

Jakob Ruess

Lifeware Project Team
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EDUCATION

Inria Saclay/Institut Pasteur: Permanent researcher (2016-...)

Topic: Stochastic Systems Biology
Lifeware Project Team (Inria) and InBio Unit (Pasteur)

IST Austria: Postdoctoral research fellow (2014-2016)

Topic: Stochastic Systems Biology
Group 1: Tom Henzinger (Computer Science), *Concurrent and Embedded Systems*
Group 2: Gasper Tkacik (Biophysics), *Information Processing in Biological Networks*

ETH Zurich: PhD studies at the Automatic Control Laboratory (2010-2014)

PhD thesis: *Moment-based methods for the analysis and identification of stochastic models of biochemical reaction networks*
Graduate School: Life Science Zurich Graduate School (Systems Biology)
Advisor: Prof. John LYGEROS

University of Heidelberg: Diploma studies in Mathematics (2004-2010)

Diploma thesis: *Nonparametric estimation of linear functionals in the convolution problem with unknown error distribution*
Advisors: Prof. Jan JOHANNES & Prof. Rainer DAHLHAUS

AWARDS

- 2015 ETH Medal (special award for the most outstanding (approx. top 8 %) doctoral theses at ETH Zurich).
- 2014 Selected for the ISTFELLOW program and fellowship, IST Austria.
- 2012 Swiss Institute of Bioinformatics 2012 Best Graduate Paper Award (including a 5000 CHF (5600 USD) cash award).

TEACHING

- 2016-... *Modelling and Engineering of Biological Systems* - Predoctoral School of ITI (PSL)
- 2016-... *Computational Biology* - Master Approches Interdisciplinaires du Vivant (CRI)
- 2012-2014 *Signals and Systems II* - Control Engineering, ETH Zurich
- 2008 *Statistics* - Mathematics, University of Heidelberg
- 2006-2007 *Introduction to Probability Theory* - Mathematics, University of Heidelberg

LIST OF PUBLICATIONS

Peer Reviewed Journal Articles

R. Chait*, J. Ruess*, T. Bergmiller, G. Tkačik, and C. Guet, “Shaping bacterial population behavior through computer-interfaced control of individual cells,” *Nature Communications*, vol. 8, no. 1, pp. 1535, 2017.

J. Ruess*, H. Koepl, and C. Zechner*, “Sensitivity estimation for stochastic models of biochemical reaction networks in the presence of extrinsic variability,” *The Journal of Chemical Physics*, vol. 146, no. 12, pp. 124122, 2017.

C. Schilling, S. Bogomolov, T.A. Henzinger, A. Podelski, and J. Ruess, “Adaptive moment closure for parameter inference of biochemical reaction networks,” *BioSystems*, vol. 149, pp. 15-25, 2016.

J. Ruess, “Minimal moment equations for stochastic models of biochemical reaction networks with partially finite state space,” *The Journal of Chemical Physics*, vol. 143, no. 24, pp. 244103, 2015.

J. Ruess*, F. Parise*, A. Miliadis-Argeitis, M. Khammash and J. Lygeros, “Iterative experiment design guides the characterization of a light-inducible gene expression circuit,” *Proceedings of the National Academy of Sciences of the USA*, vol. 112, no. 26, pp. 8148-8153, 2015.

F. Parise*, J. Lygeros and J. Ruess* “Bayesian inference for stochastic individual-based models of ecological systems: a pest control simulation study,” *Frontiers in Environmental Science*, vol. 3, pp. 42, 2015.

J. Ruess and J. Lygeros, “Moment-based methods for parameter inference and experiment design for stochastic biochemical reaction networks,” *ACM Transactions on Modeling and Computer Simulation*, vol. 25, no. 2, art. 8, 2015.

J. Ruess, A. Miliadis-Argeitis and J. Lygeros, “Designing experiments to understand the variability in biochemical reaction networks,” *Journal of the Royal Society Interface*, vol. 10, no. 88, pp. 20130588, 2013.

C. Zechner*, J. Ruess*, P. Krenn, S. Pelet, M. Peter, J. Lygeros and H. Koepl, “Moment-based inference predicts bimodality in transient gene expression,” *Proceedings of the National Academy of Sciences of the USA*, vol. 109, pp. 8340-8345, 2012.

J. Ruess, A. Miliadis-Argeitis, S. Summers and J. Lygeros, “Moment estimation for chemically reacting systems by extended Kalman filtering,” *The Journal of Chemical Physics*, vol. 135, pp. 165102, 2011.

* contributed equally

Peer Reviewed Conference Publications

S. Bogomolov, T.A. Henzinger, A. Podelski, J. Ruess# and C. Schilling “Adaptive moment closure for parameter inference of biochemical reaction networks,” in *Computational Methods in Systems Biology*, Nantes, France, September 16-18, 2015.

F. Parise, J. Ruess and J. Lygeros, “Grey-box techniques for the identification of a controlled gene expression model,” in *European Control Conference*, Strasbourg, France, June 24-27, 2014.

J. Ruess and J. Lygeros, “Identifying stochastic biochemical networks from single-cell population experiments: a comparison of approaches based on the Fisher information,” in *IEEE Conference on Decision and Control*, Florence, Italy, December 10-13, 2013.

A. Hjartarson*, J. Ruess* and J. Lygeros, “Approximating the solution of the chemical master equation by combining finite state projection and stochastic simulation,” in *IEEE Conference on Decision and Control*, Florence, Italy, December 10-13, 2013.

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Book Chapters

J. Ruess and J. Lygeros, “On the use of the moment equations for parameter inference, control and experimental design in stochastic biochemical reaction networks,” in *Computational Methods in Systems Biology* (A. Gupta and T. Henzinger, eds.), vol. 8130 of *LNBI*, Heidelberg: Springer-Verlag, 2013.