

# Publications

## Software

J. Starruß, W. de Back, L. Bruschi and A. Deutsch.  
[Morpheus: a user-friendly modeling environment for multiscale and multicellular systems biology.](#)  
*Bioinformatics*, 30(9):1331-1332, 2014.  
 Please use this reference when citing the software.

## Research papers

- Meyer, K., Ostrenko, O., Bourantas, G., Morales-Navarrete, H., Porat-Shliom, N., Segovia-Miranda, F., Nonaka, H., Ghaemi, A., Verbavatz, J.M., Bruschi, L. and Sbalzarini, I., Kalaidzidis, Y., Weigert, R., Zerial M.  
[A Predictive 3D Multi-Scale Model of Biliary Fluid Dynamics in the Liver Lobule.](#) *Cell Systems*, 2017.
- O. Parvu and D. Gilbert.  
[A novel method to verify multilevel computational models of biological systems using multiscale spatio-temporal meta model checking.](#)  
*PLoS ONE*, 11(5): e0154847, 2016.
- M. Herberg, T. Zerjatke, W. de Back, I. Glauche and I. Roeder.  
[Image-based quantification and mathematical modeling of spatial heterogeneity in ESC colonies.](#)  
*Cytometry: Part A*, 2015.
- O. Parvu and D. Gilbert.  
[Automatic validation of computational models using pseudo-3D spatio-temporal model checking.](#)  
*BMC Systems Biology*, 8:124, 2014.
- A. Köhn-Luque, W. de Back, Y. Yamaguchi, K. Yoshimura, M. A. Herrero and T. Miura.  
[Dynamics of VEGF matrix-retention in vascular network patterning.](#)  
*Physical Biology*, 10:066007, 2013.
- W. de Back, R. Zimm, L. Bruschi  
[Transdifferentiation of pancreatic cells by loss of contact-mediated signaling.](#)  
*BMC Systems Biology*, 7:77, 2013.
- W. de Back, J. X. Zhou, L. Bruschi  
[On the role of lateral stabilization during early patterning in the pancreas.](#)  
*Journal of the Royal Society Interface* 10(79):20120766, 2012.
- A. Köhn-Luque, W. de Back, J. Starruß, A. Mattiotti, A. Deutsch, J. M. Pérez-Pomares, M. A. Herrero  
[Early embryonic vascular patterning by matrix-mediated paracrine signalling.](#)  
*PLoS ONE* 6(9):e24175, 2011.
- J. Starruß, T. Bley, L. Søgaard-Andersen, A. Deutsch  
[A new mechanism for collective migration in Myxococcus xanthus.](#)  
*Journal of Statistical Physics*, 128, 269-286, 2007.

## Also cited in

- Appleton, E., Madsen, C., Roehner, N. and Densmore, D.,  
[Design Automation in Synthetic Biology.](#) *Cold Spring Harbor Perspectives in Biology*, 2017.
- Cytowski, M., Szymańska, Z., Umiński, P., Andrejczuk, G. and Raszkowski, K.  
[Implementation of an Agent-Based Parallel Tissue Modelling Framework for the Intel MIC Architecture.](#) *Scientific Programming*, 2017.
- P. Macklin, H. Frieboes, J. Sparks, A. Ghaffarizadeh, S. Friedman, E. Juarez, E. Jonckheere, S. Mumenthaler  
[Progress Towards Computational 3-D Multicellular Systems Biology](#)  
 In: *Systems Biology of Tumor Microenvironment* (edited by: K. Rejniak), 2016.

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| J. S. Yu, N. Bagheri.<br><a href="#">Multi-class and multi-scale models of complex biological phenomena</a><br><i>Current Opinion in Biotechnology</i> , 39:167-173, 2016.  |
| O. Chara, E. Tanaka, L. Brusch.<br><a href="#">Mathematical Modeling of Regenerative Processes</a> .<br>In: <i>Current Topics in Developmental Biology: Mechanisms of Regeneration</i> (edited by: B. Galliot) Volume 108, 2014.                  |
| S.J. Parker, K. Raedschelders and J. E. Van Eyk.<br><a href="#">Emerging proteomic technologies for elucidating context-dependent cellular signaling events: A big challenge of tiny proportions</a> .<br><i>Proteomics</i> , 2014.               |
| L.A. D'Alessandro, S. Hoehme, A. Henney, D. Drasdo and U. Klingmüller.<br><a href="#">Unraveling liver complexity from molecular to organ level: Challenges and perspectives</a> .<br><i>Progress in biophysics and molecular biology</i> , 2014. |
| S. Kang, S. Kahan, J. McDermott, N. Flann and I. Shmulevich.<br><a href="#">Biocellion: accelerating computer simulation of multicellular biological system models</a> .<br><i>Bioinformatics</i> 30(2):3101-3108, 2014.                          |

## Education

Morpheus was used in the following courses:

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| <a href="#">OpenMultiMed Training School</a> at the Friedrich Alexander University Erlangen-Nürnberg, Germany February 22, 2018.  |
| <a href="#">Multi-scale Biology Summer School</a> in Nottingham, organized by Prof. Markus Owen from the multi-scale biology network, UK<br>13 September 13, 2017.  |
| Workshop on multicellular modeling at <a href="#">Institute for Computational Biology</a> , Helmholtz Zentrum München, Germany<br>May 30, 2017.   |
| Graduate school workshop on Systems Biology at <a href="#">HZI in Braunschweig</a> , Germany<br>May 10, 2017.   |
| <a href="#">ESMTB/EMS Summer School on Tissue Mechanics</a> at the Lorentz center in Leiden, the Netherlands<br>July 25-29, 2016.   |
| <a href="#">GSCN</a> workshop on <a href="#">Computational Stem Cell Biology</a><br>1-2 December 2014.  |
| Annual <a href="#">DIPP</a> 5-day course on Spatio-temporal Pattern Formation in Cells and Tissues<br>Autumn 2012 till 2017.  |
| <a href="#">ECMI modeling week European Summer School in Industrial Mathematics and Modelling Week</a> (ESSIM2012) August 12-22, 2012.  |
| Described in this paper:<br>F. Rost, A. Quintero, M. Myllykoski, A. Igolkina, A. Rohde O'Sullivan Freltoft, N. Dixit<br><a href="#">Morphogenesis and Dynamics of Multicellular Systems</a><br>ECMI Newsletter, 52, October 2012. |

## Conferences

Talks and poster presentations at the following conferences and workshops:

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| W. de Back, Morpheus 2: Modeling and simulation platform for multicellular systems biology. And MorpheusML: declarative markup language for multicellular systems biology, Workshop "Towards a unified framework for benchmarking multi-cellular models and simulation software" (organized D. Drasdo and S. Hoehme et al., Leipzig, March 2016 (invited talks)                     |
| W. de Back, J. Starruß, L. Bruschi, A. Deutsch, Morpheus: Computational modeling for stem cell biologists, <a href="#">3rd International Conference of the German Stem Cell Network (GSCN 2015)</a> , Frankfurt am Main, Germany, September 2015 (talk)   |
| W. de Back, <a href="#">Spatial multiscale computational systems biology</a> , Schloss <b>Dagstuhl</b> - Leibniz-Zentrum für Informatik, Germany, November 2014 (talk)  |
| W. de Back, A. Köhn-Luque, A. Deutsch, Morpheus: a user-friendly modeling environment for multicellular systems, Joint Annual Meeting of the Japanese Society for Mathematical Biology and the Society for Mathematical Biology ( <b>JSMB/SMB</b> ), Osaka, Japan, 2014. ( <a href="#">abstract</a> ) (talk)  |
| W. de Back, J. Starruß, L. Bruschi, A. Deutsch, Morpheus: a User-friendly Modeling Environment for Multiscale and Multicellular Systems Biology, 5th Conference on Systems Biology of Mammalian Cells ( <b>SBMC</b> ), Berlin, Germany, 2014. ( <a href="#">poster</a> )  |
| L. Bruschi, W. de Back, J. Starruß, A. Deutsch, Morpheus: a User-friendly Modeling Environment for Multiscale and Multicellular Systems Biology, Symposium on "Executable cell biology for tissue engineering and regenerative medicine", <b>TERMIS-EU</b> , Genova, Italy, 2014. ( <a href="#">abstract</a> ) (talk)   |
| W. de Back, Integrative modeling in developmental systems biology, Institute for Medical Informatics and Biometry, Medical Faculty „Carl Gustav Carus“, Technische Universität Dresden, 2013. (talk)  |
| A. Köhn-Luque <a href="#">Morpheus: a simulation environment for multicellular and multiscale systems biology</a> , High Performance Computing Center, Kyoto University, Japan, 2012. (talk)  |
| W. de Back, J. Starruß, A. Deutsch, Morpheus: a novel modeling environment for multicellular systems biology, <b>BIOTEC</b> Forum: Bioinformatics and Computational Biology, Dresden, 2012. (poster)  |
| W. de Back, J. Starruß, A. Deutsch, Morpheus: modeling environment for multicellular systems biology, 4th Conference on Systems Biology of Mammalian Cells ( <b>SBMC</b> ), Leipzig, 2012. (poster)   |
| W. de Back, J. Starruß, A. Deutsch, Morpheus: a Modeling Environment for Multiscale Morphodynamics, 12th International Conference on Systems Biology ( <b>ICSB</b> ), Heidelberg/Mannheim, 2011. (poster)   |
| W. de Back, A. Deutsch, Morpheus: Modeling and Simulation in Multicellular System Biology, 1st Sino-German Workshop on Simulation, Changsha, China, 2011. (talk)  |
| W. de Back, J. Starruß, Multiscale Modeling of Morphodynamic Systems, 3rd Conference on Systems Biology of Mammalian Cells ( <b>SBMC</b> ), Freiburg, 2010. (poster)  |
| W. de Back, J. Starruß, Multiscale Modeling of Morphodynamic Systems, 4th <b>CRTD</b> Summer conference on Regenerative Medicine, Dresden, 2010. (poster)   |
| W. de Back, J. Starruß, <a href="#">Middle-out Modeling of Multiscale Morphodynamics</a> , 12th International Conference on the Synthesis and Simulation of Living Systems ( <b>ALIFE XII</b> ), Odense, Denmark, 2010. In: H. Fellermann et al. (Eds.) Proceedings of the Twelfth International Conference on Artificial Life (Alife XII), MIT Press, Cambridge, MA., 2010. (talk) |
| W. de Back, J. Starruß, Multiscale Modeling of Morphodynamic Systems, <a href="#">EMBO Workshop in System Biology of Development</a> , Ascona, Switzerland, 2010. ( <b>EMBO Poster award</b> )  |

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