, 180(2): 498–515, 2006. doi:10.1016/j.amc.2005.12.032.

Refereed proceedings

[P1] E. Blom, S. Engblom, and G. Menz. Modeling the hallmarks of avascular tumors. In A. Sequeira, A. Silvestre, S. S. Valtchev, and J. Janela, editors, *Numerical Mathematics and Advanced Applications ENUMATH 2023, Volume 1*, volume 153 of *Lecture Notes in Computational Science and Engineering*, pages 149–158, 2025. doi:10.1007/978-3-031-86173-4_15.

[P2] F. Wrede, R. Eriksson, R. Jiang, L. Petzold, S. Engblom, A. Hellander, and P. Singh. Robust and integrative Bayesian neural networks for likelihood-free parameter inference. In *2022 International Joint Conference on Neural Networks (IJCNN)*, pages 1–10, 2022. doi:10.1109/IJCNN55064.2022.9892800.

[P3] H. Runvik, A. Medvedev, R. Eriksson, and S. Engblom. Initialization of a disease transmission model. *IFAC-PapersOnLine*, 53(5): 839–844, 2020. 3rd IFAC Workshop on Cyber-Physical & Human Systems CPHS 2020, doi:10.1016/j.ifacol.2021.04.178.

[P4] S. Engblom, R. Eriksson, and P. Vilanova. Towards confident Bayesian parameter estimation in stochastic chemical kinetics. In F. J. Vermolen and C. Vuik, editors, *Numerical Mathematics and Advanced Applications: ENUMATH 2019*, volume 139 of *Lecture Notes in Computational Science and Engineering*, pages 373–380, 2021. doi:10.1007/978-3-030-55874-1_36.

[P5] S. Widgren, T. Rosendal, S. Engblom, and K. Ståhl. SimInf for spatio-temporal data-driven modeling of African swine fever in Swedish wildboar. In *GeoVet 2019: Novel spatio-temporal approaches in the era of Big Data*, number 2 in Frontiers in Veterinary Science, 2019. doi:10.3389/conf.fvets.2019.05.00002.

[P6] R. Eriksson, S. Engblom, and S. Widgren. Towards Bayesian parametrization of national scale epidemics. In *MATHMOD 2018 Extended Abstract Volume*, number 55 in ARGESIM, pages 65–66, 2018. doi:10.11128/arep.55.a55245.

[P7] J. Lindén, P. Bauer, S. Engblom, and B. Jonsson. Fine-grained local dynamic load balancing in PDES. In *Proceedings of the 2018 ACM SIGSIM Conference on Principles of Advanced Discrete Simulation*, SIGSIM PADS '18, pages 201–212, 2018. doi:10.1145/3200921.3200928.

[P8] J. Lindén, P. Bauer, S. Engblom, and B. Jonsson. Exposing inter-process information for efficient parallel discrete event simulation of spatial stochastic systems. In *Proceedings of the 2017 ACM SIGSIM Conference on Principles of Advanced Discrete Simulation*, SIGSIM PADS '17, pages 53–64, 2017. doi:10.1145/3064911.3064916.

[P9] A. Senek and S. Engblom. Multiscale stochastic neuron modeling - with applications in deep brain stimulation (wip). In *Proceedings of the Summer Simulation Multi-Conference*, SummerSim '17, pages 38:1–38:5, San Diego, CA, USA, 2017. Society for Computer Simulation International.

[P10] S. Engblom and V. Sunkara. Preconditioned Metropolis sampling as a strategy to improve efficiency in posterior exploration. *IFAC-PapersOnLine*, 49(26):89–94, 2016. Foun-

dations of Systems Biology in Engineering, FOSBE 2016, doi:10.1016/j.ifacol.2016.12.108.

[P11] J. R. Bull, S. Engblom, and S. Holmgren. A direct solver for the advection-diffusion equation using Green's functions and low-rank approximation. In M. Papadrakakis, V. Papadopoulos, G. Stefanou, and V. Plevris, editors, *Proceedings of the 7th ECCOMAS Congress*, 2016.

[P12] P. Bauer, J. Lindén, S. Engblom, and B. Jonsson. Efficient interprocess synchronization for parallel discrete event simulation on multicores. In *Proceedings of the 3rd ACM SIGSIM Conference on Principles of Advanced Discrete Simulation*, SIGSIM PADS '15, pages 183–194, 2015. doi:10.1145/2769458.2769476.

[P13] P. Bauer and S. Engblom. Sensitivity estimation and inverse problems in spatial stochastic models of chemical kinetics. In A. Abdulle, S. Deparis, D. Kressner, F. Nobile, and M. Picasso, editors, *Numerical Mathematics and Advanced Applications: ENUMATH 2013*, volume 103 of *Lecture Notes in Computational Science and Engineering*, pages 519–527, Berlin, 2015. Springer. doi:10.1007/978-3-319-10705-9_51.

[P14] S. Engblom and J. Liu. X-ray laser imaging of biomolecules using multiple GPUs. In R. Wyrzykowski, J. Dongarra, K. Karczewski, and J. Waśniewski, editors, *Parallel Processing and Applied Mathematics*, Lecture Notes in Computer Science, pages 480–489. Springer, Berlin, 2014. doi:10.1007/978-3-642-55224-3_45.

[P15] K. Mattsson, M. Almquist, and S. Engblom. Stable and accurate wave simulations in complex geometries and discontinuous media. In P. Joly, editor, *Proceedings of the 11th International Conference on Mathematical and Numerical Aspects of Waves (WAVES 2013)*, pages 201–202, 2013.

[P16] M. Do-Quang, S. Engblom, A-K. Tornberg, and G. Amberg. The well-posedness of diffuse interface modeling of surfactants in two-phase fluid flow. In D. Brutin and D. Fairhurst, editors, *1st International workshop on Wetting and evaporation: droplets of pure and complex fluids*, pages 80–81, 2013.

[P17] S. Engblom. Time-parallel simulation of stochastic chemical kinetics. In T. E. Simos, editor, *Numerical Analysis and Applied Mathematics*, volume 1048 of *AIP conference proceedings*, pages 174–177, 2008. doi:10.1063/1.2990884.

Theses

[T1] S. Engblom. *Numerical Solution Methods in Stochastic Chemical Kinetics*. PhD thesis, Uppsala University, 2008.

[T2] S. Engblom. *Numerical Methods for the Chemical Master Equation.* Licentiate thesis, Uppsala University, 2006. No. 2006-007.

[T3] S. Engblom. Multigrid preconditioners with applications to incompressible Navier-Stokes equations. Master's thesis, Dept of Information Technology, Uppsala University, 2002.

Chapters

[CH1] S. Engblom and S. Widgren. Data-driven computational disease spread modeling: from measurement to parametrization and control. In C. R. Rao, A. S. Rao, and S. Payne, editors, *Disease Modeling and Public Health: Part A*, volume 36 of *Handbook of Statistics*, chapter 11, pages 305–328. Elsevier, Amsterdam, 2017. doi:10.1016/bs.host.2017.05.005.

[CH2] S. Engblom. Stability and strong convergence for spatial stochastic kinetics. In D. Holcman, editor, *Stochastic Dynamical Systems, Multiscale Modeling, Asymptotics and Numerical Methods for Computational Cellular Biology*, chapter 3.3, pages 109–125. Springer, Berlin, 2017. doi:10.1007/978-3-319-62627-7_5.

[CH3] S. Engblom, A. Hellander, and P. Lötstedt. Multiscale simulation of stochastic reaction-diffusion networks. In D. Holcman, editor, *Stochastic Dynamical Systems, Multiscale Modeling, Asymptotics and Numerical Methods for Computational Cellular Biology*, chapter 2.4, pages 55–79. Springer, Berlin, 2017. doi:10.1007/10.1007/978-3-319-62627-7_3.

Software

Publicly available.

[SW1] R. Marin, H. Runvik, A. Medvedev, and S. Engblom, 2022–. Available at `https://github.com/robineriksson/Bayesian-Monitoring-of-COVID-19-in-Sweden`.

[SW2] S. Widgren, P. Bauer, R. Eriksson, and S. Engblom. SimInf: A framework for stochastic disease spread simulations, 2016–. Available at `www.siminf.org`.

[SW3] S. Engblom et al. URDME: Unstructured Reaction-Diffusion Master Equation, 2008–. Available at `www.urdme.org`.

[SW4] S. Engblom et al. FMM2D: an adaptive general fast multipole method in two dimensions, 2008–. *Multiple versions exist.* Available at `www.stenglib.org`.

[SW5] S. Engblom. FLOW: surfactant laden interface flows, 2011. Available at `www.stenglib.org`.

[SW6] S. Engblom. The FIBR package for simulating fibers in Stokes flow, 2010. Available at `www.stenglib.org`.

[SW7] S. Engblom. `stenglib:` a collection of Matlab packages for daily use, 2006–. *Multiple software components.* Available at www.stenglib.org.

Popular & Opinion

[PO1] T. Fall, S. Engblom, T. Monstad, Y. Ekström, V. van Zoest, B. Kennedy, A. Székely, and M. Martinell. CRUSH COVID — ett tvärvetenskapligt samarbetsprojekt. In *Qvintensen* No 2, 2023. Available at https://statistikframjandet.se/qvintensen/qvintensen-2-2023/.

[PO2] K. Forsberg, T. Fall, and S. Engblom. Viktigt att skilja på munskydd och andningskydd. In *Läkartidningen* December 23, 2021. Available at https://lakartidningen.se/opinion/debatt/2021/12/viktigt-att-skilja-pa-munskydd-och-andningskydd/.

[PO3] S. Engblom, T. Fall, and M. Martinell. Fel att sluta testa vaccinerad personer. In *Svenska Dagbladet* October 7, 2021. Available at https://www.svd.se/fel-att-sluta-testa-vaccinerade-personer.

[PO4] S. Engblom, T. Fall, P. Franks, et al. Vi behöver nytänkande datainsamling för att bekämpa COVID-19. In *Ny Teknik* June 15, 2020. Available at https://www.nyteknik.se/opinion/vi-behover-nytankande-datainsamling-for-att-bekampa-covid-19-6997134.

[PO5] L. Calmfors, T. Fall, S. Engblom, et al. Vässad strategi räddar både liv och ekonomi. In *Svenska Dagbladet* June 2, 2020. Available at https://www.svd.se/vassad-strategi-raddar-bade-liv-och-ekonomi.

[PO6] T. Fall, S. Engblom, R. Torkar, et al. Vi måste vara öppna också för skrämmande prognoser. In *Dagens Nyheter* March 31, 2020. Available at https://www.dn.se/debatt/vi-maste-vara-oppna-ocksa-for-skrammande-prognoser/.

[PO7] T. Fall, S. Engblom, J. Rocklöv, et al. Använd forskarna – tillsätt ett expertråd. In *Svenska Dagbladet* March 20, 2020. Available at https://www.svd.se/anvand-forskarna--tillsatt-ett-expertrad.

[PO8] S. Koskiniemi, S. Westenhoff, S. Engblom, and M. Segad. Forskare hinner inte meritera sig på fem år. *Curie*, 2019. Available at https://www.tidningencurie.se/debatt/forskare-hinner-inte-meritera-sig-pa-fem-ar.

[PO9] S. Widgren, A. Lindberg, U. Emanuelson, and S. Engblom. Hur kan vi övervaka och bekämpa ehec på ett kostnadseffektivt sätt? *SVAvet*, (1–2):14–15, 2015. Available at http://www.sva.se/om-sva/publikationer/tidskriften-svavet.

REPORTS *Not published elsewhere.*

[U1] S. Engblom et al. The URDME manual version 1.4, 2020. Available at http://arxiv.org/abs/0902.2912.

[U2] S. Engblom, editor. *Student's Book: Numerical Functional Analysis*, Uppsala, Sweden, 2019. Uppsala University. Available at www.it.uu.se/education/phd_studies/phd_courses/NumFunkAnalysis.

[U3] P. Bauer and S. Engblom. The URDME manual version 1.3. Technical Report 2017-003, Dept of Information Technology, Uppsala University, 2017. Available at http://arxiv.org/abs/0902.2912v4.

[U4] S. Engblom, editor. *Student's Book: Numerical Functional Analysis*, Uppsala, Sweden, 2014. Uppsala University. Available at www.it.uu.se/education/phd_studies/phd_courses/NumFunkAnalysis_2014.

[U5] S. Engblom and J. Pender. Approximations for the moments of nonstationary and state dependent birth-death queues, 2014. Available at http://arxiv.org/abs/1406.6164.

[U6] P. Bauer, S. Mikulovic, S. Engblom, K. E. Leão, F. Rattay, and R. N. Leão. Finite element analysis of neuronal electric fields: the effect of heterogeneous resistivity, 2012. Available at http://arxiv.org/abs/1211.0249.

[U7] P. Bauer, B. Drawert, S. Engblom, and A. Hellander. URDME v. 1.2: User's manual. Technical Report 2012-036, Dept of Information Technology, Uppsala University, 2012. Available at http://arxiv.org/abs/0902.2912v3.

[U8] B. Drawert, S. Engblom, and A. Hellander. URDME v. 1.1: User's manual. Technical Report 2011-003, Dept of Information Technology, Uppsala University, 2011. Available at http://arxiv.org/abs/0902.2912v2.

[U9] J. Cullhed, S. Engblom, and A. Hellander. The URDME manual version 1.0. Technical Report 2008-022, Dept of Information Technology, Uppsala University, 2008. Available at http://arxiv.org/abs/0902.2912v1.

[U10] S. Engblom. Gaussian quadratures with respect to discrete measures. Technical Report 2006-007, Dept of Information Technology, Uppsala University, 2006. Available at http://www.it.uu.se/research.

[U11] S. Engblom, A. Göran, and C. Adamsson. A compact difference method for turbulent flow in a channel. Technical Report 2000:6, Dept of Information Technology, Uppsala University, 2000.