

Curriculum Vitae

Motoharu Yoshida, Ph.D., Group leader

Cognitive Neurophysiology Group,
Leibniz Institute for Neurobiology
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Born: Feb 2, 1976

EDUCATION

- 2004 **Ph.D., Information Technology, Kyushu Institute of Technology, Fukuoka, Japan**
Dissertation: Research on the memory function based on dynamical neural activity of the hippocampal CA3-CA1 region.
Advisor: Hatsuo Hayashi
- 2001 **M.Sc., Information Technology, Kyushu Institute of Technology, Fukuoka, Japan**
- 1999 **B.Sc., Information Technology, Kyushu Institute of Technology, Fukuoka, Japan**

POSITIONS

- 2016 – present **Leibniz Institute for Neurobiology (LIN) Magdeburg**
Group leader, Cognitive Neurophysiology
- 2016 – present **German Center for Neurodegenerative Diseases (DZNE) Magdeburg**
Group leader, Cognitive Neurophysiology
- 2010 – 2016 **Ruhr-University Bochum, Faculty of Psychology**
W1 Junior-professor
- 2006 - 2009 **Boston University, Center for Memory and Brain**
Post-doctoral research fellow with Michael Hasselmo
- 2004 - 2006 **McGill University, Montreal Neurological Institute**
Post-doctoral research fellow with Angel Alonso

GRANTS

- 2018 DFG Sachbeihilfe (Individual grant), YO 177/7-1
- 2018 CBBS Neuronetworks, 2018-2021
- 2014 DFG Sachbeihilfe (Individual grant), YO 177/4-1
- 2011 Rektoratsprogramm zur "Anschubfinanzierung von Forschungsprojekten des wissenschaftlichen Nachwuchses" at Ruhr University Bochum

TEACHING

- 2014 – 2015 **In vivo electrophysiology practicum**
Ruhr-University Bochum, Faculty of Psychology

2012 – 2016	Discourse in Neural Dynamics Ruhr-University Bochum, Faculty of Psychology
2011 – 2016	Neurophysiology of Memory Ruhr-University Bochum, Faculty of Psychology
2010 – 2016	Basic Neural Simulation Ruhr-University Bochum, Faculty of Psychology
2010 – 2013	Spatial navigation and memory Ruhr-University Bochum, Faculty of Psychology
2010 – 2016	Intracellular electrophysiological recording technique Ruhr-University Bochum, Faculty of Psychology
2011	Learning and Memory Ruhr-University Bochum, Faculty of Psychology
2010	Rhythms and cognitive functions of the brain Ruhr-University Bochum, Faculty of Psychology
2003	Teaching Assistant in Neural information processing lab Kyushu Institute of Technology, Department of Brain Science and Engineering, Fukuoka, Japan
1999 – 2000	Teaching Assistant in Bases for scientific experiments lab - I Kyushu Institute of Technology, Faculty of Information Science and Systems Engineering, Fukuoka, Japan

ACADEMIC AWARDS AND HONORS

2011	Yoshida et al., 2011 paper was selected for press release http://aktuell.ruhr-uni-bochum.de/pm2011/pm00277.html http://www.innovations-report.de/html/berichte/biowissenschaften_chemie/gps_kopf_rub_forscher_entschlueselt_frequenz_182108.html http://press-news.org/46646-gps-in-the-head.html http://www.directionsmag.com/pressreleases/gps-in-the-head/199889
2009	Yoshida and Hasselmo (2009, J Neurosci) paper was selected as Faculty 1000 Recommended by Edvard I Moser and Dori Derdikman. http://f1000.com/1162347
2006 – 2008	Postdoctoral Fellowship for Research Abroad Japan Society for the Promotion of Science Title: Experimental and modeling analysis of network oscillations in entorhinal cortex layer V
2003	Best Paper Award 2002, Japanese Neural Network Society Paper title: Stochastic resonance in the hippocampal CA3-CA1 model: a possible memory recall mechanism, Neural Netw., 15, 1171-1183.
2003	Incentive Award 2002, Japanese Neural Network Society Presentation title: Regulation of spontaneous activity and organization of memory trace through STDP in a hippocampal CA3 neural network

model, Presentation at the 12th Japanese Neural Network Society Meeting. Presentation number: O4-2.

1999 – 2004

Category 1 Scholarship, Japan Student Services Organization

PUBLICATIONS

Journal Articles

Flasbeck V, Atucha E, Nakamura NH, **Yoshida M**, Sauvage MM (2018) Spatial information is preferentially processed by the distal part of CA3: implication for memory retrieval. *Behav Brain Res.* 347:116-123.

Reboreda A, Theissen F, Arboit A, Corbu MA, Valero-Aracama M, **Yoshida M** (2018) Do TRPC channels support working memory?: Comparing modulations of TRPC channels and working memory through G-protein coupled receptors and neuromodulators, *Behav Brain Res., In Press.*

Ku S, Nakamura NH, Maingret N, Mahnke L, **Yoshida M**, Sauvage MM (2017) Regional specific evidence for memory-load dependent activity in the dorsal subiculum and the lateral entorhinal cortex, *Front. Syst. Neurosci.* doi: 10.3389/fnsys.2017.00051

Cutsuridis V and **Yoshida M** (2017) Editorial: Memory Processes in Medial Temporal Lobe: Experimental, Theoretical and Computational Approaches. *Front. Syst. Neurosci.* 11:19.

Giovannini F, Knauer B, **Yoshida M**, Buhry L. (2017) The CAN-In network: A biologically inspired model for self-sustained theta oscillations and memory maintenance in the hippocampus. *Hippocampus.* 27(4):450-463.

Yoshida M (2016) Mechanisms and Roles of Intrinsic Persistent Firing in the Hippocampus, *Seibutsu Butsuri*, 56-5: 262-265.

Valero-Aracama MJ, Sauvage MM, **Yoshida M** (2015) Environmental enrichment modulates intrinsic cellular excitability of hippocampal CA1 pyramidal cells in a housing duration and anatomical location-dependent manner. *Behav Brain Res.*, 292:209-18.

Jochems A and **Yoshida M** (2015) A robust in vivo-like persistent firing supported by the CAN current in a recurrent neural network, *PLoS ONE*, 10(4):e0123799.

Saravanan V, Arabali D, Jochems A, Cui AX, Gootjes-Dreesbach L, Cutsuridis V, **Yoshida M** (2015) Transition between encoding and consolidation/replay dynamics via cholinergic modulation of CAN current: a modelling study. *Hippocampus*, 25(9):1052-70.

Yoshida M, Cutsuridis V (2014) Memory Processes in Medial Temporal Lobe: Experimental, Theoretical and Computational Approaches. *Frontiers in Systems Neuroscience.*

Yoshida M, Jochems A, Hasselmo ME (2013) Comparison of properties of medial entorhinal cortex layer II neurons in two anatomical dimensions with and without cholinergic activation. *PLoS ONE* 8(9): e73904.

Jochems A, Reboreda A, Hasselmo ME, **Yoshida M** (2013) Cholinergic receptor activation supports persistent firing in layer III neurons in the medial entorhinal cortex. *Behav. Brain Res.*, 254:108-15.

- Knauer B, Jochems A, Valero-Aracama MJ, **Yoshida M** (2013) Long-lasting intrinsic persistent firing in rat CA1 pyramidal cells: a possible mechanism for active maintenance of memory. *Hippocampus*, 23(9):820-31.
- Jochems A, **Yoshida M** (2013) Persistent firing supported by an intrinsic cellular mechanism in the hippocampal CA3 pyramidal cells. *Eur J Neurosci*, 38(2):2250-9.
- Engelbrecht JR, Loncich K, Mirollo R, Hasselmo ME, **Yoshida M** (2013) Rhythm-induced spike-timing patterns characterized by 1D firing maps. *J Comput Neurosci*. 34(1):59-71.
- Yoshida M**, Knauer B, Jochems A (2012) Cholinergic modulation of the CAN current may adjust neural dynamics for active memory maintenance, spatial navigation and time-compressed replay. *Front Neural Circuits*. 6:10.
- Yoshida M**, Giocomo LM, Boardman I and Hasselmo ME (2011) Frequency of subthreshold oscillations at different membrane potential voltages in neurons at different anatomical positions on the dorso-ventral axis in the rat medial entorhinal cortex, *J Neurosci*. 31:12683-94.
- Petersson ME, **Yoshida M**, Fransén EA (2011) Low-frequency summation of synaptically activated TRP channel-mediated depolarizations. *Eur J Neurosci.*, 34:578-93
- Hasselmo ME, Giocomo LM, **Yoshida M** (2010) Cellular dynamical mechanisms for encoding the time and place of events along spatiotemporal trajectories in episodic memory. *Behav Brain Res.*, 215:261-274.
- Zilli EA, **Yoshida M**, Tahvildari B, Giocomo LM and Hasselmo ME (2009) Evaluation of the oscillatory interference model of grid cell firing through analysis and measured period variance of some biological oscillators, *PLoS Computational Biology*, e1000573.
- Hasselmo ME, Brandon MP, **Yoshida M**, Giocomo LM, Heys JG, Fransen E, Newman EL, Zilli EA (2009) A phase code for memory could arise from circuit mechanisms in entorhinal cortex, *Neural Netw.*, 22, 1129-1138.
- Yoshida M** and Hasselmo M (2009) Persistent firing in rat postsubiculum supported by intrinsic single cell mechanisms, *J Neurosci.*, 29, 4945-4952.
- Yoshida M**, Fransén E and Hasselmo M (2008) mGluR-dependent persistent firing in entorhinal cortex layer III neurons, *Eur J Neurosci.*, 28, 1116-1126.
- Yoshida M** and Alonso A (2007) Cell-type specific modulation of intrinsic firing properties and subthreshold membrane oscillations by the M(Kv7)-current in neurons of the entorhinal cortex, *J Neurophysiol*, 98:2779-2794.
- Yoshida M** and Hayashi H (2007) Emergence of sequence sensitivity in a hippocampal CA3-CA1 model, *Neural Netw.*, 20:653-667.
- Yoshida M** and Hayashi H (2004), Regulation of spontaneous rhythmic activity and organization of pacemakers as memory traces by spike-timing-dependent synaptic plasticity in a hippocampal model, *Phys. Rev. E*, 69, 011910: 1-15.
- Yoshida M**, Hayashi H, Tateno K and Ishizuka S (2002) Stochastic resonance in the hippocampal CA3-CA1 model: a possible memory recall mechanism, *Neural Netw.*, 15, 1171-1183.

Book Articles

- Michael E. Hasselmo, Lisa M. Giocomo, Mark P. Brandon, **Motoharu Yoshida** (2008) *Dynamic Brain - from Neural Spikes to Behaviors*, LNCS 5286, ISBN 978-3-540-88852-9, Springer, Pages 28-37.
- Hatsuo Hayashi and **Motoharu Yoshida** (2004) *Knowledge-Based Intelligent Information and Engineering Systems*, ISBN 978-3-540-23318-3, Springer, Pages 967-973.

International Conference Proceedings and Abstracts

- A. Arboit, F. Theissen, J. Schweihoff, L. Birnbaumer, **M. Yoshida** (2017) Investigating the role of TRPC channels in hippocampal persistent firing, *Soc. Neurosci. Abstr.*, Vol 43, 428.08.
- A. Reboresda, M. J. Valero-Aracama, F. M. Theissen, A. Arboit, A. Corbu, **M. Yoshida** (2017) Molecular mechanisms of working memory and possible involvement of TRPC channels, *Soc. Neurosci. Abstr.*, Vol 43, 428.07.
- F. M. Theissen, A. Arboit, L. Birnbaumer, M. Sauvage, **M. Yoshida** (2017) TRPC5 channels in the hippocampus support trace fear conditioning, *Soc. Neurosci. Abstr.*, Vol 43, 428.09.
- E. Atucha Trevino, P. Schulze, B. Suchan, H. Kessler, **M. Yoshida**, S. Herpetz, M. Sauvage (2017) Effect of changes in stimulus valence on the contribution of familiarity and recollection to recognition memory in PTSD patients: A ROC study, *Soc. Neurosci. Abstr.*, Vol 43, 803.16.
- Giovannini F, Knauer B, **Yoshida M** and Buhry L (2016) Spiking regimes in model networks of hippocampal persistent firing neurons, *Soc. Neurosci. Abstr.*, Vol 42, 507.
- Giovannini F, **Yoshida M** and Buhry L (2015) Mathematical modelling of ICAN-mediated persistent firing in hippocampal neurons, *BMC Neuroscience* 2015, 16(Suppl 1):P292
- Valero-Aracama MJ, Sauvage MM and **Yoshida M** (2015) Contribution of different neuromodulators on persistent firing in hippocampal CA1 pyramidal cells, *Soc. Neurosci. Abstr.*, Vol 41, 672.13
- Giovannini F, **Yoshida M** and Buhry L (2015) Mathematical modelling of ICAN-mediated persistent firing in hippocampal neurons. The Twenty Fourth Annual Computational Neuroscience Meeting: CNS*2015.
- Valero-Aracama MJ, Sauvage MM, **Yoshida M** (2014) Modulation of cellular properties by environmental enrichment that may underlie learning enhancement and seizure prevention, *Soc. Neurosci. Abstr.*, Vol 40, 93.12.
- Knauer B, **Yoshida M** (2014) Switching between cholinergic-dependent mnemonic and epileptiform responses in individual hippocampal CA1 pyramidal neurons in acute rat brain slice preparations, *Soc. Neurosci. Abstr.*, Vol 40, 507.15.
- Yoshida M**, Jochems (2014) A hybrid of intracellular and synaptic mechanisms supports a robust in vivo-like persistent firing, *Soc. Neurosci. Abstr.*, Vol 40, 752.17.
- Knauer B, **Yoshida M** (2014) Switching between persistent firing and epileptiform activity in individual rat CA1 pyramidal neurons during cholinergic stimulation, *FENS Abstr.* 0924.

- Knauer B, **Yoshida M** (2013) Two response modes of rat hippocampal CA1 pyramids during cholinergic excitation, *Neurovisionen* 9, 83.
- Jochems A, **Yoshida M** (2012) Intrinsic persistent firing in hippocampal CA3 pyramidal neurons in vitro, *NeuroVisionen* 8, 58.
- Jochems A, Knauer B and **Yoshida M**. (2012) Intrinsic persistent firing in hippocampal CA1 and CA3 pyramidal cells, *Soc. Neurosci. Abstr.*, Vol 38, 812.15.
- Yoshida M**, Jochems A, Hasselmo ME (2012) Spike frequency adaptation and medium spike after hyperpolarization potential are differentially distributed along the dorso-ventral axis in layer II neurons from the medial entorhinal cortex, *Soc. Neurosci. Abstr.*, Vol 38, 702.26.
- Jochems A, Knauer B and **Yoshida M**. (2012) Intrinsic persistent firing in hippocampal CA3 pyramidal neurons in vitro, *FENS Abstr.* 827.
- Knauer B., Jochems, Valero Aracama MJ and **Yoshida M** (2012) Cholinergic-dependent intrinsic persistent firing of in vitro rat CA1 pyramidal neurons - a possible mechanism for short-term information retention, *FENS Abstr.* 1890.
- Saravanan V, Cui A, Gootjes-Dreesbach L, Cutsuridis V and **Yoshida M** (2012) A possible role of the CAN current in switching between real-time and time-compressed sequential activity of hippocampal pyramidal cells, *FENS Abstr.* 350.
- Yoshida M** (2012) A possible cellular mechanism for short-term information retention in the medial temporal lobe, *First International Conference on the Functional Architecture of Memory*, May 23rd to 25th, 2012 (RUB, Germany).
- Yoshida M**, Boardman I and Hasselmo M (2010) Analysis of the frequency of subthreshold oscillations at different membrane potential voltages in neurons at different anatomical positions on the dorso-ventral axis in the rat medial entorhinal cortex, *Soc. Neurosci. Abstr.*, Vol 36, 101.21
- Yoshida M** and Hasselmo M (2010) Voltage-dependent change in the frequency of subthreshold oscillations along the dorso-ventral axis in the entorhinal cortex, *FENS Abstr.*, vol.5, 196.28.
- Yoshida M** and Hasselmo M (2009) Differences in persistent firing properties dependent upon anatomical location of neurons in rat medial entorhinal cortex, *Soc. Neurosci. Abstr.*, Vol 35, 193.19.
- Engelbrecht J, Loncich K, Mirolo R, Hasselmo ME and **Yoshida M** (2009) Map dynamics for rhythmically perturbed neurons, *Soc. Neurosci. Abstr.*, Vol 35, 321.10.
- Fransén EA, Petersson ME and **Yoshida M** (2009) Mechanisms of mGluR activated TRP-current mediated potentials in entorhinal cortex neurons, *Soc. Neurosci. Abstr.*, Vol 35, 323.15.
- Yoshida M** and Hasselmo M (2008) Persistent firing in rat postsubiculum supported by intrinsic single cell mechanisms. *Soc. Neurosci. Abstr.*, Vol 34, 94.13.
- Yoshida M**, Fransén E and Hasselmo M (2007) Cholinergic-independent persistent firing in entorhinal layers III and V neurons. *Soc. Neurosci. Abstr.*, Vol 33, 935.9.

- Fransén E, **Yoshida M** and Hasselmo M (2007) Mechanisms of mGluR mediated plateau potentials in entorhinal cortex neurons. Soc. Neurosci. Abstr., Vol 33, 935.10.
- Yoshida M** and Alonso A (2005) Differential role of the M-current on the oscillatory and bursting behavior of principal cells from layers II, III and V of the Entorhinal Cortex. Soc. Neurosci. Abstr., Vol 31, 971.5.
- Hayashi H and **Yoshida M** (2004) A memory model of the hippocampus for the foundations of brain-inspired information technology. Int. Congr. Ser. 1269, 109-112.
- Igarashi J, **Yoshida M**, Tateno K and Hayashi H (2004) Synchronized Subthreshold Oscillations and Phase Coding in a Network Model of the Entorhinal Cortex, Proceedings of International Joint Conference on Neural Networks, 3119-3124.
- Yoshida M** and Hayashi H (2004) Organization of Cell Assemblies that Code Temporal Sequences in a Hippocampal CA3-CA1 Model, Proceedings of International Joint Conference on Neural Networks, 495-500.
- Yoshida M** and Hayashi H (2003) Organization of Spatiotemporal Activity Through STDP as a Mechanism for Coding Temporal Sequences in the Hippocampal Model, WSEAS Transactions on Biology and Biomedicine, Issue 1, Vol.1, 30-35.
- Yoshida M** and Hayashi H (2002) Regulation of Spontaneous Rhythmic Activity and Preserved Stimulus Dependent Pattern by STDP in the Hippocampal CA3 Model, Proceedings of the 9th International Conference on Neural Information Processing, Vol.1, 367-371.
- Yoshida M**, Hayashi H and Ishizuka S (2001) Sequential Memory Recall in CA1 Taking Advantage of Theta-Like Spatiotemporal Activity of CA3: A Hippocampal Model, Proceedings of the 8th International Conference on Neural Information Processing, Vol.1, 20-25.
- Yoshida M**, Hayashi H and Ishizuka S (2000) Periodic Burst Activity Generated in a Hippocampal Neural Network Model by Stochastic Resonance, Proceedings of the 7th International Conference on Neural Information Processing, Vol.2, 1295-1300.

INVITED TALKS

- November, 2017, Department of Physiology, Feinberg School of Medicine, Northwestern University, Chicago, USA.
- May, 2016, Third international conference on the FUNCTIONAL ARCHITECTURE OF MEMORY, Leibniz Institute for Neurobiology, Magdeburg - Germany)
- Dec, 2015, Donders Institute for Brain, Cognition and Behaviour, Netherland.
- Sept, 2015, Department of Pharmacology, Heidelberg University, Germany.
- Jan, 2015, Kyushu Institute of Technology, Japan.
- Dec, 2014, Erasmus MC, Netherland.
- Oct, 2014, INRIA, France.
- March, 2014, Universitat Tubingen, Germany.
- Feb, 2014, Bristol University.