

# 楊 正 維 Yang, Jenq-Wei

I focus on the field of system neuroscience. I apply advanced methods such as multielectrode recordings, voltage-sensitive dye imaging, wide-field calcium imaging, optogenetics, and advanced analytics to investigate the physiology and pathophysiology of cortical network activity during early brain development of rodents.



## Education & Professional Experience

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- Since Oct. 2018      **Senior research associate (Oberassistent)** in a joined position at the lab of Prof. Heiko Luhmann (Institute of Physiology, University Medical Center of the Johannes Gutenberg University, Mainz, Germany) and the lab of Prof. Theofanis Karayannis (Brain Research Institute, University of Zurich, Switzerland).
- Apr. 2011 - Sep. 2018      **Postdoctoral scientist** (the lab of Prof. Heiko Luhmann), Institute of Physiology, University Medical Center of the Johannes Gutenberg University, Mainz, Germany.
- Feb. 2007 - Apr. 2011      **Ph.D.** (the lab of Prof. Heiko Luhmann), Institute of Physiology, University Medical Center of the Johannes Gutenberg University.
- Feb. 2002 - Jan. 2007      **Research assistant** (the lab of Dr. Bai-Chung Shyu), Institute of Biomedical Sciences, Academia Sinica, Taipei, Taiwan
- Sep. 2000 - Jul. 2002      **Master of Science** (the lab of Dr. Shin-Rung Yeh), Institute of Life Sciences, National Tsing Hua University, Hsinchu, Taiwan
- Sep. 1995 - Jan. 2000      **Bachelor of Science**, Institute of Life Sciences, National Tsing Hua University, Hsinchu, Taiwan
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## Techniques

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- Stereotaxic surgery in neonatal, adolescent, and adult rodents.
- Multichannel local field potential and multi-unit recording in the somatosensory cortex, prefrontal cortex, entorhinal cortex *in vivo* (mice and rat).
- Combined optogenetics with multielectrode recording *in vivo* in rodents.
- Wide-field Calcium imaging, voltage-sensitive dye imaging and intrinsic imaging *in vivo* in rodents
- Deep knowledge of MATLAB programming and data analysis.

## Honors and Awards

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- 2011            **Gerhard Thews Preis:** best Ph.D. thesis in 2011 at the Institute of Physiology and Pathophysiology University Mainz.
- 2005            **Student Research Award:** second prize for the distinguished poster presentation at the twentieth Biomedical Sciences Conference, March 26-27, 2005, Taipei, Taiwan.

## Talks

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- 2018            Neuroscience Program of Academia Sinica (NPAS) VSD imaging workshop, Taiwan
- 2015            Institute of Cellular and Organismic Biology, Academia Sinica, Taiwan
- 2014            Swiss Laboratory Animal Science Association (SGV) 2014 meeting, Switzerland

## Publications

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### Book chapter (1)

1. **Jenq-Wei Yang\***, Pierre-Hugues Prouvot\*, Albrecht Stroh, Heiko J. Luhmann Combining optogenetics with MEA, depth-resolved LFPs and assessing the scope of optogenetic network modulation. 2017 **Neuromethods** Optogenetics: A Roadmap pp 133-152

### Articles (26)

1. Alexander van der Bourg\*, **Jenq-Wei Yang\***, Maik C. Stüttgen, Vicente Reyes-Puerta, Fritjof Helmchen, Heiko J. Luhmann Temporal refinement of sensory-evoked activity across layers in developing mouse barrel cortex **Eur J Neurosci.** **2019** Apr 3. (**\*equal contribution**)
2. Hsi-Chien Shih, **Jenq-Wei Yang**, Chia-Ming Lee and Bai-Chuang Shyu Spontaneous cingulate high-current spikes signal normal and pathological pain states **J Neurosci.** **2019** Apr 25. pii: 2590-18.
3. Petr Unichenko\*, **Jenq-Wei Yang\***, Sergei Kirischuk, Sergei Kolbaev, Werner Kilb, Matthieu Hammer, Dilja Krueger-Burg, Nils Brose, Heiko J. Luhmann Autism related neuroligin-4 knockout impairs intracortical processing but not sensory inputs in mouse barrel cortex **Cerebral Cortex.** **2018** Aug 1;28(8):2873-2886. (**\*equal contribution**)
4. **Jenq-Wei Yang**, Werner Kilb, Sergei Kirischuk, Petr Unichenko, Maik C. Stüttgen, Heiko J. Luhmann Development of the whisker-to-barrel system **Curr Opin Neurobiol.** **2018** Dec;53:29-34. doi: 10.1016/j.conb.2018.04.023. Epub 2018 May 5.
5. **Jenq-Wei Yang\***, Pierre-Hugues Prouvot\*, Vicente Reyes-Puerta, Maik C. Stüttgen, Albrecht Stroh, Heiko J. Luhmann Optogenetic Modulation of a Minor Fraction of Parvalbumin-Positive Interneurons Specifically Affects Spatiotemporal Dynamics of Spontaneous and Sensory-Evoked Activity in Mouse Somatosensory Cortex in Vivo **Cerebral Cortex.** **2017** Dec 1;27(12):5784-5803. (**\*equal contribution**)
6. Oriane Blanquie, **Jenq-Wei Yang**, Werner Kilb, Salim Sharopov, Anne Sinning Heiko J Luhmann Electrical activity controls area-specific expression of neuronal apoptosis in the mouse developing cerebral cortex **Elife.** **2017** Aug 21;6.
7. Johannes Vogt, Sergei Kirischuk, Petr Unichenko, Leslie Schlüter, Assunta Pelosi, Heiko Endle, **Jenq-Wei Yang**, Nikolai Schmarowski, Jin Cheng, Carine Thalman, Ulf Strauss, Alexey Prokudin, B. Suman Bharati, Junken Aoki, Jerold Chun, Beat Lutz, Heiko J. Luhmann and Robert Nitsch Synaptic Phospholipid Signaling Modulates Axon Outgrowth via Glutamate-dependent Ca<sup>2+</sup>-mediated Molecular Pathways **Cereb Cortex.** **2017** Jan 1;27(1):131-145
8. Vicente Reyes-Puerta, **Jenq-Wei Yang**, Magdalena E. Siwek, Werner Kilb, Jyh-Jang Sun, Heiko J. Luhmann Propagation of spontaneous slow-wave activity across columns and layers of the adult rat barrel cortex in vivo **Brain Struct Funct.** **2016** Dec;221(9):4429-4449.
9. Jin Cheng, Sadhna Sahani, Torben Johann Hausrat, **Jenq-Wei Yang**, Haichao Ji, Nikolai Schmarowski, Heiko Endle, Xinfeng Liu, Yunbo Li, Rahel Bottche, Konstantin

Radyushkin, Hans M. Maric, Anna Hoerder-Suabedissen, Zoltán Molnár, Pierre-Hugues Prouvot, Thorsten Trimbuch, Olaf Ninnemann, Jisen Huai, Wei Fan, Barbara Visentin, Roger Sabbadini, Kristian Strømgaard, Albrecht Stroh, Heiko J. Luhmann Matthias Kneussel, Robert Nitsch and Johannes Vogt Precise Somatotopic Thalamocortical Axon Guidance Depends on LPA-Mediated PRG-2/Radixin Signaling **Neuron**. 2016 Oct 5;92(1):126-142.

10. Alexander van der Bourg\*, **Jenq-Wei Yang\***, Vicente Reyes-Puerta, Balazs Laurenczy, Martin Wieckhorst<sup>1</sup>, Maik C. Stüttgen, Heiko J. Luhmann, and Fritjof Helmchen Layer-Specific Refinement of Sensory Coding in Developing Mouse Barrel cortex **Cerebral Cortex**. 2016 Sep 12 (**\*equal contribution**)
11. Petr Unichenko\*, Sergei Kirischuk\*, **Jenq-Wei Yang\***, Jan Baumgart, Thomas Roskoden, Patrick Schneider, Angela Sommer, Guilherme Horta, Konstantin Radyushkin, Robert Nitsch, Johannes Vogt and Heiko J. Luhmann Plasticity-Related Gene 1 Affects Mouse Barrel Cortex Function via Strengthening of Glutamatergic Thalamocortical Transmission **Cerebral Cortex**. 2016 Jul;26(7):3260-72 (**\*equal contribution**)
12. Heiko J. Luhmann, Anne Sinning, **Jenq-Wei Yang**, Vicente Reyes-Puerta, Maik C. Stüttgen, Sergei Kirischuk and Werner Kilb Spontaneous Neuronal Activity in Developing Neocortical Networks: From Single Cells to Large-Scale Interactions **Front Neural Circuits**. 2016 May 24;10:40.
13. **Jenq-Wei Yang**, Vicente Reyes-Puerta, Werner Kilb, and Heiko J. Luhmann Spindle Bursts in Neonatal Rat Cerebral Cortex **Neural Plasticity** 2016:3467832.
14. Johannes Vogt,\*, **Jenq-Wei Yang\***, Arian Mobascher, Jin Cheng, Yunbo Li, Xingfeng Liu, Jan Baumgart, Carine Thalman, Sergei Kirischuk, Petr Unichenko, Guilherme Horta, Konstantin Radyushkin, Albrecht Stroh, Sebastian Richers, Nassim Sahragard, Ute Distler, Stefan Tenzer, Lianyong Qiao, Klaus Lieb, Oliver Tüscher, Harald Binder, Nerea Ferreiros, Irmgard Tegeder, Andrew J Morris, Sergiu Gropa, Peter Nürnberg, Mohammad R Toliat, Georg Winterer, Heiko J Luhmann, Jisen Huai & Robert Nitsch Molecular cause and functional impact of altered synaptic lipid signaling due to a prg-1 gene SNP **EMBO Mol Med**. 2016 Jan; 8: 25–38 (**\*equal contribution**)
15. Petr Unichenko\*, **Jenq-Wei Yang\***, Heiko J. Luhmann, Sergei Kirischuk Glutamatergic system controls synchronization of spontaneous neuronal activity in the murine neonatal entorhinal cortex **Pflugers Arch**. 2015 Jul;467(7):1565-75. (**\*equal contribution**)
16. Christoph M. Zehendner , Simeon Tsohataridis, Heiko J. Luhmann, **Jenq-Wei Yang** Developmental Switch in Neurovascular Coupling in the Immature Rodent Barrel Cortex. **PLoS One**. 2013 Nov 5;8(11).

17. Christoph M. Zehendner, Heiko J. Luhmann, **Jenq-Wei Yang** A Simple and Novel Method to Monitor Breathing and Heart Rate in Awake and Urethane-Anesthetized Newborn Rodents. **PLoS One.** **2013** May 3;8(5):e62628.
18. Birgit Nimmervoll, Robin White, **Jenq-Wei Yang**, Shuming An, Christopher Henn, Jyh-Jang Sun and Heiko J. Luhmann LPS-induced microglial secretion of TNF $\alpha$  increases activity-dependent neuronal apoptosis in neonatal cerebral cortex. **Cerebral Cortex.** **2013** Jul;23(7):1742-55.
19. **Jenq-Wei Yang**, Shuming An, Jyh-Jang Sun, Vicente Reyes-Puerta, Jennifer Kindler, Thomas Berger<sup>+</sup>, Werner Kilb and Heiko J. Luhmann\* Thalamic Network Oscillations Synchronize Ontogenetic Columns in the Newborn Rat Barrel Cortex. **Cerebral Cortex.** **2013** Jun;23(6):1299-316.
20. Shuming An, **Jenq-Wei Yang**, Haiyan Sun, Werner Kilb and Heiko J. Luhmann\* Long-term potentiation in the neonatal rat barrel cortex *in vivo*. **J Neurosci.** **2012** Jul 11;32(28):9511-6.
21. **Jenq-Wei Yang**, Ileana L. Hanganu-Opatz, Jyh-Jang Sun, and Heiko J. Luhmann\* Three Patterns of Oscillatory Activity Differentially Synchronize Developing Neocortical Networks *In Vivo*. **J Neurosci.** **2009** Jul 15;29(28):9011-25.
22. S. R. Yeh, **J. W. Yang**, Y. T. Lee, L. Y. Tsai. Static magnetic field expose enhances neurotransmission in crayfish nervous system. **Int J Radiat Biol.** **2008** Jul;84(7):561-7
23. **J.W. Yang**, H.C. Shih and B.C. Shyu\* Intracortical circuits in rat anterior cingulate cortex are activated by nociceptive inputs mediated by medial thalamus. **J Neurophysiol.** **2006** Dec;96(6):3409-22.
24. Jyh-Jang Sun, **Jenq-Wei Yang**, Bai-Chung Shyu\* Current source density analysis of laser heat-evoked intra-cortical field potentials in the primary somatosensory cortex of rats. **Neuroscience.** **2006** Jul 21;140(4):1321-36.
25. Zi-Hao Wang, Ming-Hua Chang, **Jenq-Wei Yang**, Jyh-Jang Sun, H.C. Lee and Bai-Chuang Shyu\*. Layer IV of the primary somatosensory cortex has the highest complexity under anesthesia and cortical complexity is modulated by specific thalamic inputs. **Brain Res.** **2006** Apr 12; 1082(1):102-14.
26. S. R. Yeh\*, **J. W. Yang**, C.M Chen. Effect of static magnetic fields on the amplitude of action potential in the lateral giant neuron of crayfish. **Int J Radiat Biol.** **2004** Oct; 80(10):699-708.