



Olaf Wolkenhauer

Dept of Systems Biology & Bioinformatics
University of Rostock
18051 Rostock, Germany

Email: olaf.wolkenhauer@uni-rostock.de

www.sbi.uni-rostock.de

My research focusses on understanding intra and inter-cellular dynamics for biotechnological and biomedical applications. Technological advances allow us to identify and characterise cellular components but the mechanisms by which cells realise their function, remain poorly understood. My approach combines data-driven modelling with model-driven experimentation, using a wide range of computational and mathematical tools. My interest in uncertainty arising from the complexity of multilevel and multiscale nonlinear spatio-temporal systems has also led to interactions with philosophers of science. My work supports basic and clinical research.

I received my first degrees in control engineering from the University of Applied Sciences in Hamburg, Germany and the University of Portsmouth in 1994, followed by a PhD from the Control Systems Centre at the University of Manchester, Institute of Science & Technology (UMIST) in the UK in 1997. In 1999 and 2000 I was an invited research fellowship at the Technical University Delft in the Netherlands, I spent almost eleven years of my academic life in England and had one of the first joint interdisciplinary appointments between a Dept. of Electrical Engineering and a Dept. of Biomolecular Sciences in the UK. Since 2005, I hold an adjunct professorship at Case Western Reserve University, Cleveland, USA, which was initiated by Mihajlo Mesarovic, the founding father of mathematical general systems theory. In 2005, I became a fellow of the Stellenbosch Institute for Advanced Study (STIAS), in 2009 I received the SPIE Pioneer Award and in 2015, I was elected as a member of the Foundations in Medicine and Biology review panel of the German Research Foundation (DFG). From 2017 I hold an adjunct professorship at the Chhattisgarh Swami Vivekanand Technical University, India.

I have written four books, including the research monograph "Possibility Theory with Applications to Data Analysis" (Wiley), the textbooks "Data Engineering" (Wiley) and "Stochastic Approaches for Systems Biology" (Springer). Another, more unusual book is an introductory conversation handbook for 'Plattdeutsch' (lower German) an old language that is spoken by only few people. I have edited other books, including a volume on "Systems Biology" (Portland Press), the Encyclopaedia of Systems Biology (Springer), a book on MicroRNA Cancer Regulation (Springer) and in 2016 a book on Systems Medicine (Springer).

Selected Publications:

Khan FM, Marquardt S, Gupta SK, Knoll S, Schmitz U, Spitschak A, Engelmann D, Vera J, Wolkenhauer O, Pützer BM. Unraveling a tumor type-specific regulatory core underlying E2F1-mediated epithelial-mesenchymal transition to predict receptor protein signatures *Nature Communications*. 2017.

Winter F, Bludzuweit-Philipp C, Wolkenhauer O. Mathematical analysis of the influence of brain metabolism on the BOLD signal in Alzheimer's disease. *J Cereb Blood Flow Metab*. 2017

Lai X, Wolkenhauer O, Vera J. Understanding microRNA-mediated gene regulatory networks through mathematical modelling. *Nucleic Acids Res*. 2016.

Wang Y, Alla V, Goody D, Gupta SK, Spitschak A, Wolkenhauer O, Pützer BM, Engelmann D. Epigenetic factor EPC1 is a master regulator of DNA damage response by interacting with E2F1 to silence death and activate metastasis-related gene signatures. *Nucleic Acids Res*. 2016.

Wolkenhauer O. Pushing the limits by embracing complexity. *IET Syst Biol*. 2014.