Zhenrui Liao

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Citizenship: USA

Education & Training

2019– PhD in Neurobiology and Behavior (in progress), Columbia University
Supervised by Attila Losonczy & Liam Paninski

2017– MD (in progress), Columbia University College of Physicians and Surgeons

2017 MS in Electrical Engineering (*cum laude*), Columbia University
(concentration in Systems Biology and Neuroengineering)

2017 BS in Electrical Engineering (*cum laude*), Columbia University

2015-2016 MEng Visiting Student, Imperial College London

Grants, honors & awards

2020-2022 NIH Ruth L. Kirchenstein Fellowship (F31) – Won in first year of graduate school

2017-2020 Columbia University Medical Scientist Training Program

2017 Bachelor of Science with Latin Honors

2017 Tau Beta Pi (Engineering Phi Beta Kappa, top 7% of class)

Publications

2021 D. Hadjiabadi, M. Lovett-Barron, I. G. Raikov, F. T. Sparks, Z. Liao, S. C. Baraban, J. Leskovec, A. Losonczy, K. Deisseroth, and I. Soltesz. Maximally selective single-cell target for circuit control in epilepsy models. *Neuron*, 2021

2020 F. Sparks*, Z. Liao*, W. Li, A. Grosmark, I. Soltesz, and A. Losonczy. Hippocampal adult-born granule cells drive network activity in a mouse model of chronic temporal lobe epilepsy. *Nature communications*, 11(1):1–13, 2020

2019 G. F. Turi*, W.-K. Li*, S. Chavlis*, I. Pandi, J. O'Hare, J. B. Priestley, A. D. Grosmark, Z. Liao, M. Ladow, J. F. Zhang, et al. Vasoactive intestinal polypeptide-expressing interneurons in the hippocampus support goal-oriented spatial learning. *Neuron*, 101(6):1150–1165, 2019

2017 J. D. Zaremba, A. Diamantopoulou, N. B. Danielson, A. D. Grosmark, P. W. Kaifosh, J. C. Bowler, Z. Liao, F. T. Sparks, J. A. Gogos, and A. Losonczy. Impaired hippocampal place cell dynamics in a mouse model of the 22q11. 2 deletion. *Nature neuroscience*, 20(11):1612–1623, 2017

* denotes equal contribution

Talks

2021 Z. Liao. Topic models of neural ensembles and epileptogenic networks. In *American Epilepsy Society*, Chicago, IL, 2021a

2021 Z. Liao. Replay of world structure by ca3. In *Organization for Computational Neurosciences*, virtual, 2021b

2021 Z. Liao. Spectral and machine learning methods for detection of epileptiform electrophysiological events. virtual / Ripple Methods Consortium hosted by NYU, 2021c

Conference presentations

2021 S. Terada, Z. Liao, D. Hadjiabadi, I. Soltesz, and A. Losonczy. A novel mechanism of adaptive stimulus selection for sharp wave ripple-related memory consolidation in the hippocampus. In *7th Annual BRAIN Initiative Meeting*, virtual, 2021

2021 Z. Liao, A. Losonczy, and C. Papadimitriou. The excitability functionality trade-off: Random graph models of epilepsy. In *COSYNE*, virtual, 2021

2019 F. Sparks*, Z. Liao*, I. Soltesz, and A. Losonczy. Circuit level cell-type specific population dynamics within the dentate gyrus during interictal events in the kainic acid mouse model of temporal lobe epilepsy. In *Society for Neuroscience*, Chicago, IL, 2019b

2019 F. Sparks*, Z. Liao*, I. Soltesz, and A. Losonczy. Interictal events recruit distinct ensembles of adult-born and mature granule cells in the epileptic dentate gyrus. In *Park City Epilepsy Meeting*, Park City, UT, 2019a

2019 F. Sparks, S. Wiesenberger, Z. Liao, W.-K. Li, R. Nyilas, B. Vancura, H. Blockus, A. Vaziri, and A. Losonczy. Large-scale volumetric calcium imaging of hippocampal microcircuits during head-fixed spatial navigation and learning. In *Inhibition in the CNS - Gordon Research Conference*, Newry, ME, 2019

2016 G. Turi, Z. Liao, W.-K. Li, J. Zaremba, A. Grosmark, X. Luo, L. Topolnik, and A. Losonczy. Role of hippocampal vip interneurons in reward-oriented spatial learning. In *Society for Neuroscience*, San Diego, CA, 2016

2016 Z. Liao and A. Losonczy. A matched filtering algorithm for sharp-wave ripple detection in hippocampal local field potential recordings. In *38th International Conference of the IEEE Engineering in Medicine and Biology Society*, Orlando, FL, 2016. IEEE

Teaching

Teaching Assistantships

2021	Mathematics for Theoretical Neuroscience	with Danil Tyukmanov and Ken Miller
2020	Computation and the Brain	Christos Papadimitriou
2019	Unsupervised Learning	Nakul Verma
2018	Information Theory in Theoretical Computer Science	Omri Weinstein
2020	Advanced Machine Learning	Nakul Verma
2016-2020	Machine Learning	Daniel Hsu, Its'ik Pe'er, Nakul Verma
2014	Analysis and Optimization	Davesh Maulik