

Jörn Simon Wiegert, Ph. D.

Curriculum Vitae

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ACADEMIC POSITIONS

- since 09/2018** **Professor for Neurophysiology and Optogenetics** at the University Medical Center Hamburg Eppendorf, ZMNH Hamburg, Germany
RG Synaptic Wiring and Information Processing
- 04/2017-08/2018** **Independent group leader** at the ZMNH Hamburg, Germany
RG Synaptic Wiring and Information Processing
- 02/2012-12/2016** **Senior postdoctoral fellow** at the ZMNH Hamburg, Germany
Institute for Synaptic Physiology, laboratory of Prof. Thomas Oertner
- 09/2009-02/2012** **Postdoctoral fellow** at the Friedrich-Miescher Institute Basel, Switzerland
Department of Neurobiology, laboratory of Dr. Thomas Oertner
- 04/2009-08/2009** **Postdoctoral fellow** at the University of Heidelberg, Germany
Interdisciplinary Center for Neurosciences, laboratory of Prof. Hilmar Bading

EDUCATION

- 11/2005-03/2009** **PhD thesis** at the University of Heidelberg, Germany
Interdisciplinary Center for Neurosciences, laboratory of Prof. Hilmar Bading
- 08/2003-02/2004** **Internship** at the Monash University, Melbourne, Australia
Monash Institute for Medical Research, laboratory of Prof. Ban-Hock Toh
- 2001-2005** **Research assistant** at MPI for Medical Research, Heidelberg, Germany,
laboratory of Prof. Bert Sakmann
- 10/2000-11/2005** **Diploma in Biology** at the University of Heidelberg, Germany

GRANTS / FELLOWSHIPS / AWARDS

- 2016** ERC Starting Grant
- 2016** own project within DFG-funded priority program SPP 1926
- 2015** own project within DFG-funded research unit FOR2419
- 2015** Abstract selected for Hot Topic book by Society for Neuroscience
- 2013, 2014** 2x 'Paper of the month' selected by the University Medical Center Hamburg-Eppendorf
- 2010 - 2012** Marie-Curie Postdoctoral Fellowship from EU/FP7
- 2008 - 2014** Travel grants awarded by the German Academic Exchange Service (DAAD), German Neuroscience Society (NWG) & "Deutsche Forschungsgemeinschaft" (DFG)

PUBLICATIONS

Peer reviewed research articles:

- 1) **Wiegert, J.S.**, Pulin, M., Gee, C.E., Oertner, T. G. (2018). The fate of hippocampal synapses depends on the sequence of plasticity-inducing events. **eLife** e39151
- 2) Oda, K., Vierock, J., Oishi, S., Rodriguez-Rozada, S., Taniguchi, R., Yamashita, K., **Wiegert, J.S.**, Nishizawa, T., Hegemann, P., Nureki, O. (2018). Crystal structure of the red light-activated channelrhodopsin Chrimson. **Nat Commun** 9(1):3949
- 3) Helassa, N., Dürst, C.D., Coates, C., Arif, U., Schulze, C., **Wiegert, J.S.**, Geeves, M., Oertner, T.G., Török, K. (2018). Fast glutamate sensors resolve short-term synaptic plasticity, **Proc Natl Acad Sci USA** 115(21),5594-5599
- 4) Wietek, J., Rodriguez-Rozada, S., Tutas, J., Tenedini, F., Grimm, C., Oertner, T.G., Soba, P., Hegemann, P., **Wiegert, J.S.** (2017). Anion-conducting channelrhodopsins with tuned spectra and modified kinetics engineered for optogenetic manipulation of behavior. **Sci Rep** 7:14957
- 5) Bitzenhofer, S.H., Ahlbeck, J., Wolff, A. **Wiegert, J.S.**, Gee, C.E., Oertner, T.G., Hanganu-Opatz, I.L. (2017). Layer-specific optogenetic activation of pyramidal neurons causes beta-gamma entrainment of neonatal networks. **Nat Commun** 8:14563
- 6) Wietek, J., Beltramo, R., Scanziani, M., Hegemann, P., Oertner, T.G., **Wiegert, J.S.** (2015). An improved chloride-conducting channelrhodopsin for light-induced inhibition of neuronal activity in vivo. **Sci Rep** 5:14807
- 7) Blumer, C., Vivien, C., Genoud, C., Perez-Alvarez, A., **Wiegert, J.S.**, Vetter, T., Oertner, T.G. (2015). Automated analysis of spine dynamics on live CA1 pyramidal cells. **Med Image Anal** 19(1), 87-97
- 8) Wietek, J.*, **Wiegert, J.S.***, Adeishvili, N., Schneider, F., Watanabe, H., Tsunoda, S., Vogt, A., Elstner, M., Oertner, T.G., Hegemann, P. (2014). Conversion of Channelrhodopsin into a light-gated chloride channel. **Science** 344 (6182): 409-412, ***first 2 authors equally contributing**
Highlighted in Science, Science Signaling & Nature Methods
- 9) Biermann, B., Sokoll, S., Klyueva, J., Missler, M., **Wiegert, J.S.**, Sibarita, J.-B., Heine, M. (2014). Imaging of molecular surface dynamic in brain slices using single particle tracking. **Nat Commun** 5:3024
- 10) **Wiegert, J.S.** and Oertner, T. G. (2013). Long-term depression selectively eliminates weakly integrated synapses. **Proc Natl Acad Sci USA** 110(47), E4510-E4519.
- 11) Huber, D., Gutnisky, D.A., Peron, S., O'Connor, D.H., **Wiegert, J.S.**, Tian, L., Oertner, T.G., Looger, L.L., and Svoboda, K. (2012). Multiple dynamic representations in the motor cortex during sensorimotor learning. **Nature** 484, 473-478.
- 12) Holbro, N., Grunditz, A., **Wiegert, J.S.**, and Oertner, T.G. (2010). AMPA receptors gate spine Ca²⁺ transients and spike-timing-dependent potentiation. **Proc Natl Acad Sci USA** 107(36), 15975-15980.

- 13) Wittmann, M. *, Queisser, G. *, Eder, A. *, **Wiegert, J.S.** *, Bengtson, C.P. *, Hellwig, A. *, Wittum, G., and Bading, H. (2009). Synaptic activity induces dramatic changes in the geometry of the cell nucleus: interplay between nuclear structure, histone H3 phosphorylation, and nuclear calcium signaling. **J Neurosci** 29, 14687-14700. ***first 6 authors equally contributing**
- 14) **Wiegert, J.S.**, Hofmann, F., Bading, H., and Bengtson, C.P. (2009). A transcription-dependent increase in miniature EPSC frequency accompanies late-phase plasticity in cultured hippocampal neurons. **BMC Neurosci** 10, 124.
- 15) **Wiegert, J.S.**, Bengtson, C.P., and Bading, H. (2007). Diffusion and not active transport underlies and limits ERK1/2 synapse-to-nucleus signaling in hippocampal neurons. **J Biol Chem** 282, 29621-29633.

Peer reviewed review articles:

- 1) **Wiegert, J. S.**, Mahn, M., Prigge, M. Prinz, Y., Yizhar, O. (2017). Silencing Neurons: Tools, Applications, and Experimental Constraints. **Neuron** 95 (3), 504-529
- 2) Queisser, G., **Wiegert, J.S.**, Bading, H. (2011). Structural dynamics of the cell nucleus: basis for morphology modulation of nuclear calcium signaling and gene transcription. **Nucleus** 2(2), 1-7.
- 3) **Wiegert, J.S.** and Bading, H. (2011). Activity-dependent calcium signaling and ERK-MAP kinases in neurons: a link to structural plasticity of the nucleus and gene transcription regulation. **Cell Calcium** 49, 296-305.

Other publications:

- 1) **Wiegert, J. S.**, Gee, C.E., and Oertner, T. G. (2017). Stimulating Neurons with Heterologously Expressed Light-Gated Ion Channels. **Cold Spring Harb Protoc** 2017 (2)
- 2) Gee, C.E., Ohmert, I., **Wiegert, J. S.**, and Oertner, T. G. (2017). Preparation of Slice Cultures from Rodent Hippocampus. **Cold Spring Harb Protoc** 2017 (2)
- 3) **Wiegert, J. S.**, Gee, C.E., and Oertner, T. G. (2017). Single-Cell Electroporation of Neurons. **Cold Spring Harb Protoc** 2017 (2)
- 4) **Wiegert, J. S.**, Gee, C.E., and Oertner, T. G. (2017). Viral Vector-Based Transduction of Slice Cultures. **Cold Spring Harb Protoc** 2017 (2)
- 5) **Wiegert, J.S.**, and Oertner, T.G. (2016). How (not) to silence long-range projections with light. **Nat Neurosci** 19, 527-528.
- 6) **Wiegert, J.S.**, and Oertner, T.G. (2015). Neighborly synapses help each other out. **Nat Neurosci** 18, 326-327.
- 7) **Wiegert, J. S.** and Oertner, T. G. (2011). Shapeshifting for memory. **e-Neuroforum** 2(1), 6-12. [REVIEW ARTICLE]

INVITED ORAL PRESENTATIONS

- 2017** Buchmann Institute for Molecular Life Sciences, Frankfurt, Germany
- 2017** DZNE Bonn, Germany
- 2017** 19th International Neuroscience Winter Conference, Sölden, Austria
- 2016** Leibnitz-Institute for Neurobiology, Magdeburg, Germany
- 2015** 45th Annual meeting of the Society for Neuroscience, Chicago, USA
- 2015** Annual meeting of the Anatomical Society Würzburg, Germany
- 2015** DZNE Berlin, Germany (Group leader selection symposium)

- 2014** Max-Planck Institute of Neurobiology, Munich, Germany
- 2014** University Muenster, Germany
- 2014** NeuroCure, Berlin, Germany
- 2014** European Neuroscience Institute, Göttingen, Germany (Group leader selection symposium)
- 2013** University Hospital Bonn, Germany
- 2013** 'Imaging the Cell' meeting, Strasbourg, France
- 2011** Giessbach Meeting, Brienz, Switzerland

SELECTED CONFERENCE ABSTRACTS

- 2016** 10th Forum of the European Neuroscience Society, Copenhagen, Denmark
J.S. Wiegert, T.G. Oertner. Synaptic plasticity sets synaptic lifetime
- 2015** Annual Meeting of the Society for Neuroscience, Chicago, USA
J.S. Wiegert, T.G. Oertner. Synaptic plasticity sets synaptic lifetime
Invited speaker
- 2015** Annual meeting of the Anatomical Society Würzburg, Germany
J.S. Wiegert, T.G. Oertner. Optophysiology of the synapse
Invited speaker
- 2014** 9th Forum of the European Neuroscience Society, Milano, Italy
J.S. Wiegert, T.G. Oertner. Synaptic plasticity regulates network wiring
- 2014** 34th Blankenese Conference, Hamburg-Blankenese, Germany
J.S. Wiegert, T.G. Oertner. Synaptic plasticity regulates network wiring
- 2013** Annual Meeting of the Society for Neuroscience, San Diego, USA
J.S. Wiegert, T.G. Oertner. Synaptic plasticity regulates network wiring
- 2013** 7th 'Imaging the Cell' meeting, Strasbourg, France
Invited speaker
- 2012** Gordon Research Conference Synaptic Transmission, Waterville Valley, USA.
J.S. Wiegert, T.G. Oertner. State-dependent elimination of synapses suggests input-specific network rewiring during hippocampal LTD
- 2012** 8th Forum of the European Neuroscience Society, Barcelona, Spain
J.S. Wiegert, T.G. Oertner. State-dependent elimination of synapses suggests input-specific network rewiring during hippocampal LTD
- 2011** Annual Meeting of the Society for Neuroscience, Washington D.C., USA
J.S. Wiegert, T.G. Oertner. Optogenetic manipulation and long-term investigation of LTD at identified synapses in hippocampal slice culture
- 2009** 2nd European Synapse Meeting, Göttingen, Germany
J.S. Wiegert, C.P. Bengtson, H. Bading. A transcription-dependent increase in miniature EPSC frequency accompanies late-phase plasticity in cultured hippocampal neurons.
- 2008** 6th Forum of the European Neuroscience Society, Geneva, Switzerland
J.S. Wiegert, C.P. Bengtson, H. Bading. Characterization of synapse-to-nucleus signalling of ERK1/2 in hippocampal neurons: only somatic pools of ERK1/2 may account for rapid nuclear translocation and subsequent transcriptional regulation following synaptic activity.