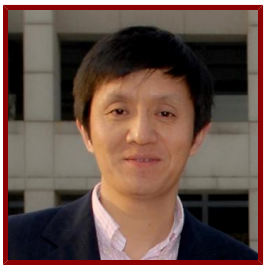
Stanford



Liqun Luo

Ann and Bill Swindells Professor and Professor, by courtesy, of Neurobiology

Biology

CONTACT INFORMATION

- **Alternate Contact**

  Mary Molacavage - Adminstrative Associate

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Bio

BIO

Dr. Luo grew up in Shanghai, China, and earned his bachelor's degree in molecular biology from the University of Science and Technology of China. After obtaining his PhD in Brandeis University, and postdoctoral training at the University of California, San Francisco, Dr. Luo started his own lab in the Department of Biology, Stanford University in December 1996. Together with his postdoctoral fellows and graduate students, Dr. Luo studies how neural circuits are assembled during development, and how their architectures enable them to perform specific functions in adults. Dr. Luo is currently the Ann and Bill Swindells Professor in the School of Humanities and Sciences, Professor of Biology, and Professor of Neurobiology by courtesy at Stanford University, and a Howard Hughes Medical Institute Investigator. He teaches neurobiology to Stanford undergraduate and graduate students. His single-author textbook “Principles of Neurobiology” (1st edition 2015; 2nd edition 2020) is widely used for undergraduate and graduate courses across the world.

Dr. Luo has served on the editorial boards of several scientific journals, including Neuron, eLife, and Annual Review of Neuroscience, Cell, and PNAS. He has also served on the Pew Scholar National Committee and Scientific Advisory Committee of Damon Runyon Cancer Research Foundation. He is recipient of the McKnight Technological Innovation in Neuroscience Award, the Society for Neuroscience Young Investigator Award, the Jacob Javits Award from National Institute of Neurological Disorders and Stroke, HW Mossman Award from American Association of Anatomists, the Lawrence Katz Prize, the Pradel Award of National Academy of Sciences, the Education in Neuroscience award from Society for Neuroscience, and Award in the Neurosciences from National Academy of Sciences. Dr. Luo is a Member of the National Academy of Sciences and a Fellow of the American Academy of Arts and Sciences.

ACADEMIC APPOINTMENTS

- Professor, Biology
- Professor (By courtesy), Neurobiology
- Member, Bio-X
- Faculty Fellow, Sarafan ChEM-H
- Member, Stanford Cancer Institute

- Member, Wu Tsai Neurosciences Institute

HONORS AND AWARDS

- NAS Award in the Neurosciences, National Academy of Sciences (2025)
- Education in Neuroscience Award, Society for Neuroscience (2020)
- Pradel Award, National Academy of Sciences (2019)
- The Lawrence C. Katz Prize for Innovative Research in Neuroscience, Duke University (2013)
- Member, National Academy of Sciences (2012)
- Fellow, American Academy of Arts and Sciences (2012)
- Fellow, American Association for the Advancement of Science (2011)
- H.W.Mossman Award, American Association of Anatomists (2007)
- Investigator, Howard Hughes Medical Institute (2005)
- Jacob Javits Award, National Institute of Neurological Disorders and Stroke (2005)
- Technology Innovation Award in Neuroscience, McKnight Foundation (2002)
- Young Investigator Award, Society for Neuroscience (2002)

PROFESSIONAL EDUCATION

- B.S., Univ. of Sci. & Tech. of China , Molecular Biology (1986)
- Ph.D., Brandeis University , Biology (1992)

PATENTS

- He Z, Zhai Q, Wang J, Watts R, Hoopfer E, Luo L. "United States Patent 7,012,063 Reducing axon degeneration with proteasome inhibitors", Harvard & Stanford
- Luo L, Zong H. "United States Patent 7,282,621 Somatic recombination", Stanford
- Luo L, Tsai RY, Tasic B, Hippenmeyer S, Zong H. "United States Patent 9,125,385 Site-directed integration of transgenes in mammals", Stanford

LINKS

- LuoLab: http://web.stanford.edu/group/luolab/

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

1. Assembly of the fly olfactory circuit

A central question in neural circuit assembly is how neurons connect specifically with their synaptic partners. We are using the fly olfactory circuit to investigate the general principles by which wiring specificity is established during development. The assembly of the fly olfactory circuit requires precise matching between axons from 50 olfactory receptor neuron types and dendrites from 50 projection neuron types. In the past 20 years, we have identified key cellular interactions and molecular mechanisms at specific steps of olfactory circuit assembly. More recently, we have also taken transcriptomic, proteomic, and live imaging approaches to complement genetic analyses of individual genes. We are currently integrating these approaches to deepen our understanding of the combinatorial cell-surface codes that instruct connection specificity.

2. Assembly of neural circuits in the mouse brain

We have studied a broad range of developmental processes in rodent brains using genetic tools we have developed. Some of these studies extend what we are learning in the fly, whereas others explore processes more prevalent in vertebrates. For example, cerebellar Purkinje cells have highly elaborate and planar dendritic trees, each of which receives presynaptic inputs from tens of thousands of granule cells. Our investigations of Purkinje cell dendrite

morphogenesis have highlighted the importance of competitive interactions in dendritic growth and branching. Our studies of hippocampal network assembly have revealed that the same cell-surface proteins, teneurin-3 and latrophilin-2, can serve both as ligands and receptors to mediate attraction and repulsion, and these molecules are likely reused in the assembly of multiple nodes of the hippocampal networks. We are investigating the function of these molecules in the assembly of additional circuits as well as how they work both as ligands and receptors.

3. Organization and function of neural circuits

We have used genetic and viral strategies to decipher the organizational principles of the fly and mouse olfactory systems, as well as the input–output architecture of norepinephrine, dopamine, and serotonin systems at the scale of the entire mouse brain. We are now also combining single-cell transcriptomics with activity recording, manipulation, and TRAPing, as well as behavioral analyses, to interrogate the functional organization of a variety of neural circuits. Recent discoveries include the dissection of dorsal raphe serotonin neuron subsystems, reward representation in cerebellar granule cells and shared cortex-cerebellum dynamics, the unit of organization and evolution of the cerebellar nuclei, differential encoding of task variables by prefrontal cortical projection neuron classes, temporal evolution of prefrontal cortical neuron ensembles that promote remote memory retrieval, and neural basis of thirst drive for motivated behavior.

4. Tool development

We continue to develop tools to interrogate neural circuit assembly and organization with increasing precision. The MARCM (mosaic analysis with a repressible cell marker) method in flies and MADM (mosaic analysis with double markers) method in mice allow the visualization and genetic manipulation of isolated single neurons. The Q system further expanded binary expression tools in flies. We recently developed tools to map circuit organization in mammals. The TRIO (tracing the relationship between input and output) and cTRIO (cell-type-specific TRIO) methods allow rabies virus–based input tracing to neurons defined by projection, or by cell type and projection. The TRAP (targeted recombination in active population) method enables genetic access to neurons based on their activity, which in combination with tools for labeling, tracing, recording, and manipulating neurons, offers a powerful approach for understanding how neural circuits process information and generate behavior.

Teaching

COURSES

2026-27

- Biology PhD Lab Rotation: BIO 299 (Aut, Win, Spr)
- Introduction to Neuroscience: BIO 102 (Win)

2025-26

- Introduction to Neuroscience: BIO 102 (Win)

2024-25

- Introduction to Neuroscience: BIO 102 (Win)

2023-24

- Exploring Neural Circuits: BIO 222 (Spr)

STANFORD ADVISEES

Jasmine Wu

Doctoral Dissertation Reader (AC)

Connie An, Sapeeda Barati, Jacqueline Bendrick, Minseung Choi, Lorna Jayne, Dane Kawano, Emmalyn Leonard, Max Madrzyk, Abigail Rogers, Emma Theisen, Valerie Tsai, Yandan Wang, Xiaochen Xiong, Junhao Xu

Postdoctoral Faculty Sponsor

Chloe Bair-Marshall, Adam Broerman, Rongrong Du, Hui Ji, Airi Yoshimoto

Doctoral Dissertation Advisor (AC)

URee Chon, Hannah Field, Ying Hu, Jordan Kalai, Jun Song, Alina Xiao, Yanbo Zhang

Doctoral Dissertation Co-Advisor (AC)

Lucas Encarnacion-Rivera, Qilin Zhao

Undergraduate Major Advisor

Tara Neddersen

Doctoral (Program)

Alina Xiao

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Biology (School of Humanities and Sciences) (PhD Program)
- Neurosciences (PhD Program)

Publications

PUBLICATIONS

- **Heterophilic interactions between cell-surface proteins Teneurin-m and Capricious drive dendrite segregation in the Drosophila olfactory circuit.** *Current biology : CB*
  Ji, H., Li, J., Xu, Y., Wong, K. K., Wu, Y., Luginbuhl, D. J., Zhang, Y., Li, Z., Lee, J., Jones, R. C., Quake, S. R., Araç, D., Özkan, et al
  2026

- **Architecture of the serotonergic projectome in the mouse brain.** *Cell*
  Song, J. H., Friedmann, D., Wu, Y., Moses, A., Baruni, J. K., Yuan, Y., Rana, I., Zhao, K., Hindmarsh Sten, T., Wang, Q., Xiao, S. A., Chen, X., Linderman, et al
  2026

- **Inverse expression of Ten3 and Lphn2 across the developing mouse brain suggests a global strategy for circuit assembly.** *Current biology : CB*
  Chon, U., Pederick, D. T., Song, J. H., Zhang, Y., Rana, I., Luo, L.
  2026

- **Ten3-Lphn2-mediated target selection across the extended hippocampal network demonstrates a repeated strategy for circuit assembly.** *Current biology : CB*
  Gingrich, E. C., Pederick, D. T., Zhang, Y., Luo, L.
  2026

- **Endocytome profiling uncovers cell-surface protein dynamics underlying neuronal connectivity.** *Neuron*
  McLaughlin, C. N., Ji, H., Dong, K. X., Xu, C., Wong, K. K., Li, Z., Luginbuhl, D. J., Xu, C., Lyu, C., Qin, W., Li, J., Udeshi, N. D., Carr, et al
  2026

- **Rewiring an olfactory circuit by altering cell-surface combinatorial code.** *Nature*
  Lyu, C., Li, Z., Xu, C., Kalai, J., Luo, L.
  2025

- **Repulsions instruct synaptic partner matching in an olfactory circuit.** *Nature*
  Li, Z., Lyu, C., Xu, C., Hu, Y., Luginbuhl, D. J., Caspi-Lebovic, A. B., Priest, J. M., Özkan, E., Luo, L.
  2025

- **Architectures of neuronal circuits.** *Science (New York, N.Y.)*
  Luo, L.

2021; 373 (6559): eabg7285

- **Principles of Neurobiology (2nd edition)**
  Luo, L.
  Garland Science/CRC Press.2020
- **Endosome-associated Rab GTPases control distinct aspects of neural circuit assembly** *ELIFE*
  Dong, K. X., Zhang, Y., Ji, H., Luginbuhl, D. J., Luo, L., McLaughlin, C. N.
  2026; 14
- **Topographic CA1 input shapes subicular spatial coding.** *Current biology : CB*
  Sun, Y., Pederick, D. T., Xu, X., Luo, L., Giocomo, L. M.
  2026
- **In-situ glial cell-surface proteomics identifies pro-longevity factors in Drosophila** *ELIFE*
  Marques, M. P., Sun, B., Park, Y., Jackson, T., Lu, T., Qi, Y., Harrison, E., Wang, M. C., Pasha, O., Varanasi, A., Carey, D., Mani, D. R., Zirin, et al
  2026; 14
- **Tirzepatide for weight and behavior management in a patient with Smith-Magenis syndrome.** *JCEM case reports*
  Liao, X. C., Huang, T., Hong, D. S., Luo, L.
  2026; 4 (7): luag152
- **A multimodal adaptive optical microscope for in vivo imaging from molecules to organisms.** *Nature methods*
  Fu, T. M., Liu, G., Milkie, D. E., Ruan, X., Görlitz, F., Shi, Y., Ferro, V., Divekar, N. S., Wang, W., York, H. M., Kilic, V., Mueller, M., Liang, et al
  2026
- **Teneurin-3 and latrophilin-2 are required for somatotopic map development and somatosensory topognosis.** *Current biology : CB*
  Sangster, K. T., Zhang, X., Del Toro, D., Sarantopoulos, C., Moses, A. M., Mahasenan, S., Pederick, D. T., Perreault, S., Fallet-Bianco, C., Roome, R. B., Seiradake, E., Luo, L., Kania, et al
  2026
- **Directed evolution of LaccID for cell surface proximity labeling and electron microscopy.** *Nature chemical biology*
  Lee, S., Roh, H., Gonzalez-Perez, D., Mackey, M. R., Hoces, D., McLaughlin, C. N., Lin, C., Adams, S. R., Nguyen, K., Kim, K., Luginbuhl, D. J., Luo, L., Udeshi, et al
  2025
- **Concerted actions of distinct serotonin neurons orchestrate female pup care behavior.** *bioRxiv : the preprint server for biology*
  Xiao, S. A., Chen, C. C., Horvath, P., Tsai, V., Cardenas, V. M., Biderman, D., Deng, F., Li, Y., Linderman, S. W., Dulac, C., Luo, L.
  2025
- **Mouse lemur cell atlas informs primate genes, physiology and disease.** *Nature*
  Ezran, C., Liu, S., Chang, S., Ming, J., Guethlein, L. A., Wang, M. F., Dehghannasiri, R., Olivieri, J., Frank, H. K., Tarashansky, A., Koh, W., Jing, Q., Botvinnik, et al
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- **A molecular cell atlas of mouse lemur, an emerging model primate.** *Nature*
  Ezran, C., Liu, S., Chang, S., Ming, J., Botvinnik, O., Penland, L., Tarashansky, A., de Morree, A., Travaglini, K. J., Zhao, J., Wang, G., Hasegawa, K., Sin, et al
  2025
- **Distinct neural representations of hunger and thirst in neonatal mice before the emergence of food- and water-seeking behaviors.** *Current biology : CB*
  Wang, D. C., Wu, Y., Mehaffy, C., Espinoza-Campomanes, L. A., Santos-Valencia, F., Franks, K. M., Luo, L.
  2025
- **Conserved brain-wide emergence of emotional response from sensory experience in humans and mice.** *Science (New York, N.Y.)*
  Kauvar, I., Richman, E. B., Liu, T. X., Li, C., Vesuna, S., Chibukhchyan, A., Yamada, L., Fogarty, A., Solomon, E., Choi, E. Y., Mortazavi, L., Chau Loo Kung, G., Mukunda, et al
  2025; 388 (6750): eadt3971
- **Dimensionality reduction simplifies synaptic partner matching in an olfactory circuit.** *Science (New York, N.Y.)*

Lyu, C., Li, Z., Xu, C., Wong, K. K., Luginbuhl, D. J., McLaughlin, C. N., Xie, Q., Li, T., Li, H., Luo, L.
2025; 388 (6746): 538-544

- **Neurobiology of Thirst and Hunger Drives.** *Annual review of neuroscience*
  Encarnacion-Rivera, L., Deisseroth, K., Luo, L.
  2025
- **Repulsive interactions instruct synaptic partner matching in an olfactory circuit.** *Research square*
  Li, Z., Lyu, C., Xu, C., Hu, Y., Luginbuhl, D. J., Lehovic, A. B., Priest, J. M., Özkan, E., Luo, L.
  2025
- **Rewiring an olfactory circuit by altering the combinatorial code of cell-surface proteins.** *Research square*
  Lyu, C., Li, Z., Xu, C., Kalai, J., Luo, L.
  2025
- **Protocol for cell-type-specific single-cell labeling and manipulation in Drosophila using a sparse driver system.** *STAR protocols*
  Xu, C., Li, Z., Luo, L.
  2025; 6 (1): 103694
- **Prohormone cleavage prediction uncovers a non-incretin anti-obesity peptide.** *Nature*
  Coassolo, L., B Danneskiold-Samsøe, N., Nguyen, Q., Wiggenhorn, A., Zhao, M., Wang, D. C., Toomer, D., Lone, J., Wei, Y., Patel, A., Liparulo, I., Kavi, D., Wat, et al
  2025
- **Repulsive interactions instruct synaptic partner matching in an olfactory circuit.** *bioRxiv : the preprint server for biology*
  Li, Z., Lyu, C., Xu, C., Hu, Y., Luginbuhl, D. J., Caspi-Lebovic, A. B., Priest, J. M., Ozkan, E., Luo, L.
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- **Distinct Neural Representations of Hunger and Thirst in Neonatal Mice before the Emergence of Food- and Water-seeking Behaviors.** *Current Biology*
  Wang, D. C., Wu, Y., Mehaffey, C., Espinoza-Campomanes, L. A., Santos-Valencia, F., Franks, K. M., Luo, L.
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- **Directed evolution of the multicopper oxidase laccase for cell surface proximity labeling and electron microscopy.** *bioRxiv : the preprint server for biology*
  Lee, S. Y., Roh, H., Gonzalez-Perez, D., Mackey, M. R., Kim, K. Y., Hoces, D., McLaughlin, C. N., Adams, S. R., Nguyen, K., Luginbuhl, D. J., Luo, L., Udeshi, N. D., Carr, et al
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- **Molecular mechanisms of proteoglycan-mediated semaphorin signaling in axon guidance.** *Proceedings of the National Academy of Sciences of the United States of America*
  Nourisanami, F., Sobol, M., Li, Z., Horvath, M., Kowalska, K., Kumar, A., Vlasak, J., Koupilova, N., Luginbuhl, D. J., Luo, L., Rozbesky, D.
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- **Molecular and cellular mechanisms of teneurin signaling in synaptic partner matching.** *Cell*
  Xu, C., Li, Z., Lyu, C., Hu, Y., McLaughlin, C. N., Wong, K. K., Xie, Q., Luginbuhl, D. J., Li, H., Udeshi, N. D., Svinkina, T., Mani, D. R., Han, et al
  2024
- **Embryonically active piriform cortex neurons promote intracortical recurrent connectivity during development.** *Neuron*
  Wang, D. C., Santos-Valencia, F., Song, J. H., Franks, K. M., Luo, L.
  2024
- **A cerebellar granule cell-climbing fiber computation to learn to track long time intervals.** *Neuron*
  Garcia-Garcia, M. G., Kapoor, A., Akinwale, O., Takemaru, L., Kim, T. H., Paton, C., Litwin-Kumar, A., Schnitzer, M. J., Luo, L., Wagner, M. J.
  2024
- **Neural landscape diffusion resolves conflicts between needs across time.** *Nature*
  Richman, E. B., Ticea, N., Allen, W. E., Deisseroth, K., Luo, L.
  2023

- **Toward building a library of cell type-specific drivers across developmental stages.** *Proceedings of the National Academy of Sciences of the United States of America*
  Lyu, C., Li, Z., Luo, L.
  2023; 120 (35): e2312196120
- **A neural circuit for male sexual behavior and reward.** *Cell*
  Bayless, D. W., Davis, C. O., Yang, R., Wei, Y., de Andrade Carvalho, V. M., Knoedler, J. R., Yang, T., Livingston, O., Lomvardas, A., Martins, G. J., Vicente, A. M., Ding, J. B., Luo, et al
  2023
- **Expansion spatial transcriptomics.** *Nature methods*
  Fan, Y., Andrusivova, Z., Wu, Y., Chai, C., Larsson, L., He, M., Luo, L., Lundeberg, J., Wang, B.
  2023
- **Aging Fly Cell Atlas identifies exhaustive aging features at cellular resolution.** *Science (New York, N.Y.)*
  Lu, T. C., Brbić, M., Park, Y. J., Jackson, T., Chen, J., Kolluru, S. S., Qi, Y., Katheder, N. S., Cai, X. T., Lee, S., Chen, Y. C., Auld, N., Liang, et al
  2023; 380 (6650): eadg0934
- **Origin of wiring specificity in an olfactory map revealed by neuron type-specific, time-lapse imaging of dendrite targeting.** *eLife*
  Wong, K. K., Li, T., Fu, T. M., Liu, G., Lyu, C., Kohani, S., Xie, Q., Luginbuhl, D. J., Upadhyayula, S., Betzig, E., Luo, L.
  2023; 12
- **Context-dependent requirement of G protein coupling for Latrophilin-2 in target selection of hippocampal axons.** *eLife*
  Pederick, D. T., Perry-Hauser, N. A., Meng, H., He, Z., Javitch, J. A., Luo, L.
  2023; 12
- **Hypothalamic neurons that mirror aggression.** *Cell*
  Yang, T., Bayless, D. W., Wei, Y., Landayan, D., Marcelo, I. M., Wang, Y., DeNardo, L. A., Luo, L., Druckmann, S., Shah, N. M.
  2023
- **Loss of Rai1 enhances hippocampal excitability and epileptogenesis in mouse models of Smith-Magenis syndrome.** *Proceedings of the National Academy of Sciences of the United States of America*
  Chang, Y., Kowalczyk, M., Fogerson, P. M., Lee, Y., Haque, M., Adams, E. L., Wang, D. C., DeNardo, L. A., Tessier-Lavigne, M., Huguenard, J. R., Luo, L., Huang, W.
  2022; 119 (43): e2210122119
- **In situ cell-type-specific cell-surface proteomic profiling in mice.** *Neuron*
  Shuster, S. A., Li, J., Chon, U., Sinantha-Hu, M. C., Luginbuhl, D. J., Udeshi, N. D., Carey, D. K., Takeo, Y. H., Xie, Q., Xu, C., Mani, D. R., Han, S., Ting, et al
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- **Scent of a human: The mosquito olfactory system defies dogma to ensure attraction to humans.** *Cell*
  McLaughlin, C. N., Luo, L.
  2022; 185 (17): 3079-3081
- **Illuminating complexity in serotonin neurons of the dorsal raphe nucleus.** *Neuron*
  Baruni, J., Luo, L.
  2022; 110 (16): 2519-2521
- **Transcriptional and functional motifs defining renal function revealed by single-nucleus RNA sequencing.** *Proceedings of the National Academy of Sciences of the United States of America*
  Xu, J., Liu, Y., Li, H., Tarashansky, A. J., Kalicki, C. H., Hung, R., Hu, Y., Comjean, A., Kolluru, S. S., Wang, B., Quake, S. R., Luo, L., McMahon, et al
  2022; 119 (25): e2203179119
- **Isolation and RNA sequencing of single nuclei from Drosophila tissues.** *STAR protocols*
  McLaughlin, C. N., Qi, Y., Quake, S. R., Luo, L., Li, H.
  2022; 3 (2): 101417
- **A preoptic neuronal population controls fever and appetite during sickness.** *Nature*
  Osterhout, J. A., Kapoor, V., Eichhorn, S. W., Vaughn, E., Moore, J. D., Liu, D., Lee, D., DeNardo, L. A., Luo, L., Zhuang, X., Dulac, C.

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- **Transcription factor Acj6 controls dendrite targeting via a combinatorial cell-surface code.** *Neuron*
  Xie, Q., Li, J., Li, H., Udeshi, N. D., Svinkina, T., Orlin, D., Kohani, S., Guajardo, R., Mani, D. R., Xu, C., Li, T., Han, S., Wei, et al
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- **Fly Cell Atlas: A single-nucleus transcriptomic atlas of the adult fruit fly.** *Science (New York, N.Y.)*
  Li, H., Janssens, J., De Waegeneer, M., Kolluru, S. S., Davie, K., Gardeux, V., Saelens, W., David, F. P., Brbic, M., Spanier, K., Leskovec, J., McLaughlin, C. N., Xie, et al
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- **Mating-driven variability in olfactory local interneuron wiring.** *Science advances*
  Chou, Y., Yang, C., Huang, H., Liou, N., Panganiban, M. R., Luginbuhl, D., Yin, Y., Taisz, I., Liang, L., Jefferis, G. S., Luo, L.
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- **An Explant System for Time-Lapse Imaging Studies of Olfactory Circuit Assembly in Drosophila.** *Journal of visualized experiments : JoVE*
  Li, T., Luo, L.
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- **Cellular bases of olfactory circuit assembly revealed by systematic time-lapse imaging.** *Cell*
  Li, T., Fu, T., Wong, K. K., Li, H., Xie, Q., Luginbuhl, D. J., Wagner, M. J., Betzig, E., Luo, L.
  2021
- **Teneurins** *CURRENT BIOLOGY*
  Pederick, D. T., Luo, L.
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- **Gut cytokines modulate olfaction through metabolic reprogramming of glia.** *Nature*
  Cai, X. T., Li, H., Borch Jensen, M., Maksoud, E., Borneo, J., Liang, Y., Quake, S. R., Luo, L., Haghighi, P., Jasper, H.
  2021
- **A neural circuit state change underlying skilled movements.** *Cell*
  Wagner, M. J., Savall, J., Hernandez, O., Mel, G., Inan, H., Rumyantsev, O., Lecoq, J., Kim, T. H., Li, J. Z., Ramakrishnan, C., Deisseroth, K., Luo, L., Ganguli, et al
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  Contreras, X., Amberg, N., Davaatseren, A., Hansen, A. H., Sonntag, J., Andersen, L., Bernthaler, T., Streicher, C., Heger, A., Johnson, R. L., Schwarz, L. A., Luo, L., Rulicke, et al
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- **The relationship between birth timing, circuit wiring, and physiological response properties of cerebellar granule cells.** *Proceedings of the National Academy of Sciences of the United States of America*
  Shuster, S. A., Wagner, M. J., Pan-Doh, N., Ren, J., Grutzner, S. M., Beier, K. T., Kim, T. H., Schnitzer, M. J., Luo, L.
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- **Reciprocal repulsions instruct the precise assembly of parallel hippocampal networks.** *Science (New York, N.Y.)*
  Pederick, D. T., Lui, J. H., Gingrich, E. C., Xu, C., Wagner, M. J., Liu, Y., He, Z., Quake, S. R., Luo, L.
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  Xie, Q., Brbic, M., Horns, F., Kolluru, S. S., Jones, R. C., Li, J., Reddy, A. R., Xie, A., Kohani, S., Li, Z., McLaughlin, C. N., Li, T., Xu, et al
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- **Single-cell transcriptomes of developing and adult olfactory receptor neurons in Drosophila.** *eLife*
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  2021; 10
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  Kramer, D. J., Aisenberg, E. E., Kosillo, P. n., Friedmann, D. n., Stafford, D. A., Lee, A. Y., Luo, L. n., Hockemeyer, D. n., Ngai, J. n., Bateup, H. S.

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- **Deep posteromedial cortical rhythm in dissociation.** *Nature*
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  2020
- **Mapping mesoscale axonal projections in the mouse brain using a 3D convolutional network.** *Proceedings of the National Academy of Sciences of the United States of America*
  Friedmann, D., Pun, A., Adams, E. L., Lui, J. H., Kebschull, J. M., Grutzner, S. M., Castagnola, C., Tessier-Lavigne, M., Luo, L.
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