

Curriculum Vitae

Friedrich T. Sommer

Current Address:

Redwood Center for Theoretical Neuroscience
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Current Position:

2011-present Adjunct Professor, Helen Wills Neuroscience Institute & Redwood Center for Theoretical Neuroscience, University of California, Berkeley

2002-present Faculty member (Privatdozent), Computer Science Department, University of Ulm

Education:

Degrees

2002 Habilitation, Computer Science, University of Ulm

1993 Ph.D., Physics, University of Düsseldorf

1987 Diploma in Physics, University of Tübingen

Postdoctoral Fellowships

1994-1995 Section of Experimental Magnetic Resonance of the Central Nervous System, University of Tübingen

1993-1994 Department of Neural Information Processing, University of Ulm

Professional Experience:

1 – 6 /2009 Acting Director of the Redwood Center for Theoretical Neuroscience, University of California, Berkeley

6 – 12/2007 Acting Director of the Redwood Center for Theoretical Neuroscience, University of California, Berkeley

2005-2011 Associate Adjunct Professor, Helen Wills Neuroscience Institute & Redwood Center for Theoretical Neuroscience, University of California, Berkeley

2002-2005 Principal Investigator, Redwood Neuroscience Institute, Menlo Park, CA, USA

- 2004-2005 Visiting Scholar, Helen Wills Neuroscience Institute, University of Berkeley, USA
- 1996-2002 Assistant Professor, Computer Science Department, University of Ulm, Germany
- 1999 Visiting scholar, Brain & Cognitive Science Department, MIT, Boston, USA
- 1995-1996 Staff Scientist, Institute of Medical Psychology & Department of Neuroradiology, University of Tübingen, Germany
- 1993-1995 Research Associate, Computer Science Department, University of Ulm, Germany
- 1988-1993 Research Assistant, Vogt-Institute of Brain Research and Neuroanatomy, University of Düsseldorf, Germany

Membership in Academic Societies

- 1986 - German/European Physical Society (DPG)
- 2003 - Society for Neuroscience

Funding Support:

Extramural Awards

- 2014-2019 Unlearning neural systems dysfunction in neuropsychiatric disorders. DARPA
Co-Principal Investigator
- 2013-2016 Scalable statistics and machine learning for data-centric science. Department of Energy
Co-Principal Investigator
- 2011-2015 Making sense of incomplete sensor data. National Science Foundation, Award number
IIS-1219212
Principal investigator
- 2012 CRCNS.ORG – Online repository for high-quality neuroscience data and resources for
computational neuroscience. Supplement. National Science Foundation, Award number
IIS-1205243
Principal Investigator
- 2009-2013 CRCNS.ORG – Online repository for high-quality neuroscience data and resources for
computational neuroscience. National Science Foundation, Award number CNS-
0855272
Principal Investigator
- 2007-2010 Exploring neurobiological strategies of visual scene analysis using oscillations in recur-
rent neural circuitry. National Science Foundation, Award number IIS-0713657

Principal Investigator

- 2007-2009 CRCNS data sharing: Central facility and services. National Science Foundation, Award number IIS-0749049
Principal Investigator (CoPI: Bruno A.Olshausen)
- 2007-2008 Google research award
- 2005-2008 Research Award, Strauss Hawkins Trust
- 1999-2002 German governmental research award (funds 1 PI and 1 Postdoc position)
Principal Investigator
- 1999-2000 Ph.D. student salary, German Society of Endomitriosis
- 1996-1999 Habilitation-Fellowship of the German Research Foundation (DFG)

Intramural Awards

- 1999-2001 Funding for Ph.D. project, University of Ulm
- 1997-1998 Funding for Ph.D. project, University of Tübingen

Sponsorship for postdoc fellowships

- 2007-2009 National Swiss Science Foundation: Postdoctoral fellowship for Gianluca Monaci
- 2009-2011 National Science Foundation: NSA Postdoctoral fellowship for Chris Hillar
- 2010-2013 National Institute of Health: NSRA Postdoctoral fellowship for Gautam Agarwal

Teaching Experience:

Lecture Courses

- 2010 *Neural Computation (VS265)*, University of California Berkeley, One of 4 lecturers
- 2009 *Computational Neuroscience (MCB262)*, University of California Berkeley, One of 5 lecturers
- 2008 *Neural Computation (VS298)*, University of California Berkeley, One of 3 lecturers
- 2007 *Computational Neuroscience (MCB262)*, University of California Berkeley, One of 6 lecturers
- 2006 *Neural Computation (VS298)*, University of California Berkeley, One of 3 lecturers

- 2005 *Computational Neuroscience (MCB262/PSYCH290P)*, University of California Berkeley, One of 6 lecturers
- 2005 *Statistics of natural stimuli, a potential key to brain function*, University of Ulm, Lecturer
- 2003 *Computational Neuroscience (MCB262/PSYCH290P)*, University of California Berkeley, One of 4 Lecturers
- 2002 *Information Retrieval and Associative Memories*, University of Ulm, Lecturer
- 2001 *Computational Neuroscience*, University of Ulm, Lecturer
- 2000 *Theoretical Methods for the Interpretation of Medical Functional Imaging Data* University of Ulm, Lecturer
- 1998 & 2000 *Information Retrieval*, University of Ulm, Lecturer
- 1997 & 1998 *Associative Memories: Conventional and Neural*, University of Ulm, Lecturer
- 1997 *Neural Cell Assemblies*, University of Ulm, One of 2 Lecturers

Summer courses

- 2013 *Berkeley summer course in mining and modeling of neuroscience data*, UC Berkeley, Organizer and one of 6 international lecturers, see <http://crons.org/course>
- 2012 *Berkeley summer course in mining and modeling of neuroscience data*, UC Berkeley, Organizer and one of 5 international lecturers, see <http://crons.org/course>
- 2011 *Berkeley summer course in mining and modeling of neuroscience data*, UC Berkeley, Organizer and one of 6 international lecturers, see <http://crons.org/course>

Invited lectures

- 2012 Theory of associative memories and their application to the hippocampus, University of Bochum
- 2010 Lecture at CSHL Banbury seminar on Computational Neuroscience – Vision, Banbury Center, Long Island
- 2010 Lecture at the Symposium “Beyond Neural Cartography”, University of Southern California, Los Angeles
- 2009 Lecture at the Graduiertenkolleg, University of Ulm, Ulm 2/2009
- 2006 Graduate lecture on V1 and sparse coding, University of Southern California, Los Angeles

- 2001 Exploratory data analysis in functional neuroimaging. Lecture at the 3rd Tutorial on Neuro-fMRI, Tuebingen, Germany 3/2001
- 2000 Multivariate methods of data analysis in functional neuroimaging. Lecture at the 2nd Tutorial on Neuro-fMRI, Tuebingen, Germany 3/2000

Teaching Assistance

- 1988 – 1993 Annual graduate courses “*Theory of Neural Networks*”, University of Düsseldorf
- 1986 Undergraduate course “*Theoretical Thermodynamics*”, University of Tübingen
- 1985 Undergraduate course “*Theoretical Electrodynamics*”, University of Tübingen

Students and Fellows:

Undergraduates

- 2012-present Aditya Joshi, UC Berkeley
- 2009-2010 Evan Ehrenberg, UC Berkeley – **Honors thesis won Glushko Price 2010**

Master Students

- 2007-2009 Will Coulter, Masters in Neuroscience, UC Berkeley
- 2000-2002 Volker Schmitt, Diploma Thesis 2002, University of Ulm
- 1997-1999 Urs Vollmer, Diploma Thesis 1999, University of Ulm
- 1997-1999 Thomas Gunsch, Diploma Thesis 1999, University of Ulm

Ph.D. Students

- 2012-present Chris Warner, doctoral candidate, UC Berkeley
- 2011-present Guy Isely, doctoral candidate, UC Berkeley
- 2008-2013 Daniel Little, UC Berkeley - Ph.D. 2013, now at U. Chicago
- 2004-2011 Vishal Vaingankar, University of Southern California - Ph.D. 2013 (co-advisor)
- 2003-2010 Xin Wang, University of Southern California - Ph.D. 2010 (co-advisor), now at Salk Institute
- 2003-2005 Martin Rehn, Royal Institute of Technology (KTH), Stockholm - Ph.D. 2005 (co-advisor)
- 1999-2004 Andreas Knoblauch, University of Ulm - Ph.D. 2004 (co-advisor), now at Honda Research Europe

- 1997-2002 Axel Baune, University of Ulm - Ph. D. 2002
1994-1997 Wolfgang Kopold, University of Ulm - Ph. D. 1997 (co-advisor)

Post Graduate Fellows

- 2011-present Gautam Agarwal, Ph.D. UC Berkeley
2010 Reza Moazzezi, Ph.D. UC Berkeley
2009-present Chris Hillar, Ph.D., UC Berkeley
2007-2009 Gianluca Monaci, Ph.D., UC Berkeley
2007-2008 Martin Rehn, Ph.D., Google and UC Berkeley
2006-2010 Kilian Koepsell, Ph.D., UC Berkeley
1999-2003 Andrzej Wichert, Ph.D., University of Ulm

University Service:

Administrative Committees/Advising/Interviews

- 2014 Interviewer for candidates in Helen Wills Institute for Neuroscience Ph.D. Program
2013-2014 Neuroscience Graduate Advisor for the
Helen Wills Institute for Neuroscience Ph.D. Program
2013 Interviewer for candidates in Helen Wills Institute for Neuroscience Ph.D. Program
2012 Interviewer for candidates in Helen Wills Institute for Neuroscience Ph.D. Program
2011 Interviewer for candidates in Helen Wills Institute for Neuroscience Ph.D. Program
2010 Member of Admissions Committee Helen Wills Institute for Neuroscience Ph.D. Program
2010 Interviewer for candidates in Helen Wills Institute for Neuroscience Ph.D. Program
2009 Interviewer for candidates in Helen Wills Institute for Neuroscience Ph.D. Program
2008 Interviewer for candidates in Helen Wills Institute for Neuroscience Ph.D. Program
2007 Interviewer for candidates in Helen Wills Institute for Neuroscience Ph.D. Program
2006 Interviewer for candidates in Helen Wills Institute for Neuroscience Ph.D. Program

Doctoral Committees

- 2012 Tyler Lee, HWNI, UC Berkeley
- 2011 Daniel Little, UC Berkeley
- 2010 Xundong Wu, University of Southern California
- 2010 Channing Moore, UC Berkeley
- 2005 Dr. Christopher Tengrove, University of Technology, Sydney, Australia
- 2004 Dr. Andreas Knoblauch, University of Ulm, Germany
- 2004 Dr. Anders Sandberg, Royal Institute of Technology, Stockholm, Sweden
- 2000 Dr. Gracia Del Rosario, Saybrook Research Center, San Francisco, USA

Committees for Qualifying Exams

- 2014 Eric Weiss, HWNI, UC Berkeley
- 2013 Mike Schachter, Biophysics, UC Berkeley
- 2012 Guy Isely, HWNI, UC Berkeley
- 2008 Channing Moore, Department of Psychology, UC Berkeley
- 2007 Jimmy Wang, School of Optometry, UC Berkeley
- 2007 Amir Khosrowshahi, School of Optometry, UC Berkeley
- 2006 Sangita Dandekar, School of Optometry, UC Berkeley

Miscellaneous

- 2008-present UC Berkeley Amateur Radio Club, Trustee and coordinator for the involvement of this group in campus emergency preparedness
- 2000 Imaging Center Development, University of Ulm, Planning Committee
- 1996-1999 Interdisciplinary seminar series on Theoretical Neuroscience at the Universities of Tübingen and Ulm, Organizer
- 1994 Exhibit of neural hardware for information retrieval, representing University of Ulm at CeBit, Hannover, Germany, Presenter
- 1989-1991 Interdisciplinary seminar series on “Brain and Mind”, University of Düsseldorf, Organizer

Public service: scientific journals, conferences, educational and governmental agencies:

Journal Reviews

Biological Cybernetics
Cerebral Cortex
Frontiers in Neuroscience
Human Brain Mapping
International Journal of Neural Systems
Journal of Theoretical Medicine
Journal of Computational Neuroscience
Journal of Machine Learning Research
Journal of Neural Engineering
Journal of Neurophysiology
Journal of Neuroscience
Journal of Vision
Network: Computation in Neural Systems
Neural Networks
Neural Computation
Neurocomputing
NeuroImage
NMR in Biomedicine
Physics Letters A
Physiological Measurement (IOP)
Public Library of Science – Biology
Public Library of Science – Computational Biology
Proceedings of the National Academy of Sciences, USA
IEEE Signal Processing Letters
IEEE Transactions on Information Theory
IEEE Transactions on Neural Networks
IT-Information Technology
Science
SIAM Journal on Applied Mathematics
Theory in Biosciences

Editorial Boards

Frontiers in Neuroinformatics (Associate editor)
Gigascience (Editorial board)

Review committees and panels

Expert Reviewer for the Competitive Call of the Human Brain Project 2013

Member of review committee for Bernstein Network for Computational Neuroscience (Deutsches Zentrum für Luft und Raumfahrt e.V. Gesundheitsforschung, Bonn, Germany) 2011

Member of review committee for Bernstein Network for Computational Neuroscience (Deutsches Zentrum für Luft und Raumfahrt e.V. Gesundheitsforschung, Bonn, Germany) 2010

Review Panelist, National Science Foundation 2007

Conference organization

2013 International conference *Neural Information Processing (NIPS)*, Reviewer

2012 International conference *Neural Information Processing (NIPS)*, Reviewer

2011 International conference *Neuroinformatics*, Boston, MA, member of program committee

2010 International conference *Computational and Systems Neuroscience (CoSyNe)*, Reviewer

2010 International conference *Neural Information Processing (NIPS)*, Reviewer

2009 International conference *Computational and Systems Neuroscience (CoSyNe)*, Reviewer

2009 International conference *Neural Information Processing (NIPS)*, Reviewer

2008 International conference *Computational and Systems Neuroscience (CoSyNe)*, Workshop Chair

2007 International conference *Computational and Systems Neuroscience (CoSyNe)*, Workshop Chair

2005 International conference *Neural Information Processing (NIPS)*, Program Chair

2003 Workshop *Inference and Prediction in Neocortical Circuits*, Palo Alto, CA, sponsored by AIM, NSF and RNI, Planning Committee

2002 European Conference on Artificial Intelligence (ECAI), Lyon, France, Reviewer

2001 Annual Conference of the Cognitive Science Society, Edinburgh, UK, Reviewer

2000 International Joint Conference on Neural Networks (IJCNN), Como, Italy, Reviewer

1999 Fest-Symposium for Guenther Palm, University of Ulm, Germany, Organizer

1998 “Local and global information processing in the cortex” Schloss Reisenburg, Günzburg, Germany, Planning Committee

Workshop organization

2013 High-dimensional statistical inference in the brain. NIPS conference, Tahoe, CA, Workshop Organizer

2010 Perception & Action – An interdisciplinary approach to cognitive systems theory. Santa Fe Institute, Santa Fe, NM, Co-organizer

2008 Data sharing and modeling challenges in Neuroscience – a first step towards predictive neuron models, CoSyNe conference, Workshop Organizer

- 2005 Redwood Center Inaugural Symposium, University of California, Berkeley, Chair and Planning Committee
- 2003 Inference and prediction in neocortical circuits, American Institute of Mathematics, Palo Alto, Planning Committee
- 2002 Neural assemblies: development in theory and experiment, Computational Neuroscience Conference (CNS), Chicago, IL, (Proceedings published in Theory in Biosciences), Workshop Organizer
- 2000 Explorative analysis and data modeling in functional neuroimaging. Neural Information Processing Conference (NIPS), (Proceedings published by the MIT Press), Workshop Organizer

National and International Lectures

- Talk at the annual retreat of the Center for Neural Engineering and Prosthesis UC Berkeley 12/2013
- Talk at the Kavli Futures Symposium Nanoscience and Neuroscience, Berkeley, 1/2013
- Talk at the Conference of Music and Neuroscience, Ascona 3/2012
- Talk at LMU Munich, Munich 3/2013
- Talk at University of Bochum, Bochum, Germany 2/2012
- Talk at the CRCNS-PI meeting, Princeton, NJ 10/2011
- Talk at the Neuroinformatics 2011 Conference, Boston, MA 9/2011
- Talk at the Osnabrück Computational Cognition Alliance Meeting (OCCAM) on "Natural computation in hierarchies". 6/2011
- Talk at the Janelia Conference: Computations in Neocortical Circuits: What Does the Cortex Do? DC 5/2011
- Talk in the Math-Biology seminar series at UC Davis, Davis, CA, 4/2011
- Talk in the CNS seminar at the California Institute of Technology, Pasadena, CA 4/2011
- Talk in the BioX seminar series at University of Stanford, Palo Alto, CA, 3/2011
- Talk at the workshop "Compressed sensing in Neuroscience", CoSyNe, Snowbird, UT, 2/2011

Invited Talk at the symposium "Challenges in Computational Neuroscience II", Santa Fe, NM, 2/2011

Invited Talk at EPFL, Lausanne, Switzerland, 10/2010

Talk at Los Alamos Research Laboratories, Los Alamos, NM 8/2010

Talk at the Perception and Action workshop, Santa Fe Institute, NM 8/2010

Invited Talk at the symposium "Beyond Neural Cartography", University of Southern California, Los Angeles, CA 3/2010

Talk at the workshop "Determinants of functional biases in sensory tuning across cortical laminae and regions", CoSyNe, Snowbird, UT, USA 2/2010

Invited Talk at the workshop "Synchronization and Multiscale Complex Dynamics in the Brain", Dresden, Germany 11/2009

Invited Talk at Johns Hopkins University, Baltimore, USA 9/2009

Talk at CNS conference, Berlin, Germany 7/2009

Invited Talk at workshop "Structure and Dynamics of Networks", Blaubeuren, Germany 7/2009

Invited Talk at CRCNS-PI meeting, CMU/U. Pittsburgh, Pittsburgh, USA 6/2009

Invited Talk at Joint Symposium on Neural Computation, Los Angeles, USA 5/2009

Invited Talk at Computational Neuroscience Group at Universitat Pompeu Fabra, Barcelona, Spain 3/2009

Invited Talk at Bernstein Center for Theoretical Neuroscience, Ludwig-Maximilians Universität München, Germany 2/2009

Invited Talk at Center for Neurobiology and Behavior, Columbia University, New York, USA 1/2009

Invited talk at the 1st INCF Workshop on Time Series Data: Analysis and Management, Stockholm, Sweden 12/2008

How network dynamics in early visual stages can form sensory representations. Invited talk at University of Nijmegen, The Netherlands 7/2008

Roles of dynamical processes in early visual stages for forming sensory representations. Invited talk at the Ladislav Tauc conference “Complexity in Neural Network Dynamics”, Gif sur Yvette, France 12/2007

Can high-level perception use dynamical processes in early visual stages? Invited talk at the workshop on High-level perception and low-level vision: Bridging the semantic gap. Santa Fe Institute, Santa Fe, NM, USA 10/2007

Retinal oscillations carry visual information to cortex. Conference of the Biomedical Engineering Society, Los Angeles, CA, 9/2007

Modeling spike trains and the transmission of information in LGN. Invited talk at the workshop Quantitative Neuron Modeling, EPFL, Lausanne, Switzerland, 6/2007

Spike timings relative to retinal oscillations carry visual information to cortex. Invited talk at the Brain Network Dynamics Conference, Berkeley, CA, USA 3/2007

In what sense should visual representations be sparse? Honda Research & Development Europe, GmbH, Frankfurt, Germany 2/2006

Theoretical approaches for understanding neural representation and memory in the brain. CBB Seminar, University of California, Berkeley, CA, USA 9/2005

A Model for binary sparse coding of visual input can explain the shape diversity of simple cell receptive fields. Empirical Inference Symposium. Max Planck Institute for Biological Cybernetics, Tübingen, Germany, 8/2005

Testing cell assemblies with fMRI. Computational Neuroimaging Workshop, Organizers: B. Wandell and K. Grill-Spector, Stanford University, Palo Alto, CA, USA, 7/2004

Cortical inference with sparse associative memories. Workshop of the Canadian Institute of Advanced Research, Organizer: Geoffrey Hinton, Vancouver, Canada, 12/2003

Associative memory with spiking neurons. Workshop “Inference and prediction in the cortex” American Institute of Mathematics, Palo Alto, CA, USA, 9/2003

Cell assemblies and associative memories. Department of Biomedical Engineering, University of Southern California, Los Angeles, CA, USA, 11/2002

Associative memory in neuronal networks: spatial and temporal coding. Workshop at the Computational Neuroscience Conference. Chicago, IL, USA, 7/2002

Exploratory data analysis in event-related fMRI: Application on working memory. Department of Diagnostic Radiology and Applied Physics, Yale University, New Haven, CT, USA 7/2001

Dynamical cluster analysis for fMRI. Workshop at the Neural Information Processing Systems (NIPS) Conference, Denver, CO, USA 12/2000

Analysis and Bayesian foundation of associative memory models. Max Planck Institute of Mathematics in the Sciences, Leipzig, Germany 7/2000

Activation processes and information processing in the brain. University of Aachen, Germany, 5/1999

Adaptive cluster analysis of functional magnetic resonance data. University of Düsseldorf, Germany 3/1999

Improved retrieval in associative memories. Division of System & Circuit Technology, Heinz Nixdorf Institute, University of Paderborn, Germany 11/1998

Cell assemblies and associative memory. Department of Brain and Cognitive Science, MIT, Boston, MA, USA 5/1998

Mechanisms of memory in the brain. Division of Applied Mathematics/Neuroscience Department, Brown University, Providence, RI, USA 4/1998

Neural associative memories: Models derived from probabilistic reasoning. Center for Biological and Computational Learning, MIT, Boston, MA, USA 3/1998

Simulation of a cortical network using anatomical data. (Invited Talk) Workshop on Information Processing in Cells and Tissues, IPCAT96, Düsseldorf, Germany 10/1996

Cell assemblies, associative memory and back. Max Planck Institute of Psychological Research, Munich, Germany, 3/1996

Neural information processing with local synaptic learning rules. Department of Psychology, University of Tübingen, Germany 11/1995

Iterative retrieval in associative memory. Computer Science Faculty, Technical University Munich, Germany, 11/1994

Neural associative memories as modules for information processing systems. Workshop "Neuronales Lernen", CoWAN '94, Technical University Cottbus, Germany, 10/1994

Iterative Retrieval of Sparsely Coded Associative Memory Patterns. NeuroNet '93 Conference, Prague, Czech Republic, 9/1993

Definitions and results of information capacity for associative memories. Symposium on Physics of Neural Networks, Bad Honnef, Germany, 2/1992

Publications:

Books

1. Sommer F. T., Wichert A., Editors (2003) Exploratory analysis and data modeling in functional neuroimaging. MIT Press, Cambridge, MA, ISBN 0-262-19481-3
2. Sommer F. T. (1994) Theorie neuronaler Assoziativspeicher – Lokales Lernen und iteratives Retrieval von Information. Hänsel-Hohenhausen, Egelsbach, ISBN 3-89349-901-6

Popular Science Writings

1. Sommer F. T. (2010) Associative memory and learning. *Encyclopedia of the Sciences of Learning*, Springer Verlag
2. Sommer F. T. (2007) Bunte Theorien für graue Zellen. *Gehirn und Geist* 6/2007: 70-76. Spektrum der Wissenschaften Verlag

Journal Articles

1. Agarwal, G., Stevenson, I. H., Berényi, A., Mizuseki, K., Buzsáki, G., Sommer F. T. (2014) Spatially distributed local fields in the hippocampus encode rat position. *Science*, in the press
2. Martinez, L. M., Molano-Mazon, M., Wang, X., Sommer, F. T., Hirsch J. A. (2014) Statistical wiring of thalamic receptive fields optimizes spatial sampling of the retinal image. *Neuron* 81: 943-956
3. Little, D. Y., Sommer, F. T.: (2013) Learning and exploration in action-perception loops. *Frontiers. Frontiers in Neural Circuits*. DOI: 10.3389/fncir.2013.00037.
4. Little, D. Y., Sommer, F. T.: (2013) Maximal mutual information, not minimal entropy, for escaping the dark room. Comment in *Behavioral Brain Sciences* 36 (2)
5. Wang, X., Sommer, F. T., Hirsch, J. A. (2011) Inhibitory circuits for visual processing in thalamus. *Current Opinion in Neurobiology* 21: 726-733
6. Wang X., Vaingankar, V., Soto Sanchez, C., Sommer, F. T., Hirsch, J. A. (2011) Thalamic interneurons and relay cells use complementary synaptic mechanisms for visual processing. *Nature Neuroscience* 14: 224-231
7. Wang X., Hirsch, J. A., Sommer, F. T. (2010) Recoding of sensory information across the retinothalamic synapse. *Journal of Neuroscience* 30: 13567-13577
8. Koepsell K., Wang X., Hirsch, J. A., Sommer, F. T. (2010) Exploring the function of neural oscillations in early sensory systems. Focused review in *Frontiers in Neuroscience* 4: 53-61

9. Knoblauch A., Palm, G., Sommer, F. T. (2010) Memory capacities for synaptic and structural plasticity. *Neural Computation* 22: 289-341
10. G. Monaci P. Vandergheynst, Sommer F. T. (2009) Learning bimodal structure in audio-visual data. *IEEE Transactions on Neural Networks* 20: 1898-1910
11. Koepsell K., Wang, X., Vaingankar, V., Wei, Y., Wang, Q., Rathbun, D. L., Usrey, Hirsch, J. A., Sommer F. T. (2009) Retinal oscillations carry visual information to cortex. *Frontiers in Systems Neuroscience* 3:4
12. Koepsell K., Sommer, F.T. (2008) Information transmission in oscillatory neural activity. *Biological Cybernetics* 99: 403-416
13. Teeters J. L., Harris, K.D., Millman, K.J., Olshausen, B.A., Sommer, F.T. (2008) Data sharing for computational neuroscience. *Neuroinformatics* DOI 10.1007/s12021-008-9009-y
14. Wang X., Wie, Y., Vaingankar, V., Wang, Q., Koepsell, K., Sommer, F. T., Hirsch, J. A. (2007) Feedforward excitation and inhibition evoke dual modes of firing in the cat's visual thalamus using naturalistic viewing. *Neuron* 55(3): 465-478
15. Rehn M., Sommer, F. T. (2007) A network that uses few active neurones to code visual input predicts the diverse shapes of cortical receptive fields. *J. Comp. Neurosci.* 22(2):135-146
16. Rehn M., Sommer, F. T. (2006) Storing and restoring visual input with collaborative rank coding and associative memory *Neurocomputing* 69:1219-1223
17. Sommer F. T., Kanerva, P. (2006) Can neural models of cognition benefit from the advantages of connectionism? *Behavioral and Brain Sciences* 29 (1):86-87
18. Sommer F. T., Wennekers T. (2005) Synfire chains with conductance-based neurons: internal timing and coordination with timed input. *Neurocomputing* 65-66:449-454
19. George D., Sommer, F. T. (2005) Computing with inter-spike interval codes in networks of integrate and fire neurons. *Neurocomputing* 65-66:414-420
20. Martinez J. M., Wang, Q., Reid, R. C., Pillai, C., Alonso, J.-M., Sommer F. T., Hirsch, J.A. (2005) Receptive field structure varies with layer in the primary visual cortex. *Nature Neuroscience* 8: 372 - 379
21. Knoblauch A., Sommer F. T. (2004) Spike-timing dependent plasticity can form "zero-lag" links for cortical oscillations. *Neurocomputing* 58-60:185-190

22. Glatting G., Mottaghy, F. M., Karitzky, J., Baune, A., Sommer, F. T., Landwehrmeyer, G. B., Reske, S. N. (2004) Improving binding potential analysis in [¹¹C]raclopride PET studies using cluster analysis. *Medical Physics* 31: 902-906
23. Hirsch J.A., Martinez, J.M., Pillai, C., Alonso, J.-M., Wang, Q., Sommer F. T. (2003) Functionally distinct inhibitory neurons at the first stage of visual cortical processing. *Nature Neuroscience* 6 : 1300-1308
24. Knoblauch A., Sommer F. T. (2003) Synaptic plasticity, conduction delays and inter-areal phase relations of spike activity in a model of reciprocally connected areas. *Neurocomputing* 52-54:301-306
25. Sommer F. T., Wennekers T. (2003) Models of distributed associative memory networks in the brain *Theory in Biosciences* 122: 70-86
26. Knoblauch A., Wennekers T., Sommer F. T. (2002) Is voltage dependent synaptic transmission in NMDA receptors a robust mechanism for working memory? *Neurocomputing* 44-46:19-24
27. Sommer F. T., Wennekers T. (2001) Associative memory in networks of spiking neurons. *Neural Networks* 14: 825-834
28. Vollmer U., Sommer F. T. (2000) Coexistence of short and long term memory in a network of realistic neurons. *Neurocomputing* 38-40: 1031-1036
29. Sommer F. T., Wennekers T. (2000) Modeling studies on the computational function of fast temporal structure in cortical circuit activity. *Journal of Physiology, Paris* 94: 473-488
30. Sommer F. T., Wennekers T. (2000) Associative memory in a pair of cortical groups with reciprocal connections. *Neurocomputing* 38-40: 1575-1580
31. Sommer F. T. (2000) On cell assemblies in a cortical column. *Neurocomputing* 32-33: 517-522
32. Kötter R., Sommer F. T. (2000) Global relationship between anatomical connectivity and activity propagation in the cerebral cortex. *Philosophical Transactions of the Royal Society: Biological Sciences* 355: 127-134
33. Wennekers T., Sommer F. T. (1999) Gamma-oscillations support optimal retrieval in associative memories of Pinsky-Rinzel neurons. *Neurocomputing* 26-27: 573-578
34. Baune A., Sommer F. T., Erb M., Wildgruber D., Kardatzki B., Palm G., Grodd W. (1999) Dynamical cluster analysis of cortical fMRI activation. *NeuroImage* 6: 477-489

35. Sommer F. T., Palm G. (1999) Improved bidirectional retrieval of sparse patterns stored by Hebbian learning. *Neural Networks* 12: 281-297
36. Sommer F. T., Dayan P. (1998) Bayesian retrieval in associative memories with storage errors. *IEEE Trans. Neural Networks* 9: 705-713
37. Schwenker F., Sommer F. T., Palm G. (1996) Iterative retrieval of sparsely coded associative memory patterns. *Neural Networks* 9: 445-455
38. Palm G., Sommer F. T. (1992) Information capacity in recurrent McCulloch-Pitts networks with sparsely coded memory states. *Network* 3: 177-186
39. Frodl P., Sommer F. T., Hau K., Wahl F. (1990) On the effective interaction of two hydrogen centres in niobium. *Z. f. Naturforsch.* 43a: 857-866
40. Hau K., Frodl P., Gnirß M., Sommer F. T., Wahl F. (1989) A microscopic theory of a α -phase hydrogen in niobium. *Z. f. physikalische Chemie* 163: 549-554
41. Hau K., Frodl P., Sommer F. T., Wahl F. (1988) A microscopic theory of a single hydrogen centre in niobium. *Z. f. Naturforsch.* 43a: 914-922
42. Sommer, F. T., Hau, K., Wahl F. (1988) Calculation of the excitation energies of a hydrogen impurity in niobium. *Z. f. Naturforsch.* 43a: 923-929

Refereed Book Chapters and Conference papers

1. Sommer, F. T. (2014) Neural oscillations and synchrony as mechanisms for coding, communication and computation in the visual system. In *The Visual Neurosciences*. Eds. L. M. Chaluppa, J. S. Werner, MIT Press 2014
2. Hirsch, J. A., Wang, X., Vaingankar, V. V., Sommer, F. T. (2014) Inhibitory circuits in the visual thalamus. In *The Visual Neurosciences*. Eds. L. M. Chaluppa, J. S. Werner, MIT Press 2014
3. Agarwal G., Sommer, F. T. (2013) Measuring information in spike trains about intrinsic brain signals. In *Spike timing: Mechanisms and functions*. Eds. P. M. DiLorenzo, J. D. Victor, CRC 2013
4. Isely G., Hillar, C., Sommer F. T. (2011) Deciphering subsampled data: adaptive compressed sensing as a principle of brain communication. *Advances in Neural Information Processing Systems* 23, MIT Press, Cambridge, MA, USA.

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