

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

Publications

- 2021 S. Terada, T. Geiller*, **Z. Liao***, J. O’Hare*, B. Vancura*, and A. Losonczy. Adaptive stimulus selection for consolidation in the hippocampus. *Nature*, 2021a
- 2021 B. Dudok*, M. Szoboszlai*, A. Paul*, P. M. Klein*, **Z. Liao***, E. Hwaun, G. G. Szabo, T. Geiller, B. Vancura, B.-S. Wang, S. McKenzie, J. Homidan, L. M. Klaver, D. F. English, Z. J. Huang, G. Buzsáki, A. Losonczy, and I. Soltesz. Recruitment and inhibitory action of hippocampal axo-axonic cells during behavior. *Neuron*, 2021
- 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

Invited talks

- 2021 **Z. Liao.** AI & the Brain: Learning about learning. In *Inspire AI Spotlight Talks*, virtual, 2021b
- 2021 **Z. Liao.** Dissecting interictal epileptiform discharge diversity: A Bayesian topic modeling approach. In *American Epilepsy Society*, Chicago, IL, 2021a
- 2021 **Z. Liao.** Replay of world structure by CA3. In *Organization for Computational Neurosciences*, virtual, 2021c
- 2021 **Z. Liao.** Spectral and machine learning methods for detection of epileptiform electrophysiological events. virtual / Ripple Methods Consortium hosted by NYU, 2021d

Conference presentations

- 2021 D. Hadjiabadi*, **Z. Liao***, Q. A. Nguyen, S. Terada, A. Losonczy, and I. Soltesz. Data-driven biophysical model of genetic epilepsy predicts loss of cue cell suppression during sharp-wave ripple associated memory replay. In *American Epilepsy Society*, Chicago, IL, 2021
- 2021 **Z. Liao***, D. Hadjiabadi*, I. Soltesz, and A. Losonczy. Hebbian plasticity of gabaergic synapses sufficient for consolidation of world structure by ca3 replay. In *Society for Neuroscience*, virtual, 2021
- 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, 2021b
- 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

Grants, honors & awards

- 2020-2022 NIH Ruth L. Kirchstein Fellowship (F31, \$171,010 award) – Won in first year of graduate school
- 2021 American Epilepsy Society Faculty Stipend 2021
- 2021 Society for Neuroscience 2021 Professional Development Award

2017-2020	Columbia University Medical Scientist Training Program Training Grant
2017	Bachelor of Science with Latin Honors
2017	Tau Beta Pi (Engineering Phi Beta Kappa, top 7% of class)

Teaching

INSTRUCTOR

2021, 2022	Mathematics for Theoretical Neuroscience	with Danil Tyukmanov (semester course)
2021	Artificial Intelligence	InspirAI (winter course)
2018, 2019	Pharmacokinetics & Pharmacodynamics	Columbia Medical School (student-led)

TEACHING ASSISTANT

2020, 2021	Computation and the Brain	with 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