

Melanie I. Stefan

Professional Appointments

- Apr 2015 – **Edinburgh-Zhejiang Lecturer**, *School of Biomedical Sciences*.
University of Edinburgh (UK)
- Jan 2015 – **Visiting Scientist**, *Modelling of allosteric synaptic proteins*.
Mar 2015 Babraham Institute, Cambridge (UK), Le Novère lab
- Jul 2013– **Lecturer and Curriculum Fellow**, *Quantitative Biology*.
Dec 2014 Harvard Medical School, Boston (US), Department of Neurobiology and Curriculum Fellows Program
- Nov 2010– **Postdoctoral Fellow**, *Modes of regulation of postsynaptic proteins*.
Jun 2013 California Institute of Technology, Pasadena (US), Kennedy lab
- Jan 2010– **Visiting Fellow**, *Understanding CaMKII regulation through modelling and experiment*.
Jun 2010 University of Tokyo (JP), Kuroda lab
- Oct 2005– **Research Fellow**, *Allosteric regulation and cooperativity in synaptic plasticity*.
Oct 2010 EMBL-European Bioinformatics Institute, Cambridge (UK), Le Novère lab
- 2005 **Research Assistant**, *Biomathematical cancer models*.
University of Salzburg (AT), Schöllnberger lab
- Jan–Dec **MSc research**, *Characterisation and genetic mapping of zebrafish skin mutations*.
2004 Max Planck Institute for Developmental Biology, Tübingen (DE), Nüsslein-Volhard lab

Academic qualifications

- PhD **Molecular Biology/Bioinformatics**, 2009, EMBL-EBI and Clare College, Cambridge.
- MSc **Genetics**, 2005, University of Salzburg, with distinction.
- MSc **Mathematics**, 2012, The Open University (UK).

Research Interests

Computational models of neuronal proteins.

Calcium dynamics and Calmodulin regulation; function and regulation of CaMKII

Theoretical and computational biochemistry.

allostery; cooperativity; multi-state modelling; sharing of models and techniques

Learning and memory in the classroom.

use of data from educational platforms; self-directed learning

Research Funding

- 2014 **SPARK grant**, *Harvard Initiative for Teaching and Learning*.
Improving statistics literacy in graduate students and postdoctoral fellows in the life sciences
- 2010-2012 **Long-term post-doctoral fellowship**, *EMBO*.
- 2010 **Short-term post-doctoral fellowship**, *Japan Society for the Promotion of Science*.
- 2009–2010 **Short-term post-doctoral fellowship**, *EMBL*.
- 2005–2009 **Pre-doctoral fellowship**, *EMBL*.

Awards and fellowships

- since 2104 **Chartered Biologist**, *Society of Biology*.
- since 2014 **Fellowship in Medical Education Research**, *Harvard Medical School Academy*.
- since 2013 **NeXXt fellow**, *New York Academy of Sciences*.
- 2011–2013 **Fast Track Fellow**, *Robert Bosch Foundation*.
- 2009 **Christian Doppler Prize for biology**, *State of Salzburg, Austria*.
- 2006 **Student project prize**, *Okinawa Computational Neuroscience Course*.
- 2003 **Student participant**, *Lindau Meeting of Nobel Laureates*.
- 2003 **Exchange semester fellowship**, *Erasmus*.
- 2002 **Excellence award for mathematics**, *University of Salzburg*.

Teaching

- 2014 **Molecular Biology of the Cell**, *Quarter Course*, Harvard Medical School, Instructor, Computational Modelling Workshop.
- 2013-2014 **Technologies for Data Analysis for Experimental Biologists**, *Nanocourse*, Harvard Medical School, Instructor.
- 2013-2014 **Boot Camp in Quantitative Methods**, *Quarter Course*, Harvard Medical School, Curriculum Fellow.
- 2013-2014 **Quant Bio Club**, *Weekly discussion session*, Harvard Medical School, Initiator, Leader.
- 2013 **Molecular and Cellular Basis of Medicine**, *Pre-clinical medical course*, Harvard Medical School, Tutor.
- 2012 **Computational models in Biology and Biochemistry**, *Reading course*, Caltech, Instructor.

Research student supervision

PhD rotation students.

Katherine Brugman (Caltech, 2013)

Graduate research assistants.

Mingshu Huang (HMS, 2014)

Undergraduate research assistants.

David Tolnay (Caltech, 2011–2013), David Marshall (EMBL-EBI, 2007)

Conference organisation and committee service

- 2012–2013 **Caltech Women Mentoring Women**, *Mentor*, California Institute of Technology.
- 2008 **European Science and Society Summer School. Deconstructing and reconstructing life: From classification to design**, *Heidelberg*, Organising committee.
- 2008 **EMBL-EBI Science and Society Symposium. The personal genome**, *Cambridge*, Organising committee.
- 2007-2008 **Clare College MCR**, *Cambridge*, Webmaster.
- 2007 **EMBL-EBI Science and Society Symposium. Biology and language**, *Cambridge*, Organising committee.
- 2006–2008 **EMBL science and society committee**, EBI representative.
- 2006 **EMBL International PhD Student Symposium. Biology of disease**, *Heidelberg*, Organising committee.

Editorial work and reviewing

- since 2010 **Reviewer**, *BMC Systems Biology*, *Theoretical Biology and Medical Modelling*, *BMC Genomics*, *Journal of Mathematical Biology*.
- 2010 **Postdoc Journal keeper**, *Nature Jobs*.
- 2001–2007 **Editorial board**, *Kriterion: Journal of Philosophy*.

Memberships

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| since 2015 | Biochemical Society | since 2014 | Academy at Harvard Medical School |
| since 2013 | New York Academy of Sciences | since 2012 | Society of Biology |
| since 2011 | International Neuroinformatics Coordinating Facility | since 2011 | Austrian Scientists and Scholars in North America |

Posters and talks

Conference posters

A. Ahuja, K. Dillon, **M.I. Stefan**, Y. Liu, J. Gutlerner and D. V. Vactor. Characterizing statistics understanding and attitudes in graduate students and postdocs in the life sciences. *SABER National meeting, Twin Cities (US)*, 2014.

M. I. Stefan, S. Pepke, S. Mihalas, T. Bartol, T. Sejnowski and M. Kennedy. Modelling Ca²⁺-dependent proteins in the spine - challenges and solutions. *INCF Neuroinformatics, Munich (DE)*, 2012.

M.I. Stefan, S. Pepke, S. Mihalas, T. Bartol, T. Sejnowski and M. Kennedy. Multi-stage modelling of the kinetics of CaMKII activation. *INCF Neuroinformatics, Boston (US)*, 2011.

M.I. Stefan and N. Le Novère. Models of a memory device – understanding CaMKII. *Sanger-Cambridge PhD Symposium, Cambridge (UK)*, 2009.

M.I. Stefan, D. Marshall and N. Le Novère. Stochastic modelling of CaMKII regulation. *The Tenth International Conference on Systems Biology, Stanford (US)*, 2009.

M.I. Stefan, S. Edelstein and N. Le Novère. An allosteric model of calmodulin. *Sanger-Cambridge PhD Symposium, Hinxton (UK)*, 2008.

M.I. Stefan, S. Edelstein and N. Le Novère. An allosteric model of calmodulin explains differential activation of PP2B and CaMKII. *Sixth FENS Forum of European Neuroscience, Geneva (CH)*, 2008.

M.I. Stefan, S. Edelstein and N. L. Novère. An allosteric model of calmodulin explains differential activation of PP2B and CaMKII. *The Ninth International Conference on Systems Biology, Göteborg (SE)*, 2008.

C. Li, M. Donizelli, N. Le Novère, H. Dharuri, E. He, L. Li, B. Shapiro, **M.I. Stefan**, R. Machne, C. Laibe, D. Tolle, R. Schiappa and M. Hucka. BioModels Database, a curated and annotated resource of published quantitative kinetic models. *The Eighth International Conference on Systems Biology, Long Beach (US)*, 2007.

M.I. Stefan and N. Le Novère. A StochSim model for CaMKII regulation. *Synthetic Biology, Systems Biology and Bioinformatics, Manchester (UK)*, 2007.

M.I. Stefan and N. Le Novère. A StochSim model for CaMKII regulation. *The Seventh International Conference on Systems Biology, Yokohama (JP)*, 2006.

M.I. Stefan and N. Le Novère. Molecules for memory. *Okinawa Computational Neuroscience Course, Okinawa (JP)*, 2006.

Invited Talks

- M.I. Stefan.** Recognizing and managing micro-aggression and micro-prejudice in the classroom. *CFP Education Lunch Series, Harvard Medical School, Boston (US)*, 2014.
- M.I. Stefan.** Multi-state modelling of synaptic proteins. *University of Oxford (UK)*, 2013.
- M.I. Stefan.** Calcium signalling and memory. *Babraham Institute, Cambridge (UK)*, 2012.
- M.I. Stefan.** Computermodellierung neuronaler Proteine. *Austrian Scientists and Scholars in North America, Pasadena (US)*, 2012.
- M.I. Stefan.** Hypothesis testing and the Quant Bio Clinic. *Harvard Medical School, Boston (US)*, 2012.
- M.I. Stefan.** Modelling CaMKII: From StochSim to MCell. *Salk Institute, San Diego (US)*, 2011.
- A. Trilling, E. Sünter, **M.I. Stefan** and M. Annoni. New technologies and human identity. *EMBL/EMBO Science and Society Summer School, Heidelberg (DE)*, 2011.
- M.I. Stefan.** PP2B or PP not to be? *CRG Minisymposium on Systems Biology, Center for Genomic Regulation, Barcelona (ES)*, 2010.
- M.I. Stefan.** Tales of a travelling postdoc. *Naturejobs Career Fair, London (UK)*, 2010.
- M.I. Stefan.** An allosteric model of calmodulin explains differential activation of PP2B and CaMKII. *ZBIT-Colloquium, Center for Bioinformatics, Tübingen (DE)*, 2009.
- M.I. Stefan.** Modelling allosteric devices in synaptic plasticity. *University of Helsinki (FI)*, 2009.
- M.I. Stefan.** Modelling CaMKII regulation and autoregulation. *CECAM Workshop: Linking Systems Biology and Biomolecular Simulations, Lausanne (CH)*, 2009.
- M.I. Stefan.** Stochastic modelling of CaMKII. *California Institute of Technology, Pasadena (US)*, 2009.
- M.I. Stefan.** An allosteric model of calmodulin. *Cold Spring Harbor Laboratory meeting on Computational Cell Biology, Hinxton (UK)*, 2008.
- M.I. Stefan.** An allosteric model of calmodulin. *National Institute for Medical Research, London (UK)*, 2008.
- M.I. Stefan.** An allosteric model of calmodulin. *EBI External Seminar, Hinxton (UK)*, 2008.
- M.I. Stefan.** An allosteric model of calmodulin. *EMBL Predoc Retreat, Lisbon (PT)*, 2008.
- M.I. Stefan.** Models and brains. *Clare College Research Symposium, Cambridge (UK)*, 2008.
- M.I. Stefan.** Model curation for the BioModels Database. *Okinawa Computational Neuroscience Course, Okinawa (JP)*, 2006.
- M.I. Stefan.** Molecules for memory: NMDA receptors, calmodulin, CaMKII. *Bioinformatics Research and Education Workshop, Hinxton (UK)*, 2006.

Publications

Published

M. I. Stefan, J. L. Gutlerner, R. T. Born and M. Springer. The quantitative methods boot camp: teaching quantitative thinking and computing skills to graduate students in the life sciences. *PLoS Comput Biol*, 11(4):e1004208, 2015.

R. Dutta Roy, **M. I. Stefan** and C. Rosenmund. Biophysical properties of presynaptic short-term plasticity in hippocampal neurons: insights from electrophysiology, imaging and mechanistic models. *Front Cell Neurosci*, 8:141, 2014.

J. Marino, **M. I. Stefan** and S. Blackford. Ten simple rules for finishing your PhD. *PLoS Comput Biol*, 10(12):e1003954, 2014.

M. I. Stefan, T. M. Bartol, T. J. Sejnowski and M. B. Kennedy. Multi-state modeling of biomolecules. *PLoS Comput Biol*, 10(9):e1003844, 2014.

M. I. Stefan and N. Le Novère. Cooperative binding. *PLoS Comput Biol*, 9(6):e1003106, 2013.

L. Endler, **M. I. Stefan**, S. Edelstein and N. Le Novère. *Using chemical kinetics to model neuronal signalling pathways*. In: *Computational Systems Neurobiology, N. Le Novère (ed)*. Springer, 2012.

L. Li, **M. I. Stefan** and N. Le Novère. Calcium input frequency, duration and amplitude differentially modulate the relative activation of calcineurin and CaMKII. *PLoS One*, 7(9):e43810, 2012.

M. I. Stefan, D. P. Marshall and N. Le Novère. Structural Analysis and Stochastic Modelling Suggest a Mechanism for Calmodulin Trapping by CaMKII. *PLoS One*, 7(1):e29406, 2012.

G. M. Dall'Olio, J. Marino, M. Schubert, K. L. Keys, **M. I. Stefan**, C. S. Gillespie, P. Poulain, K. Shameer, R. Sugar, B. M. Invergo, L. J. Jensen, J. Bertranpetit and H. Laayouni. Ten simple rules for getting help from online scientific communities. *PLoS Comput Biol*, 7(9):e1002202, 2011.

M. I. Stefan, S. Pepke, S. Mihalas, T. Bartol, T. Sejnowski and M. Kennedy. Multi-stage modeling of the kinetics of activation of CaMKII. *Front Neuroinform*, Conference Abstract: 4th INCF Congress of Neuroinformatics, 2011.

S. Edelstein, **M. I. Stefan** and N. Le Novère. Ligand depletion in vivo modulates the dynamic range and cooperativity of signal transduction. *PLoS One*, 5(1):e8449, 2010.

C. Li, M. Donizelli, N. Rodriguez, H. Dharuri, L. Endler, V. Chelliah, L. Li, E. He, A. Henry, **M. I. Stefan**, J. L. Snoep, M. Hucka, N. Le Novère and C. Laibe. Biomodels database: An enhanced, curated and annotated resource for published quantitative kinetic models. *BMC Syst Biol*, 4:92, 2010.

M. I. Stefan, S. J. Edelstein and N. Le Novère. Computing phenomenologic Adair-Klotz constants from microscopic MWC parameters. *BMC Syst Biol*, 3(1):68, 2009.

M. I. Stefan, S. J. Edelstein and N. Le Novère. An allosteric model of calmodulin explains differential activation of PP2B and CaMKII. *Proc Natl Acad Sci USA*, 105(31):10768–10773, 2008.

M. I. Stefan and N. Le Novère. Molecules for memory: modelling CaMKII. *BMC Systems Biology*, 1(Suppl 1):P40, 2007.

A. Anglberger, P. Brössel and **M.I. Stefan**. Rezension: Argumentation in Theorie und Praxis. *Kriterion*, 20:37–41, 2006.

A. Anglberger, P. Brössel, N. Furlan, F. Greinecker, M. Karlegger, N. Pfeiffer, **M.I. Stefan** and A. Ungar. Rezension: Was wir Karl R. Popper und seiner Philosophie verdanken. *Kriterion*, 17:23–27, 2003.