

Paper suggestions: modeling

Here you can find a list of suggested papers that involve modeling. You can also find suitable papers on your own (ask Thilo Figge).

If you are unhappy with a paper you can always ask Thilo Figge to look for a replacement topic.

You will have to write a one-page summary of the paper and send it to Thilo Figge a few days before your presentation.

Citation	Link	Keywords
Zitzmann C and Kaderali L (2018) Mathematical Analysis of Viral Replication Dynamics and Antiviral Treatment Strategies: From Basic Models to Age-Based Multi-Scale Modeling. <i>Front. Microbiol.</i> 9:1546. doi: 10.3389/fmicb.2018.01546	https://www.frontiersin.org/journals/microbiology/articles/10.3389/fmicb.2018.01546/full	mathematical modeling, viral kinetics, viral replication, human immunodeficiency virus, Hepatitis C virus, Influenza A virus, antiviral therapy, immune response
Almansour S, Dunster JL, Crofts JJ, Nelson MR (2024) Modelling the continuum of macrophage phenotypes and their role in inflammation, <i>Mathematical Biosciences</i> , Volume 377, 109289, ISSN 0025-5564, https://doi.org/10.1016/j.mbs.2024.109289 .	https://www.sciencedirect.com/science/article/pii/S0025556424001494	mathematical modeling, macrophages and inflammation, Bifurcation analysis, PDE
Chathoth K, Fostier L, Martin B, Baysse C, Mahé F (2022) A Multi-Skilled Mathematical Model of Bacterial Attachment in Initiation of Biofilms. <i>Microorganisms</i> , 10(4):686. https://doi.org/10.3390/microorganisms10040686	https://www.mdpi.com/2076-2607/10/4/686	biofilm, bacterial attachment, mathematical model, stochastic, 2D and 3D
Schmid N, Fernandes Del Pozo D, Waegeman W, Hasenauer J (2025) Assessment of uncertainty quantification in universal differential equations. <i>Philos Trans A Math Phys Eng Sci</i> ; 383(2293):20240444. doi:10.1098/rsta.2024.0444	https://pubmed.ncbi.nlm.nih.gov/40172556/	uncertainty quantification, universal differential equations, scientific machine learning

Citation	Link	Keywords
Maddu S, Cheeseman BL, Sbalzarini IF, Müller CL (2022) Stability selection enables robust learning of differential equations from limited noisy data. <i>Proc. A</i> ; 478 (2262): 20210916. https://doi.org/10.1098/rspa.2021.0916	https://royalsocietypublishing.org/rspa/article/478/2262/20210916/54488/Stability-selection-enables-robust-learning-of	stability selection, sparse regression, PDE identification
Heinrich V, Simpson WD 3rd, Francis EA (2017) Analytical Prediction of the Spatiotemporal Distribution of Chemoattractants around Their Source: Theory and Application to Complement-Mediated Chemotaxis. <i>Front Immunol.</i> ; 8:578. Published 2017 May 26. doi:10.3389/fimmu.2017.00578	https://pmc.ncbi.nlm.nih.gov/articles/PMC5445147/	chemotaxis, reaction–diffusion, mathematical model, single-cell, host–pathogen
Niemann J-H, Klus S, Schütte C (2021) Data-driven model reduction of agent-based systems using the Koopman generator. <i>PLoS ONE</i> 16(5): e0250970. https://doi.org/10.1371/journal.pone.0250970	https://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0250970	ABM, PDEs, data-driven reduction
Lorenzi T, Painter KJ (2025) Pattern formation within phenotype-structured chemotactic populations. <i>Proc. A</i> 1; 481 (2324): 20250483. https://doi.org/10.1098/rspa.2025.0483	https://royalsocietypublishing.org/doi/abs/10.1098/rspa.2025.0483	PDEs, pattern formation, chemotaxis, non-local advection-diffusion-reaction eqs.
Kejie C, Kai-Rong O (2021) Random Walks of a Cell With Correlated Speed and Persistence Influenced by the Extracellular Topography, <i>Frontiers in Physics</i> , Volume 9, 10.3389/fphy.2021.719293	https://www.frontiersin.org/journals/physics/articles/10.3389/fphy.2021.719293/full	Random walks, complex environments, PRWs, Cell migration
Ohno K, Kobayashi Y, Uesaka M <i>et al.</i> (2021) A computational model of the epidermis with the deformable dermis and its application to skin diseases. <i>Sci Rep</i> 11 , 13234. https://doi.org/10.1038/s41598-021-92540-1	https://www.nature.com/articles/s41598-021-92540-1	ABM, skin modelling, skin disease, cellular layer

Revision #7

Created 2025-12-02 07:38:07 UTC by Carl-Magnus Svensson

Updated 2026-02-09 12:13:42 UTC by Ruman Gerst