Jakob H Macke

research center caesar
Ludwig Erhard Allee 2
53175 Bonn
http://www.mackelab.org
Jakob.Macke@caesar.de

Employment

05/15-now	research center caesar, Bonn Max Planck Research Group Leader (W2) Bernstein Fellow, Bernstein Center for Computational Neuroscience Tübingen
05/12-04/15	Max Planck Institute for Biological Cybernetics and Bernstein Center for Computational Neuroscience Tübingen Bernstein Research Group Leader
04/10-04/12	Gatsby Computational Neuroscience Unit, University College London Marie Curie Fellow, with Prof. Maneesh Sahani
10-12/09	McKinsey & Company, Associate Intern
10/05-03/10	Max Planck Institute for Biological Cybernetics, Graduate Student

Education

10/05-03/10	Doctoral Thesis *Population coding in the visual system: Statistical methods and theory.* Supervised by Profs. Bernhard Schölkopf and Matthias Bethge
08/2006	Methods in Computational Neuroscience, MBL Woods Hole
08/2005	Neuroinformatics Course, MBL Woods Hole
10/01-06/05	University of Oxford (Somerville College), UK, Master in Mathematics

Awards and scholarships

03/13	Member of *Young Academy at the Berlin-Brandenburg Academy of Sciences and Humanities and the German National Academy of Sciences Leopoldina*
06/12	Otto Hahn Medal by the Max Planck Society
05/10-04/12	Marie Curie Intra-European Fellowship
07/05	Gibbs Prize in Mathematics (Proxime Accessit) by Oxford University
10/03-06/05	German National Academic Foundation (Studienstiftung des Deutschen Volkes)

Professional activities

2016	Area chair at NIPS
12/2015	Co-organiser, Workshop "Statistical methods for analysing neural systems", NIPS (Neural Information Processing Systems), Montreal
03/2015	Co-organiser, Workshop "Causation from correlation?", Ohlstadt, Germany
12/2014	Co-organiser, Workshop "Large scale optical physiology: From data-acquisition to models of neural coding", NIPS, Lake Tahoe
03/2014	Session organizer, 4th *British-German Frontiers of Science Symposium 2014* Alexander von Humboldt Foundation, the Young Academy and the Royal Society
12/2013	Co-organiser, Workshop "Acquiring and analyzing the activity of large neural ensembles", NIPS, Vancouver
09/2013	Organizing- and program committee of Bernstein Conference 2013, Tübingen
2013	*Scientific associate* of *Stiftung neue Verantwortung*, a Berlin based Think Tank, in the project *Cognitive Robotics*

2009-10 Co-editor, special issue in *Frontiers in Computational Neuroscience* "Statistical analysis of multi-electrode recordings: Linking models and experimental data"

05/2009 Co-organiser, Workshop "Statistical analysis of multi-electrode recordings" at annual meeting of the Computational Neuroscience Society (CNS)

Selected talks

01/2016 Bernstein Seminar, Bernstein Center Heidelberg

12/2015 Invited speaker, Workshop *Inference for dynamics on networks*, NIPS, Montreal

11/2015 Keynote, Bonn International Graduate School Neuroscience Retreat, Castle Diez

10/2015 Group for Neural Theory, Ecole Normale Superieure, Paris

09/2015 Contributed plenary talk, Bernstein Conference Heidelberg

09/2015 Workshop *Estimating Parameters and Unobserved State Variables from Neural Data*, Bernstein Conference

04/2015 Swiss Computational Neuroscience Series, ETH Zurich

03/2014 Workshop *Cascaded Computations*, COSYNE, Salt Lake City

07/2014 Workshop *Population Codes: From Data Analysis to Mechanisms* Bernstein Center München

06/2015 Workshop *Modelling variability in neuronal populations*, New York University

05/2014 Computational Neuroscience Seminar, Friedrich Miescher Institute Basel

05/2014 Invited talk, OCCAM Osnabrück

01/2014 Seminar, Center for Advanced European Studies and Research, Bonn, 01/2014

12/2013 Computational Neuroscience Seminar, EPFL Lausanne

10/2013 Biotheory Seminar, Max Planck Institute for Brain Research, Frankfurt

09/2013 Institute of Computational Biology, Helmholtz Zentrum München

09/2013 Institute for Neuroinformatics, ETH Zürich

09/2013 Workshop *Modelling neural response properties*, Bernstein Conf. Tübingen

09/2013 Workshop *Unsolved problems in 2p imaging analysis*, Bernstein Conf. Tübingen

03/2013 Cambridge University, Department of Information Engineering

05/2012 Janelia Conference *Machine Learning, Statistical Inference and Neuroscience*

06/2011 Computational Neuroscience Seminar, Department of Biology, LMU Munich

11/2010 Department for Mathematics and Statistics, Boston University

09/2012 Conference on information representation and estimation at University College London, Department of Statistics

06/2010 Workshop on Computational Neuroscience, Hebrew University

05/2010 Spike train analysis seminar series, Newcastle University

07/2009 Workshop *Statistical analysis of multi-electrode recordings*, CNS Berlin

06/2009 Computational Neuroscience Seminar, EPFL Lausanne

05/2009 Center for Theoretical Neuroscience, Columbia University

05/2009 Symposium *Modern approaches to modeling visual data* at VSS, Naples, FL

12/2008 Workshop *Modelling response dependencies in neural populations*, NIPS

Publications

Reviews and book chapters

5. C Kayser, **JH Macke**, J Gross, S Panzeri: Neural population coding: combining insights from microscopic and mass signals, Trends in Cognitive Sciences, 19(3), 162-171, 01 2015
4. **JH Macke**, L Büsing, M Sahani: Estimating state and model parameters in state-space models of spike trains. Invited book-chapter in *Advanced State Space Methods for Neural and Clinical Data*, Cambridge University Press, in press, 2015
3. **JH Macke**: Bayesian analysis of neurophysiological data. Springer Encyclopedia of Computational Neuroscience, 2014
2. S Gerwinn, **JH Macke**, M Bethge: Reconstructing stimuli from the spike times of leaky integrate and fire neurons. Focused Review, Frontiers in Neuroscience, 5:1, 2 2011
1. **JH Macke**, P Berens, M Bethge, Statistical analysis of multi-cell recordings: Linking population coding models to experimental data. Editorial, Frontiers in Computational Neuroscience 5(35), 1-2, 07 2011

Journal papers

16. R Küffner et al: Crowdsourced analysis of clinical trial data to predict amyotrophic lateral sclerosis progression. Nature Biotechnology, 33(1), 51-57, 01 2015
15. I Fründ, FA Wichmann, **JH Macke**: Quantifying the effect of inter-trial dependence on perceptual decisions. Journal of Vision, 14 (7), 06 2014
14. M Watanabe, A Bartels, **JH Macke**, Y Murayama, NK Logothetis: Temporal jitter of the BOLD signal reveals improved spatial resolution. Current Biology 23 (21), 2146-2150, 08 2013
13. **JH Macke**, I Murray, P Latham: Estimation bias in maximum entropy models. Entropy 15:3109-3219, 08 2013
12. R Haefner, S Gerwinn, **JH Macke**, M Bethge: Inferring decoding strategies from choice probabilities in the presence of correlated variability. Nature Neuroscience 16(2), 235–242, 01 2013
11. G Schwartz, **JH Macke**, D Amodei, H Tang, MJ Berry: Low error discrimination using a correlated population code. Journal of Neurophysiology, 108(4), 1069-1088, 04 2012
10. L Büsing, **JH Macke**, M Sahani: Learning stable, regularised latent models of neural population dynamics. Network: Computation in Neural Systems, 23(1-2) 24-47, 03 2012
9. **JH Macke**, M Opper, M Bethge: Common input explains higher-order correlations and entropy in a simple model of neural population activity. Physical Review Letters 106, 208102, 05 2011
8. **JH Macke**, S Gerwinn, L White, M Kaschube, M Bethge: Gaussian process methods for estimating cortical maps. Neuroimage 56(2), 570-81, 05 2011
7. D Lyamzin, **JH Macke**, NA Lesica: Modeling population spike trains with specified time-varying spike rates, trial-to-trial variability, and pairwise signal and noise correlations. Frontiers in Computational Neuroscience, 4:144, 11 2010
6. S Gerwinn, **JH Macke**, M Bethge: Bayesian inference for generalized linear models for spiking neurons. Frontiers in Computational Neuroscience, 4:12, 05 2010
5. **JH Macke**, FA Wichmann: Estimating critical stimulus features from psychophysical data: The decision-image technique applied to human faces. Journal of Vision, 10(5):22, 1-24, 05 2010
4. S Gerwinn, **JH Macke**, M Bethge: Bayesian population decoding of spiking neurons. Frontiers in Computational Neuroscience 3(21), 1-28, 10 2009
3. **JH Macke***, P Berens*, AS Ecker, AS Tolias and M Bethge: Generating Spike Trains with Specified Correlation Coefficients. Neural Computation 21(2), 397-423, 02 2009
2. SP Ku, A Gretton, **JH Macke** and NK Logothetis: Comparison of Pattern Recognition Methods in Classifying High-resolution BOLD Signals Obtained at High Magnetic Field in Monkeys. Magnetic Resonance Imaging 26(7), 1007-1014, 09 2008
1. **JH Macke***, N Maack*, B Schölkopf, W Denk, A Borst: Contour-Propagation Algorithms for Semi-Automated Reconstruction of Neural Processes. Journal of Neuroscience Methods 167(2), 349-357, 01 2008

Peer reviewed conference papers

12. M Park, G Bohner, **JH Macke**: Unlocking neural population non-stationarities using hierarchical dynamics models Advances in Neural Information Processing Systems (NIPS), Curran Associates Inc., 12 2015
11. E Archer, U Köster, J Pillow, **JH Macke**: Low-dimensional models of neural population activity in sensory cortical circuits. Advances in Neural Information Processing Systems (NIPS), Curran Associates Inc., 12 2014
10. P Putzky, F Franzen, G Bassetto, **JH Macke**: A Bayesian model for identifying hierarchically organised states in neural population activity. Advances in Neural Information Processing Systems (NIPS), Curran Associates Inc., 12 2014
    (selected as one of 62 spotlights out of 1678 submissions)
9. SC Turaga, L Büsing, AM Packer, H Dalgleish, N Petit, M Häusser, **JH Macke**: Inferring neural population dynamics from multiple partial recordings of the same neural circuit. Advances in Neural Information Processing Systems (NIPS), Curran Associates Inc., 2013
    (selected as one of 52 spotlights out of 1420 submissions).
8. L Büsing*, **JH Macke***, M Sahani: Spectral learning of linear dynamics from generalised-linear observations with application to neural population data. Advances in Neural Information Processing Systems (NIPS), Curran Associates Inc., 2012
    (selected as one of 20 oral presentation out of 1467 submissions)
7. **JH Macke**, I Murray, P Latham: How biased are maximum entropy models? Advances in Neural Information Processing Systems (NIPS), Curran Associates Inc., 2011
6. **JH Macke**, L Büsing, JP Cunningham, BM Yu, KV Shenoy, M Sahani: Empirical models of spiking in neural populations. Advances in Neural Information Processing Systems (NIPS), Curran Associates Inc., 2011
    (selected as one of 20 oral presentation out of 1400 submissions)
5. **JH Macke**, S Gerwinn, L White, M Kaschube, M Bethge: Bayesian estimation of orientation preference maps. Advances in Neural Information Processing Systems (NIPS), MIT Press, Cambridge, MA 2009
4. **JH Macke**, G Zeck, M Bethge: Receptive Fields without Spike-Triggering. Advances in Neural Processing Systems (NIPS), MIT Press, Cambridge, MA 2007
3. S Gerwinn, **JH Macke**, M Seeger, M Bethge: Bayesian Inference for Spiking Neuron Models with a Sparsity Prior. Advances in Neural Processing Systems (NIPS), MIT Press, Cambridge, MA 2007
    (selected as one of 26 oral presentation out of 975 submissions)
2. M Bethge, S Gerwinn and **JH Macke**: Unsupervised learning of a steerable basis for invariant image representations. Proceedings of SPIE, 2007
1. J Laub, **JH Macke**, KR Mueller and FA Wichmann: Inducing Metric Violations in Human Similarity Judgements. Advances in Neural Processing Systems (NIPS), MIT Press, Cambridge, MA 2006