

# Naoya Takahashi, Ph.D.

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NeuroCure Cluster of Excellence  
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## Education and Research Experience

02/2012 – present	Postdoctoral Researcher, Humboldt-Universität zu Berlin, Germany
04/2011 – 01/2012	Assistant Professor, University of Tokyo, Japan
04/2008 – 03/2011	Ph.D., University of Tokyo, Japan
04/2006 – 03/2008	M.Sc., University of Tokyo, Japan
04/2002 – 03/2006	B.Sc., Kyoto University, Japan

## Techniques&Skills

- Whole-cell patch-clamp recording *in vitro* and *in vivo* (in both awake and anesthetized animals)
- Two-photon Ca<sup>2+</sup> imaging from neuron/dendrite/spine *in vitro* and *in vivo*
- Optogenetics
- Animal surgery and training for behavioral experiments
- Programing for device control and analysis with Matlab, Igor, C/C++

## Teaching

2015 –	Cold Spring Harbor Laboratory, NY: Teaching Assistant in “Imaging Function & Structure in the Nervous System” summer course
2015 –	Humboldt University, Berlin: Instructor in “Introductory Neuroscience” course for graduate students
2011 – 2012	University of Tokyo, Tokyo: Lecturer in “Pharmacology” class for undergraduate students

## Fellowships/Grants/Awards

2016	Best Poster Award, EMBO workshop: Dendritic Anatomy, Molecules and Function
2016	FENS-IBRO/PERC Travel Grants
2015 – 2016	Research Grants, Kanoe Foundation for the Promotion of Medical Science
2014 –	German Research Foundation (DFG)
2014 – 2014	Postdoctoral Fellowship, Uehara Memorial Foundation
2013	Society for Neuroscience Travel Grants Award
2012 – 2014	Postdoctoral Fellowship for Research Abroad, Japan Society for the Promotion of Science
2011 – 2012	Grants-in-Aid for Young Scientists, Japan Society for the Promotion of Science

2011 – 2012	Research Grants, Suzuken Memorial Foundation
2010	Global COE Travel Grants Award
2008 – 2011	Research Fellowship for Young Scientists, Japan Society for the Promotion of Science
2007	Fuji Sankei Business i. Award of Advanced Technology

## Memberships

American Neuroscience Society

European Neuroscience Society

Japanese Neuroscience Society

## Oral Presentations (Invited Talks\*)

2016	SfN satellite meeting Barrels XXIX, Los Angeles
2016	Barrel Cortex Function 2016, Amsterdam
2014	University of Tokyo, Tokyo*
2010	RIKEN Brain Science Institute, Tokyo*
2010	4th International Neural Microcircuitry Conference, Okinawa*
2007	Multi-Neuronal Computation Symposium, Tokyo*

## Publications

1. [Takahashi N](#), Oertner G T, Hegemann P, Larkum E M. Active cortical dendrites modulate perception. *Science (in press)*
2. [Takahashi N](#), Kobayashi C, Ishikawa T, Ikegaya Y. Subcellular imbalances in synaptic activity. *Cell Reports* 14: 1348–54 (2016)
3. Anisuzzaman AS, Uwada J, Masuoka T, Yoshiki H, Nishio M, Ikegaya Y, [Takahashi N](#), Matsuki N, Fujibayashi Y, Yonekura Y, Momiyama T, Muramatsu I. Novel contribution of cell surface and intracellular M1-muscarinic acetylcholine receptors to synaptic plasticity in hippocampus. *J Neurochem* 126:360-71 (2013)
4. Egawa T, Hirabayashi K, Koide Y, Kobayashi C, [Takahashi N](#), Mineno T, Terai T, Ueno T, Komatsu T, Ikegaya Y, Matsuki N, Nagano T, Hanaoka K. Red fluorescent probe for monitoring the dynamics of cytoplasmic calcium ions. *Angew Chem Int Ed Engl* 52:3874-7 (2013)
5. Kobayashi C, [Takahashi N](#), Ikegaya Y. Real time imaging of synaptic inputs. *Nihon Yakurigaku Zasshi*, 140:19-23 (2012)
6. Okada Y, Sasaki T, Oku Y, [Takahashi N](#), Seki M, Ujita S, Tanaka KF, Matsuki N, Ikegaya Y. Preinspiratory calcium rise in putative pre-Botzinger complex astrocytes. *J Physiol* 590:4933-44 (2012)
7. Seki M, Kobayashi C, [Takahashi N](#), Matsuki N, Ikegaya Y. Synchronized spike waves in immature dentate gyrus networks. *Eur J Neurosci* 35:673-81 (2012)

8. Ikegaya Y, Sasaki T, Ishikawa D, Honma N, Tao K, Takahashi N, Minamisawa G, Ujita S, Matsuki N. Interpyramid spike transmission stabilizes the sparseness of recurrent network activity. *Cereb Cortex* 23:293-304 (2013)
9. Takahashi N, Kitamura K, Matsuo N, Mayford M, Kano M, Matsuki N, Ikegaya Y. Locally synchronized synaptic inputs. *Science* 335:353-6 (2012)
10. Takahashi N, Oba S, Yukinawa N, Ujita S, Mizunuma M, Matsuki N, Ishii S, Ikegaya Y. High-speed multineuron calcium imaging using Nipkow-type confocal microscopy. *Curr Protoc Neurosci* Chapter 2:Unit 2.14 (2011)
11. Kimura R, Kang S, Takahashi N, Usami A, Matsuki N, Fukai T, Ikegaya Y. Hippocampal polysynaptic computation. *J Neurosci* 31:13168-79 (2011)
12. Egawa T, Hanaoka K, Koide Y, Ujita S, Takahashi N, Ikegaya Y, Matsuki N, Terai T, Ueno T, Komatsu T, Nagano T. Development of a far-red to near-infrared fluorescence probe for calcium ion and its application to multicolor neuronal imaging. *J Am Chem Soc* 133:14157-9 (2011)
13. Ikegaya Y, Takahashi N. Return to forever: Finding the origin of neural synchrony. *Commun Integr Biol* 3:567-8 (2010)
14. Takahashi N, Sasaki T, Matsumoto W, Matsuki N, Ikegaya Y. Circuit topology for synchronizing neurons in spontaneously active networks. *Proc Natl Acad Sci U S A* 107:10244-9 (2010)
15. Takahashi N, Takahara Y, Ishikawa D, Matsuki N, Ikegaya Y. Functional multineuron calcium imaging for systems pharmacology. *Anal Bioanal Chem* 398:211-8 (2010)
16. Ishikawa D, Takahashi N, Sasaki T, Usami A, Matsuki N, Ikegaya Y. Fluorescent pipettes for optically targeted patch-clamp recordings. *Neural Netw* 23:669-72 (2010)
17. Mizunuma M, Takahashi N, Usami A, Matsuki N, Ikegaya Y. High-temperature, but not high-pressure, conditions alter neuronal activity. *J Pharmacol Sci* 110:117-21 (2009)
18. Minamisawa G, Takahashi N, Matsuki N, Ikegaya Y. Laterality of neocortical slow-wave oscillations in anesthetized mice. *Neurosci Res* 64:240-2 (2009)
19. Sasaki T, Minamisawa G, Takahashi N, Matsuki N, Ikegaya Y. Reverse optical trawling for synaptic connections in situ. *J Neurophysiol* 102:636-43 (2009)
20. Sasaki T, Takahashi N, Matsuki N, Ikegaya Y. Fast and accurate detection of action potentials from somatic calcium fluctuations. *J Neurophysiol* 100:1668-76 (2008)
21. Koyama R, Muramatsu R, Sasaki T, Kimura R, Ueyama C, Tamura M, Tamura N, Ichikawa J, Takahashi N, Usami A, Yamada MK, Matsuki N, Ikegaya Y. A low-cost method for brain slice cultures. *J Pharmacol Sci* 104:191-4 (2007)
22. Takahashi N, Sasaki T, Usami A, Matsuki N, Ikegaya Y. Watching neuronal circuit dynamics through functional multineuron calcium imaging (fMCI). *Neurosci Res* 58:219-25 (2007)