

HIROAKI TSUKANO
Curriculum Vitae, Jan 23, 2025

Contact Information

Department of Psychiatry, University of North Carolina at Chapel Hill
116 Manning Dr., Mary Ellen Jones Building, Chapel Hill, NC 27599-7250
E-mail: hiroakit@email.unc.edu; tsukano-nii@umin.ac.jp
Website: <http://hiroakitnp.starfree.jp>

Current Position

Research Associate
Department of Psychiatry, University of North Carolina at Chapel Hill

Education and Degrees

Apr 2008 – Sep 2011 Ph.D. Department of Neurophysiology, Brain Research Institute,
Niigata University, Japan
Apr 2002 – Mar 2008 M.D. School of Medicine, Niigata University, Japan

Academic Positions

Apr 2024 – present Research Associate, UNC Chapel Hill
Apr 2019 – Mar 2024 Postdoctoral Research Associate, UNC Chapel Hill
Oct 2011 – Apr 2019 Assistant Professor, Brain Research Institute, Niigata University

Professional Society Memberships

2008 – present Society for Neuroscience
2015 – present The American Physiological Society
2006 – present The Japan Neuroscience Society
2009 – present Physiological Society of Japan (2016 – present; Councilor)
2019 – 2023 The Japanese Society for Artificial Intelligence

Editorial Board

2019 – present Review Editor, *Frontiers in Neuroanatomy*

Awards

- Travel Award, *Advances and Perspectives in Auditory Neuroscience (APAN)* (2023)
- Annual Conference Award, The Japanese Society for Artificial Intelligence (2019)
- Promotion Award of the Physiological Society of Japan for Young Scientists (2019)
- The Niigata University President Award (2016)
- The Yujin Young Investigator Award (2016)

- Nakata Mizuho Award (2006)

Research Projects

2019 – present	Top-down regulation for the auditory cortex
2017 – present	Visualizing functional specialization in auditory cortical areas.
2015 – present	Vocal communication processing in the auditory cortex.
2011 – 2017	Precise brain mapping in the mouse auditory cortex.
2010 – present	Thalamocortical circuitry in the auditory pathway.
2005 – present	Detecting harmony in the mice auditory cortex.

Grants

- Foundation of Hope Research Grant (Co-PI, \$40,000, 2020)
- Financial support for paper submission (100,000 yen, 2018)
- Donation (100,000 yen, 2018)
- Grant-in-Aid for Scientific Research (C) (Direct: 3,700,000 yen, 2017–2021)
- The Niigata University President Award (800,000 yen, 2016)
- Donation (100,000 yen, 2016)
- The Yujin Young Investigator Award (500,000 yen, 2016)
- The Promotion of Medical Science and Medical Care from the Ichiro Kanehara Foundation (500,000 yen, 2015)
- Donation (100,000 yen, 2015)
- Grant for Basic Science Research Projects from the Sumitomo Foundation (1,900,000 yen, 2014–2015)
- Donation (100,000 yen, 2014)
- Grant-in-Aid for Young Scientists (B) (Direct: 3,000,000 yen, 2014–2016)
- Financial support for paper submission (60,863 yen, 2013)
- Donation (50,000 yen, 2013)
- Grant-in-Aid for Young Scientists (B) (Direct: 3,400,000 yen, 2012–2013)

Teaching, Lecture, and Workshop

Lecture in Classroom

- “Hypothalamus”, School of Medicine, Niigata University (2015–2018).
- “Posterior pituitary gland”, School of Medicine, Niigata University (2015–2018).
- “Reproductive system”, School of Medicine, Niigata University (2018).
- Pathology, Yukyuzan Nutrition and cooking college (2017–2018)
- Anatomy and Physiology, Yukyuzan Nutrition and cooking college (2017–2018)

Tutor

- Physiological practice for undergraduate students at School of Medicine, Niigata University (2009, 2011–2012, 2014–2015, 2017–2018)
- Training course of flavoprotein fluorescence imaging at the summer seminar of Brain Research Institute (2010–2018)

Services to Society

- 2011 – present Fixed-point survey subjects
National Institute of Science and Technology Policy
Ministry of Education, Culture, Sports, Science and Technology, Japan
- 2013 – present Science and Technology Expert
National Institute of Science and Technology Policy
Ministry of Education, Culture, Sports, Science and Technology, Japan
- 2016 – present Councilor, Physiological Society of Japan

Committee Services to University

- 2012 – 2018 Member of the animal committee in Brain Research Institute (Brain Research Institute, Niigata University).
- 2012 – 2016 Member of the planning committee of the Niigata summer seminar in neuroscience (Brain Research Institute, Niigata University).
- 2012 – 2013 Member of the judging committee of Nakata Mizuho award (Brain Research Institute, Niigata University).

Academic Works

Publications and Preprints (English only) (*Corresponding author)

1. Garcia MM, Kline AM, Onodera K, **Tsukano H**, Dandu PR, Acosta HC, Kasten M, Manis PB, Kato HK. (2025) Noncanonical Short-Latency Auditory Pathway Directly Activates Deep Cortical Layers. *bioRxiv*
doi: <https://doi.org/10.1101/2025.01.06.631598>
2. Takahashi K*, Guo T, Yamagishi T, Ohshima S, **Tsukano H***, Horii A (2024) Orthogonal spectral and temporal envelope representation in auditory cortex. *bioRxiv*.
doi: <https://doi.org/10.1101/2024.10.28.620417>
3. **Tsukano H**, Garcia MM, Dandu PR, Kato HK (2024) Predictive filtering of sensory response via orbitofrontal top-down input. *bioRxiv*.
doi: <https://doi.org/10.1101/2024.09.17.613562>. (In revision at *Nature Neuroscience*)
4. Narayanan DP[†], **Tsukano H^{†*}**, Kline AM[†], Onodera K[†], Kato HK* (2022) Biological constraints on stereotaxic targeting of functionally-defined cortical areas. *Cerebral Cortex*. (†Co-first) (*bioRxiv*. doi: 10.1101/2022.03.04.483047).
5. Kline AM, Aponte DA, **Tsukano H**, Giovannucci A, Kato HK (2021) Inhibitory gating of coincidence-dependent sensory binding in secondary auditory cortex. *Nature Communications*. 12:4610.
6. Aponte DA, Handy G, Kline AM, **Tsukano H**, Doiron B, Kato HK (2021) Recurrent

network dynamics shape direction selectivity in primary auditory cortex. *Nature Communications*. 12:314.

7. Furukawa S, Terashima H, Koumura T, **Tsukano H** (2020) Data-driven approaches for unveiling the neurophysiological functions of the auditory system. *Acoustical Science and Technology*. 41(1) 63–66.
8. **Tsukano H***, Hou X, Horie M, Kitaura H, Nishio N, Hishida R, Takahashi K, Kakita A, Takebayashi H, Sugiyama S, Shibuki K (2019) Reciprocal connectivity between secondary auditory cortical field and amygdala in mice. *Scientific Reports*. 9(1) 19610 (*bioRxiv*. doi: <https://doi.org/10.1101/634469>).
9. Ogi M, Yamagishi T, **Tsukano H**, Nishio N, Hishida R, Takahashi K, Horii A, Shibuki K (2019) Associative responses to visual shape stimuli in the mouse auditory cortex. *PLoS One*. 14, e0223242.
10. Ohga S, **Tsukano H***, Horie M, Terashima H, Nishio N, Kubota Y, Takahashi K, Hishida R, Takebayashi H, Shibuki K. (2019) Corrigendum: Direct Relay Pathways from Lemniscal Auditory Thalamus to Secondary Auditory Field in Mice. *Cerebral Cortex*. 28(12):4424–4439.
11. Ohnishi T, Watanabe T, Sasaki M, Kamiya Y, Horie M, **Tsukano H**, Hishida R, Kohno T, Takebayashi H, Baba H, Shibuki K. (2019) Acute spatial spread of NO-mediated potentiation during hindpaw ischemia in mice. *The Journal of Physiology*. 597(13), 3441–3455.
12. Hishida R, Horie M, **Tsukano H**, Tohmi M, Yoshitake K, Meguro R, Takebayashi H, Yanagawa Y, Shibuki K. (2019) Feedback inhibition derived from the posterior parietal cortex regulates the neural properties of the mouse visual cortex. *European Journal of Neuroscience*. 50(6):2970–2987.
13. **Tsukano H**. Revealing a neuroanatomically precise figure of the central auditory system. *Impact*. Number 2, pp. 12–14, March 2019.
14. Ohga S, **Tsukano H***, Horie M, Terashima H, Nishio N, Kubota Y, Takahashi K, Hishida R, Takebayashi H, Shibuki K. (2018) Direct Relay Pathways from Lemniscal Auditory Thalamus to Secondary Auditory Field in Mice. *Cerebral Cortex* 28:4424–4439 (*bioRxiv*. doi: <https://doi.org/10.1101/226100>).
15. Nishio N, **Tsukano H**, Hishida R, Abe M, Nakai J, Kawamura M, Aiba A, Sakimura K, Shibuki K. (2018) Higher visual responses in the temporal cortex of mice. *Scientific Reports* 8:11136.
16. Yamagishi T, Yoshitake K, Kamatani D, Watanabe K, **Tsukano H**, Hishida R, Takahashi K, Sugata T, Horii A, Yagi T, Shibuki K. (2018) Molecular diversity of clustered protocadherin- α required for sensory integration and short-term memory in mice. *Scientific Reports* 8:9616.
17. Maniwa K, Yamashita H, **Tsukano H**, Hishida R, Endo N, Shibata M, Shibuki K. (2018) Tomographic optical imaging of cortical responses after crossing nerve transfer in mice. *PLoS One* 13:e0193017.

18. Hou X, Yoshioka N, **Tsukano H**, Sakai A, Miyata S, Watanabe Y, Yanagawa Y, Sakimura K, Takeuchi K, Kitagawa H, Hensch TK, Shibuki K, Igarashi M, Sugiyama S. (2017) Chondroitin Sulfate Is Required for Onset and Offset of Critical Period Plasticity in Visual Cortex. *Scientific Reports* 7:12646.
19. **Tsukano H***, Horie M, Ohga S, Takahashi K, Kubota Y, Hishida R, Takebayashi H, Shibuki K. (2017) Corrigendum: Reconsidering Tonotopic Maps in the Auditory Cortex and Lemniscal Auditory Thalamus in Mice. *Frontiers in Neural Circuits* 11:39.
20. **Tsukano H***, Horie M, Ohga S, Takahashi K, Kubota Y, Hishida R, Takebayashi H, Shibuki K. (2017) Reconsidering Tonotopic Maps in the Auditory Cortex and Lemniscal Auditory Thalamus in Mice. *Frontiers in Neural Circuits* 11:14.
21. **Tsukano H***, Horie M, Takahashi K, Hishida R, Takebayashi H, Shibuki K. (2017) Independent tonotopy and thalamocortical projection patterns in two adjacent parts of the classical primary auditory cortex in mice. *Neuroscience Letters* 637: 26–30.
22. Baba H, **Tsukano H**, Hishida R, Takahashi K, Horii A, Takahashi S, Shibuki K. (2016) Auditory cortical field coding long-lasting tonal offsets in mice. *Scientific Reports* 6: 34421.
23. **Tsukano H***, Horie M, Hishida R, Takahashi K, Takebayashi H, Shibuki K. (2016) Specific distribution of non-phosphorylated neurofilaments characterizing each subfield in the mouse auditory cortex. *Scientific Reports* 6: 22315.
24. Horie M, **Tsukano H**, Takebayashi H, Shibuki K. (2015) Specific distribution of non-phosphorylated neurofilaments characterizing each subfield in the mouse auditory cortex. *Neuroscience Letters* 606: 182–187.
25. Watanabe T, Sasaki M, Komagata S, **Tsukano H**, Hishida R, Kohno T, Baba H, Shibuki K. (2015) Spinal mechanisms underlying potentiation of hindpaw responses observed after transient hindpaw ischemia in mice. *Scientific Reports* 5: 11191.
26. **Tsukano H***, Horie M, Bo T, Uchimura A, Hishida R, Kudoh M, Takahashi K, Takebayashi H, Shibuki K. (2015) Delineation of a frequency-organized region isolated from the mouse primary auditory cortex. *Journal of Neurophysiology* 113(7): 2900–2920.
27. Meguro R, Hishida R, **Tsukano H**, Yoshitake K, Imamura R, Tohmi M, Kitsukawa T, Hirabayashi T, Yagi T, Takebayashi H, Shibuki K. (2015) Impaired clustered protocadherin- α (cPcdh- α) leads to aggregated retinogeniculate terminals and impaired visual acuity in mice. *Journal of Neurochemistry* 133(1): 66–72.
28. Tohmi M, Meguro R, **Tsukano H**, Hishida R, Shibuki K. (2014) The Extrageniculate Visual Pathway Generates Distinct Response Properties in the Higher Visual Areas of Mice. *Current Biology* 24(6): 587–597.
29. Yoshitake K, **Tsukano H**, Tohmi M, Komagata S, Hishida R, Yagi T, Shibuki K. (2013) Visual map shifts based on whisker-guided cues in the young mouse visual cortex. *Cell Reports* 5(5): 1365–1374.
30. **Tsukano H***, Horie M, Honma Y, Ohga S, Hishida R, Takebayashi H, Takahashi S,

Shibuki K. (2013) Age-related deterioration of cortical responses to slow FM sounds in the auditory belt region of adult C57BL/6 mice. *Neuroscience Letters* 556: 204–209.

31. Honma Y, **Tsukano H**, Horie M, Ohshima S, Tohmi M, Kubota Y, Takahashi K, Hishida R, Takahashi S, Shibuki K. (2013) Auditory cortical areas activated by slow frequency-modulated sounds in mice. *PLoS ONE* 8(7): e68113.
32. Horie M, **Tsukano H***, Hishida R, Takebayashi H, Shibuki K. (2013) Dual compartments of the ventral division of the medial geniculate body projecting to the core region of the auditory cortex in C57BL/6 mice. *Neuroscience Research* 76(4): 207–212.
33. **Tsukano H**, Hishida R, Shibuki K. (2011) Detection of virtual pitch up to 5 kHz by mice. *Neuroscience Research* 71(2): 140–144.
34. Ohshima S, **Tsukano H**, Kubota Y, Takahashi K, Hishida R, Takahashi S, Shibuki K. (2010) Cortical depression in the mouse auditory cortex after sound discrimination learning. *Neuroscience Research* 67(1): 51–58.
35. Kubota Y, Kamatani D, **Tsukano H**, Ohshima S, Takahashi K, Hishida R, Kudoh M, Takahashi S, Shibuki K. (2008) Transcranial photo-inactivation of neural activities in the mouse auditory cortex. *Neuroscience Research* 60(4): 422–430.
36. Shibuki K, Komagata S, Yoshitake K, **Tsukano H**, Hishida R. (2008) Transcranial fluorescence imaging of experience-dependent plasticity in the mouse sensory cortices *Protein, Nucleic acid, Enzyme* 53(4 Suppl) 512–517.

Presentations etc at Professional Meetings

1. **Tsukano H**, Garcia MM, Dandu PR, Kato HK. Predictive filtering of sensory response via orbitofrontal top-down input. (Auditory System Gordon Research Conference 2024. Poster. Smithfield, RI, USA. July 14-19)
2. Garcia MM, Kline AM, Onodera K, **Tsukano H**, Kato HK. Delineating Parallel Ascending Pathways onto Secondary Auditory Cortex. (Auditory System Gordon Research Conference 2024. Poster. Smithfield, RI, USA. July 14-19)
3. Garcia MM, Kline AM, **Tsukano H**, Graves CM, Dandu PR, Kato HK. Delineating Parallel Ascending Pathways onto the Secondary Auditory Cortex. (Society for Neuroscience (SfN) 2023. Poster. Washington DC, USA. Nov 11-15)
4. **Tsukano H**, Garcia M, Dandu PR, Graves CM, Kato HK. Predictive filtering of primary auditory cortex activity by frontal top-down inputs. (Society for Neuroscience (SfN) 2023. Poster. Washington DC, USA. Nov 11-15)
5. Garcia MM, Kline AM, **Tsukano H**, Graves CM, Dandu PR, Kato HK. Delineating Parallel Ascending Pathways onto the Secondary Auditory Cortex. (Advances and Perspectives in Auditory Neuroscience (APAN) 2023. Poster. Washington DC, USA. Nov 10)
6. **Tsukano H**, Garcia MM, Dandu PR, Graves CM, Kato HK. Predictive filtering of primary auditory cortex activity by frontal top-down inputs. (Advances and

- Perspectives in Auditory Neuroscience (APAN) 2023. Poster. Washington DC, USA. Nov 10)
7. **Tsukano H**, Kato HK. Experience-dependent gating of primary auditory cortex by frontal top-down inputs. (Society for Neuroscience (SfN) 2022. Poster. San Diego, USA. Nov 12-16)
 8. Kline AM, Garcia MM, **Tsukano H**, Onodera K, Kasten MR, Manis PB, Kato HK. Short-latency non-lemniscal auditory inputs onto deep cortical layers. (Society for Neuroscience (SfN) 2022. Poster. San Diego, USA. Nov 12-16)
 9. **Tsukano H**, Kato HK. Experience-dependent gating of primary auditory cortex by frontal top-down inputs. (Advances and Perspectives in Auditory Neuroscience (APAN). Poster. San Diego, USA. Nov 11)
 10. Kline AM, Garcia MM, **Tsukano H**, Onodera K, Kasten MR, Manis PB, Kato HK. Short-latency non-lemniscal auditory inputs onto deep cortical layers. (Advances and Perspectives in Auditory Neuroscience (APAN). Poster. San Diego, USA. Nov 11)
 11. Kline AM, Aponte DA, **Tsukano H**, Giovannucci A, Kato HK. Inhibitory gating of coincidence-dependent sensory binding in secondary auditory cortex. Society for Neuroscience (SfN) 2021. Virtual poster, USA. Nov 8–11, 2021.
 12. Narayanan DP[†], **Tsukano H**[†], Kline AM, Onodera K, Kato HK. Quantification of spatial variability in auditory cortical areas affecting stereotaxic targeting. Society for Neuroscience (SfN) 2021. Virtual poster, USA. Nov 8–11, 2021. (†Co-presenter)
 13. **Tsukano H**[†], Narayanan DP[†], Kline AM, Onodera K, Kato HK. Quantification of spatial variability in auditory cortical areas affecting stereotaxic targeting. Advances and Perspectives in Auditory Neuroscience (APAN) 2021. Virtual poster, USA. Nov 8-11, 2021. (†Co-presenter)
 14. Kline AM, Aponte DA, **Tsukano H**, Giovannucci A, Kato HK. Discrete Functional Subnetworks within Secondary Auditory Cortex Integrate Multi-Frequency Sounds with Synchronous Onsets. Advances and Perspectives in Auditory Neuroscience (APAN) 2020. Virtual poster, USA.
 15. Aponte DA, Handy G, Kline AM, **Tsukano H**, Doiron B, Kato HK. Recurrent Network Dynamics Shape Direction Selectivity in Primary Auditory Cortex. Advances and Perspectives in Auditory Neuroscience (APAN) 2020. Virtual poster, USA.
 16. Terashima H, Furukawa S, **Tsukano H**. Data-driven auditory field mapping for mice using naturalistic sounds. Society for Neuroscience 2019. Poster. Chicago, USA.
 17. Terashima H, **Tsukano H**, Furukawa S. Area segmentation of mouse auditory cortex using complex sounds and unsupervised learning. The 33rd Annual Conference of the Japanese Society for Artificial Intelligence, 2019. Oral. Niigata, Japan.
 18. **Tsukano H**. Characterization of the secondary auditory field in the mouse auditory cortex. 9th FOAPS, 2019. Symposium. Hyogo, Japan.
 19. **Tsukano H**. Characterization of the secondary auditory field in the mouse auditory cortex. 9th FOAPS, 2019. Poster. Hyogo, Japan.

20. Nishio N, **Tsukano H**, Hishida R, Abe M, Nakai J, Kawamura M, Aiba A, Sakimura K, Shibuki K, Ohki K. Analysis of a novel higher visual area, ECT, in the mouse ventral stream. 9th FOAPS, 2019. Poster. Hyogo, Japan.
21. Terashima H, **Tsukano H**, Furukawa S. Mapping Areal Organization of the Mouse Auditory Cortex by Data-driven Decomposition of Responses to Naturalistic Sounds. ARO 42nd Annual MidWinter Meeting. Poster. Merryland, USA.
22. **Tsukano H**. Characterization of secondary auditory cortical fields in mice. The 5th Annual Meeting of the Society for Bioacoustics. Invited Talk. Dec, 8-9, 2018. Kumamoto University, Kumamoto, Japan.
23. **Tsukano H**, Hou X, Horie M, Takebayashi H, Sugiyama S, Shibuki K. Cortico-subcortical monosynaptic excitatory loops that originate and terminate in the auditory cortex. Society for Neuroscience 2018. Poster. San Diego, USA.
24. Furukawa S, Terashima H, Koumura T, **Tsukano H**. Data-driven approaches for unveiling the neurophysiological functions of the auditory system. Seminar on Brain, Hearing and Speech Sciences for Universal Speech Communication. Invited Talk. Sendai, Japan. Oct 2018.
25. Terashima H, **Tsukano H**, Furukawa S. Unsupervised Area Segmentation of Mouse Auditory Cortex based on Responses to Naturalistic Complex Sounds. The 28th Annual Conference of the Japanese Neural Network Society (JNNS2018). Poster. Okinawa, Japan.
26. Nishio N, **Tsukano H**, Hishida R, Abe M, Nakai J, Kawamura M, Aiba A, Sakimura K, Shibuki K. Revealing a ventral stream extending to temporal cortex in mice. The 41th Annual Meeting of the Japanese Neuroscience Society 2018. Poster. Hyogo, Japan.
27. Inaba H, Namba H, **Tsukano H**, Shibuki K, Nawa H. Dopamine-dependent disruption of auditory offset responses in a mice model of schizophrenia. The 41th Annual Meeting of the Japanese Neuroscience Society 2018. Poster. Hyogo, Japan.
28. **Tsukano H**, Ohga S, Horie M, Terashima H, Nishio N, Kubota Y, Takahashi K, Hishida R, Takebayashi H, Shibuki K. Thalamocortical structures that differentiate complexity in functional organizations between primary and secondary auditory cortices in mice. The 41th Annual Meeting of the Japanese Neuroscience Society 2018. Poster. Hyogo, Japan.
29. Yoshitake K, Nishio N, **Tsukano H**, Hishida R, Yagi T, Shibuki K. Higher functions in the posterior parietal cortex: analysis using a mouse model. The 41th Annual Meeting of the Japanese Neuroscience Society 2018. Poster. Hyogo, Japan.
30. **Tsukano H**, Ohga S, Horie M, Hou X, Terashima H, Kitaura H, Sugiyama S, Kakita A, Takebayashi H, Shibuki K. Characterization of higher order fields in the mouse auditory cortex. BRI The 8th International symposium “The innovative progress of neuroscientific research through the use of advanced animal models”. Feb, 2018. Poster. Niigata, Japan.
31. Onishi T, Watanabe T, Sasaki M, Kamiya Y, Kohno T, Horie M, **Tsukano H**, Hishida R, Takebayashi H, Baba H, Shibuki K. Spinal potentiation after hindpaw ischemia

mediated by group II mGluRs and nitric oxide in mice. Society for Neuroscience 2017. Poster. Washington, DC.

32. Inaba H, Namba H, **Tsukano H**, Shibuki K, Nawa H. Abnormal auditory OFF responses recorded from the cortex of an EGF-induced schizophrenia rat model. The 40th Annual Meeting of the Japanese Neuroscience Society 2017. Poster. Chiba, Japan.
33. **Tsukano H**, Ohga S, Horie M, Terashima H, Takebayashi H, Shibuki K. Tonotopic properties in the secondary auditory field are derived from structural organization of the ventral medial geniculate body and thalamocortical projections in mice. The 40th Annual Meeting of the Japanese Neuroscience Society 2017. Poster. Chiba, Japan.
34. Hishida R, Horie M, **Tsukano H**, Tohmi M, Shibuki K. Plastic changes of visual responses in the primary visual cortex are induced selectively by inhibitory projection from posterior parietal cortex in mice. The 40th Annual Meeting of the Japanese Neuroscience Society 2017. Poster. Chiba, Japan.
35. Ogi M, Yamagishi T, **Tsukano H**, Nishio N, Hishida R, Horii A, Yagi T, Shibuki K. Complexity of sound stimuli required for sound-shape associative responses in the mouse auditory cortex. The 40th Annual Meeting of the Japanese Neuroscience Society 2017. Poster. Chiba, Japan.
36. Nishio N, Ogi M, Yamagishi T, **Tsukano H**, Hishida R, Yagi T, Shibuki K. Optical imaging of temporal cortical areas involved in audiovisual integration in awake mice. The 40th Annual Meeting of the Japanese Neuroscience Society 2017. Poster. Chiba, Japan.
37. Yoshitake K, **Tsukano H**, Hishida R, Yagi T, Shibuki K. Analysis of prediction error responses in the posterior parietal cortex of awake mice. The 40th Annual Meeting of the Japanese Neuroscience Society 2017. Poster. Chiba, Japan.
38. **Tsukano H**, Shibuki K. Neuronal responses to harmonic sounds visualized in the mouse auditory cortex. The Acoustical Society of Japan Jun, 2017. Oral. Tokyo, Japan.
39. Nawa H, Sotoyama H, Narihara I, **Tsukano H**, Jodo E, Eifuku S, Namba H. Neuropathologic implication of pallidal hyperactivity in the auditory abnormality of schizophrenia animal models. 13th World Congress of Biological Psychiatry 2017, Lecture in Symposium, Copenhagen, Denmark.
40. Onishi T, Watanabe T, Kohno T, **Tsukano H**, Hishida R, Baba H, Shibuki K. Spinal NO production visualized during hindpaw ischemia and NO-induced spinal potentiation in mice. The 94th Annual Meeting of the Physiological Society of Japan 2017. Poster. Shizuoka, Japan.
41. **Tsukano H**, Shibuki K. Frequency organization of the secondary auditory fields reflecting tonotopically-arranged afferents from the primary auditory thalamus. The 94th Annual Meeting of the Physiological Society of Japan 2017. Poster. Shizuoka, Japan.
42. Ogi M, Yamagishi T, **Tsukano H**, Kamatani D, Hishida R, Horii A, Yagi T, Shibuki K. Higher cortical functions required for sound-shape associative learning in mice. The 94th Annual Meeting of the Physiological Society of Japan 2017. Poster. Shizuoka, Japan.

43. Yoshitake K, **Tsukano H**, Hishida R, Yagi T, Shibuki K. Analysis of prediction error responses in the mouse posterior parietal cortex. The 94th Annual Meeting of the Physiological Society of Japan 2017. Poster. Shizuoka, Japan.
44. Nana N, Ogi M, Yamagishi T, **Tsukano H**, Hishida R, Yagi T, Shibuki K. Ventral visual cortex as a candidate for a higher area responsible for shape recognition in mice. The 94th Annual Meeting of the Physiological Society of Japan 2017. Poster. Shizuoka, Japan.
45. **Tsukano H**, Shibuki K. Functional properties in the secondary auditory field are derived from structural organization of primary auditory thalamus and thalamocortical projections in mice. Society for Neuroscience 2016. Poster. San Diego, USA.
46. Shibuki K, Yamagishi T, Kamatani D, Yoshitake K, **Tsukano H**, Watanabe K, Hishida R, Takahashi K, Takahashi S, Horii A, Yagi T. Functional footprints of impaired consciousness in mice with reduced molecular diversity of clustered protocadherin- α . Society for Neuroscience 2016. Poster. San Diego, USA.
47. Yoshitake K, **Tsukano H**, Hishida R, Yagi T, Shibuki K. Prediction error responses in the mouse posterior parietal cortex are dependent on molecular diversity of clustered protocadherin α . Society for Neuroscience 2016. Poster. San Diego, USA.
48. **Tsukano H**. The 39th Annual Meeting of the Japanese Neuroscience Society 2016. Chairperson at Oral session "Audition". Kanagawa, Japan.
49. **Tsukano H**, Shibuki K. Formation of voice-dependent associative memory circuits in primary auditory cortex in mice. The 39th Annual Meeting of the Japanese Neuroscience Society 2016. Poster. Kanagawa, Japan.
50. Onishi T, Watanabe T, **Tsukano H**, Hishida R, Kohno T, Baba H, Shibuki K. Visualized spinal NO production after ischemic treatment applied to the hindpaw and NO-induced spinal potentiation in mice. The 39th Annual Meeting of the Japanese Neuroscience Society 2016. Poster. Kanagawa, Japan.
51. Hishida R, Horie M, **Tsukano H**, Tohmi M, Shibuki K. Inhibition derived from parietal association area regulates the neural properties of the primary visual cortex in mice. The 39th Annual Meeting of the Japanese Neuroscience Society 2016. Poster. Kanagawa, Japan.
52. Ogi M, Yamagishi T, **Tsukano H**, Kamatani D, Hishida R, Horii A, Yagi T, Shibuki K. Higher cortical functions required for sound-shape associative learning in mice. The 39th Annual Meeting of the Japanese Neuroscience Society 2016. Poster. Kanagawa, Japan.
53. Yoshitake K, **Tsukano H**, Hishida R, Yagi T, Shibuki K. Impaired prediction error responses in the posterior parietal cortex of mice with reduced diversity of protocadherin- α . The 39th Annual Meeting of the Japanese Neuroscience Society 2016. Poster. Kanagawa, Japan.
54. Nawa H, Sotoyama H, **Tsukano H**, Shibuki K, Namba H. Hyperdopaminergic activity and abnormal auditory processing in a cytokine-induced schizophrenia model. The 39th Annual Meeting of the Japanese Neuroscience Society 2016. Poster. Kanagawa, Japan.

55. **Tsukano H**, Shibuki K. Voice dependent formation of associative memory circuit in mouse primary auditory cortex. The 93th Annual Meeting of the Physiological Society of Japan 2016. Poster. Hokkaido, Japan.
56. Onishi T, Watanabe T, **Tsukano H**, Hishida R, Kohno T, Baba H, Shibuki K. Bilateral spinal potentiation induced by NO after hemilateral and transient ischemia applied to the mouse hindpaw. The 93th Annual Meeting of the Physiological Society of Japan 2016. Poster. Hokkaido, Japan.
57. Nawa H, **Tsukano H**, Shibuki K, Kakita A, Sotoyama H, Namba H. Neuroinflammatory features of the cytokine-induced animal model for schizophrenia; implication of the regional specificity. The 58th Annual Meeting of the Japanese Society for Neurochemistry 2015. Symposium. Saitama, Japan.
58. Yamagishi T, **Tsukano H**, Baba H, Honma Y, Ohshima S, Kubota Y, Takahashi K, Hishida R, Yagi T, Shibuki K, Takahashi S. The cortical area dorsally to auditory cortex involved in sound-shape association memory in mice. 30th Politzer Society Meeting 2015. Oral. Niigata, Japan.
59. Baba H, **Tsukano H**, Yamagishi T, Honma Y, Ohshima S, Kubota Y, Takahashi K, Hishida R, Yagi T, Shibuki K, Takahashi S. OFF responses produced by short-term depression to inhibitory neurons in the mouse auditory cortex. 30th Politzer Society Meeting 2015. Oral. Niigata, Japan.
60. **Tsukano H**, Hishida R, Shibuki K. Newly identified region in the auditory cortex responding to ultrasonic male songs in mice. The 38th Annual Meeting of the Japanese Neuroscience Society 2015. Poster. Hyogo, Japan.
61. Onishi T, Watanabe T, **Tsukano H**, Hishida R, Kohno T, Baba H, Shibuki K. Spinal potentiation contralateral to the ischemic treatment applied to the hindpaw is mediated by nitric oxide. The 38th Annual Meeting of the Japanese Neuroscience Society 2015. Poster. Hyogo, Japan.
62. Yoshitake K, **Tsukano H**, Hishida R, Yagi T, Shibuki K. Prediction error responses in the mouse posterior parietal cortex are produced by experience. The 38th Annual Meeting of the Japanese Neuroscience Society 2015. Poster. Hyogo, Japan.
63. Hishida R, Horie M, **Tsukano H**, Tohmi M, Shibuki K. Two-photon imaging analysis of inhibitory projections from the parietal association area to the primary visual cortex in mice. The 38th Annual Meeting of the Japanese Neuroscience Society 2015. Poster. Hyogo, Japan.
64. **Tsukano H**, Shibuki K. Re-definition of the primary auditory cortex by separating a newly identified region and their functional specialization in mice. The 92th Annual Meeting of the Physiological Society of Japan 2015. Symposium. Hyogo, Japan.
65. Ohnishi T, Watanabe T, **Tsukano H**, Hishida R, Kohno T, Baba H, Shibuki K. Ischemia-induced potentiation of cortical responses to hindpaw stimulation is partly mediated by nitric oxide at the spinal cord level. The 92th Annual Meeting of the Physiological Society of Japan 2015. Poster. Hyogo, Japan.
66. Ohga S, **Tsukano H**, Shibuki K. The secondary auditory cortex receives topological

projections from the ventral division of the medial geniculate body in mice. The 92th Annual Meeting of the Physiological Society of Japan 2015. Poster. Hyogo, Japan.

67. Yoshitake K, **Tsukano H**, Hishida R, Yagi T, Shibuki K. Prediction error responses in the mouse posterior parietal cortex are dependent on protocadherin- α diversity. The 92th Annual Meeting of the Physiological Society of Japan 2015. Poster. Hyogo, Japan.
68. Yamagishi T, **Tsukano H**, Kamatani D, Hishida R, Yamamoto Y, Yagi T, Shibuki K. Higher visual cortices responsible for shape recognition in mice. The 92th Annual Meeting of the Physiological Society of Japan 2015. Poster. Hyogo, Japan.
69. Meguro R, Hishida R, **Tsukano H**, Yoshitake K, Kitsukawa T, Hirabayashi K, Takebayashi H, Yagi T, Shibuki K. Postnatal developmental observations of abnormal retinal terminal aggregation in the cPcdh- α KO mice. The 92th Annual Meeting of the Physiological Society of Japan 2015. Poster. Hyogo, Japan.
70. Maniwa K, Yamashita H, **Tsukano H**, Hishida R, Endo N, Shibata M, Shibuki K. Somatosensory Cortical Responses after Crossing Nerve Transfer in Mice. The 92th Annual Meeting of the Physiological Society of Japan 2015. Poster. Hyogo, Japan.
71. Yamagishi T, **Tsukano H**, Kamatani D, Hishida R, Takahashi S, Shibuki K. Transcranial imaging of cortical activities after sound-shape association in mice. The 37th Annual Meeting of the Japanese Neuroscience Society 2014. Poster. Kanagawa, Japan.
72. Hishida R, Horie M, **Tsukano H**, Tohmi M, Shibuki K. Inhibitory controls from the parietal association area to the primary visual cortex in mice. The 37th Annual Meeting of the Japanese Neuroscience Society 2014. Poster. Kanagawa, Japan.
73. **Tsukano H**, Horie M, Hishida R, Shibuki K. Dorsal high frequency area of the primary auditory cortex responding to ultrasonic male songs in mice. The 37th Annual Meeting of the Japanese Neuroscience Society 2014. Poster. Kanagawa, Japan.
74. Yoshitake K, **Tsukano H**, Tohmi M, Hishida R, Yagi T, Shibuki K. Impaired multisensory responses in the posterior parietal cortex of mice with a reduced cluster number of protocadherin- α . The 37th Annual Meeting of the Japanese Neuroscience Society 2014. Poster. Kanagawa, Japan.
75. Tohmi M, Meguro R, **Tsukano H**, Hishida R, Norita M, Shibuki K. Roles of the extrageniculate pathway in properties of higher visual cortices of mice. The 37th Annual Meeting of the Japanese Neuroscience Society 2014. Poster. Kanagawa, Japan.
76. Maniwa K, Yamashita H, **Tsukano H**, Hishida R, Shibata M, Endo N, Shibuki K. Direct and indirect somatosensory cortical responses after crossing nerve transfer in mice. The 37th Annual Meeting of the Japanese Neuroscience Society 2014. Poster. Kanagawa, Japan.
77. Yoshitake K, **Tsukano H**, Tohmi M, Hishida R, Yagi T, Shibuki K. Whisker-guided visual map shifts and formation of ocular dominance column-like structures in mice. The 91th Annual Meeting of the Physiological Society of Japan 2014. Poster. Kagoshima, Japan.
78. **Tsukano H**, Hishida R, Shibuki K. Properties as associative memory circuits in the primary auditory cortex of mice. The 91th Annual Meeting of the Physiological Society

of Japan 2014. Poster. Kagoshima, Japan.

79. Watanabe T, Komagata S, **Tsukano H**, Hishida R, Kohno T, Baba H, Shibuki K. Spinal cord imaging during post-ischemic numbness in mice. The 91th Annual Meeting of the Physiological Society of Japan 2014. Poster. Kagoshima, Japan.
80. Maniwa K, Yamashita H, **Tsukano H**, Hishida R, Shibata M, Endo N, Shibuki K. Somatosensory cortical responses after crossing nerve transfer in mice. The 91th Annual Meeting of the Physiological Society of Japan 2014. Poster. Kagoshima, Japan.
81. Yamagishi T, **Tsukano H**, Baba H, Honma Y, Ohshima S, Kubota Y, Takahashi K, Takahashi S, Shibuki K. Sound-shape association memory tested using a M-maze in mice. The 91th Annual Meeting of the Physiological Society of Japan 2014. Poster. Kagoshima, Japan.
82. Shibuki K, **Tsukano H**, Komagata S, Hishida R. Optical imaging of deep brain activity in mice. The 36th Annual Meeting of the Japanese Neuroscience Society 2013. Oral. Kyoto, Japan.
83. **Tsukano H**, Hishida R, Shibuki K. Harmonic sound processing in mouse primary auditory cortex revealed by in vivo two-photon calcium imaging. The 36th Annual Meeting of the Japanese Neuroscience Society 2013. Poster. Kyoto, Japan.
84. Yoshitake K, **Tsukano H**, Tohmi M, Hishida R, Yagi T, Shibuki K. Multiplicity of protocadherins required for cross-modal plasticity in the primary visual cortex of mice. The 36th Annual Meeting of the Japanese Neuroscience Society 2013. Poster. Kyoto, Japan.
85. Hishida R, Horie M, **Tsukano H**, Tohmi M, Takebayashi H, Shibuki K. Reduced visual acuity after blockade of feedback inhibitory projections from the parietal association area to the primary visual cortex in mice. The 36th Annual Meeting of the Japanese Neuroscience Society 2013. Poster. Kyoto, Japan.
86. Watanabe T, Komagata S, **Tsukano H**, Hishida R, Kohno T, Baba H, Shibuki K. Spinal mechanisms underlying post-ischemic numbness. The 36th Annual Meeting of the Japanese Neuroscience Society 2013. Poster. Kyoto, Japan.
87. **Tsukano H**, Horie M, Hishida R, Shibuki K. New subarea in the rostradorsal part of the primary auditory cortex in mice. The 90th Annual Meeting of the Physiological Society of Japan 2013. Poster. Tokyo, Japan.
88. **Tsukano H**, Hishida R, Shibuki K. Two-photon calcium imaging of harmonic sound responses in mouse primary auditory cortex. The 35th Annual Meeting of the Japanese Neuroscience Society 2012. Poster. Aichi, Japan.
89. Baba H, **Tsukano H**, Honma Y, Ohshima S, Kubota Y, Hishida R, Takahashi K, Takahashi S, Shibuki K. Biphasic ON-OFF responses in the mouse auditory cortex appeared after exposure to sustained tone bursts. The 35th Annual Meeting of the Japanese Neuroscience Society 2012. Poster. Aichi, Japan.
90. Horie M, **Tsukano H**, Takebayashi H, Shibuki K. Anatomical and physiological parcellation of mouse auditory cortex using flavoprotein fluorescence imaging and immunohistochemistry for nonphosphorylated neurofilament protein. The 35th Annual

Meeting of the Japanese Neuroscience Society 2012. Poster. Aichi, Japan.

91. Watanabe T, Komagata S, **Tsukano H**, Hishida R, Kohno T, Baba H, Shibuki K. Spinal mechanism underlying post-ischemic numbness: potentiation of Somatosensory cortical responses after transient ischemia in mice. The 35th Annual Meeting of the Japanese Neuroscience Society 2012. Poster. Aichi, Japan.
92. Shibuki K, **Tsukano H**, Komagata S, Watanabe K, Hishida R. Macro-confocal imaging of mouse brain activity. The 35th Annual Meeting of the Japanese Neuroscience Society 2012. Poster. Aichi, Japan.
93. Meguro R, Tohmi M, **Tsukano H**, Hirabayashi T, Takebayashi H, Yagi T, Shibuki K. Abnormal appearance of retinal terminals in the dorsal lateral geniculate nucleus of the protocadherin a-deficient mice. The 35th Annual Meeting of the Japanese Neuroscience Society 2012. Poster. Aichi, Japan.
94. Tohmi M, Meguro R, **Tsukano H**, Hishida R, Shibuki K. Preferred speeds of higher visual areas determined by extrageniculate visual pathways. The 35th Annual Meeting of the Japanese Neuroscience Society 2012. Poster. Aichi, Japan.
95. Hishida R, Horie M, **Tsukano H**, Tohmi M, Takebayashi H, Shibuki K. Functional analysis of inhibition mediated by feedback projections from higher association areas to the primary visual cortex in mice. The 35th Annual Meeting of the Japanese Neuroscience Society 2012. Poster. Aichi, Japan.
96. Baba H, **Tsukano H**, Honma Y, Ohshima S, Kubota Y, Hishida R, Takahashi K, Takahashi S, Shibuki K. ON and OFF responses in the mouse auditory cortex after exposure to long-lasting tone bursts. The 89th Annual Meeting of the Physiological Society of Japan 2012. Poster. Nagano, Japan.
97. **Tsukano H**, Iwasato T, Yagi T, Hishida R, Shibuki K. Primary auditory cortex stores and recalls combined sound patterns in mice. The 89th Annual Meeting of the Physiological Society of Japan 2012. Poster. Nagano, Japan.
98. Watanabe T, Komagata S, **Tsukano H**, Hishida R, Kohno T, Baba H, Shibuki K. Somatosensory cortical responses to vibratory stimuli applied to the hindpaw that experienced transient ischemia in mice. The 89th Annual Meeting of the Physiological Society of Japan 2012. Poster. Nagano, Japan.
99. **Tsukano H**, Hishida R, Shibuki K. Neuronal responses to harmonic sounds visualized using two-photon microscopy in the mouse auditory cortex. The 34th Annual Meeting of the Japanese Neuroscience Society 2011. Poster. Kanagawa, Japan.
100. Honma Y, **Tsukano H**, Ohshima S, Tohmi M, Kubota Y, Takahashi K, Hishida R, Takahashi S, Shibuki K. Differential imaging of FM sounds-selective areas in the mouse auditory cortex. The 33th Annual Meeting of the Japanese Neuroscience Society 2010. Poster. Hyogo, Japan.
101. **Tsukano H**, Nagami K, Tohmi M, Hishida R, Shibuki K. Variance of visual cortical responses in awake mice is eliminated by a lesion in the frontal association cortex. The 32th Annual Meeting of the Japanese Neuroscience Society 2009. Poster. Aichi, Japan.
102. **Tsukano H**, Yamato K, Iwasato T, Itohara S, Yagi T, Komagata S, Hishida R, Shibuki K.

Experience-dependent formation of cortical circuits for detecting harmonic sounds in mice. The 36th Congress of the International Union of Physiological Sciences 2009. Poster. Kyoto, Japan.

103. **Tsukano H**, Kubota Y, Komagata S, Hishida R, Kudoh M, Shibuki K. Experience-dependent formation of cortical responses to “missing” fundamentals during presentation of harmonic sounds in the mouse auditory cortex. Society for Neuroscience 2008. Poster. Washington DC., USA.
104. Ohshima S, **Tsukano H**, Kubota Y, Takahashi K, Hishida R, Takahashi S, Shibuki K. Transcranial flavoprotein fluorescence imaging of cortical depression in the mouse auditory cortex after sound discrimination learning. Society for Neuroscience 2008. Poster. Washington DC., USA.
105. Ohshima S, **Tsukano H**, Kubota Y, Hishida R, Takahashi K, Shibuki K. Transcranial fluorescence imaging of cortical auditory activities after sound discrimination learning in mice. The 31th Annual Meeting of the Japanese Neuroscience Society 2008. Poster. Tokyo, Japan.
106. **Tsukano H**, Kubota Y, Tohmi M, Kudoh M, Shibuki K. Cortical responses to missing fundamentals visualized with flavoprotein fluorescence imaging in the mouse primary auditory cortex. The 29th Annual Meeting of the Japanese Neuroscience Society 2006. Poster. Kyoto, Japan.

Invited Talks and Chairs

1. 25th Japan Human Brain Mapping Society (2023)
2. 9th Federation of the Asian and Oceanian Physiological Societies (FAOPS) (2019)
3. NTT Communication Science Lab (2019)
4. Niigata Daiichi Junior and High School (2019)
5. Brain Research Institute, Niigata University (2019)
6. The 5th Annual Meeting of the Society for Bioacoustics (2018)
7. The 123rd Annual Meeting of The Japanese Association of Anatomists (2018)
8. Chair, The 123rd Annual Meeting of The Japanese Association of Anatomists (2018)
9. NTT Communication Science Lab (2017)
10. Chair, The 39th Annual Meeting of The Japan Neuroscience Society (2016)
11. The 92th Annual Meeting of the Physiological Society of Japan (2015).
12. Summer seminar of Brain Research Institute, Niigata University (2013)
13. Graduate School of Medicine, Gifu University (2011)
14. Niigata Daiichi Junior and High School (2011)
15. Niigata Daiichi Junior and High School (2010)

Invited Journal Reviewer

Audiology and Neurotology, BioEssays, BMC Neuroscience, Frontiers in Neural Circuits, Hearing Research, Journal of Neurophysiology, Neuroscience, Neuron, Neuroscience Bulletin, Neuroscience Letters, Neuroscience Research, Scientific Reports, Zoological Science