Songting Li

Contact Information

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Research Interests

Applied Mathematics, Theoretical and Computational Neuroscience, Biophysics

Employment

Sept. 2022 - present	Full Professor （early promotion） Institute of Natural Sciences & School of Mathematical Sciences Shanghai Jiao Tong University
Sept. 2018- Sept. 2022	Tenure-track Associate Professor Institute of Natural Sciences & School of Mathematical Sciences Shanghai Jiao Tong University
Aug. 2017- Sept. 2018	Visiting Member, Courant Institute, New York University Research Associate, New York University Abu Dhabi
Jan. 2015- Jul. 2017	Postdoctoral Associate, Courant Institute, New York University Advisor: David W. McLaughlin

Education

2010-2014	Ph.D. in Mathematics **Shanghai Jiao Tong University (SJTU)**, Shanghai, China Advisors: David Cai & Douglas Zhou
2010-2012	M.S. in Industrial Engineering (GT-SJTU dual master program) **Georgia Institute of Technology (GT)**, Atlanta, United States
2006-2010	B.S. in Mathematics **Shanghai Jiao Tong University**, Shanghai, China

Selected Awards

2024 宝钢优秀教师奖

2024 上海交大第四届十大科技进展（项目负责人）

2024 上海交大佳和优秀青年教师奖

2023 全国青年教师教学竞赛理科组一等奖（第二名）

2023 上海市五一劳动奖章

2023 上海市教学能手

2022 上海市青年教师教学竞赛理科组特等奖（第一名）

2022 上海高校市级重点课程

2021 教育部青年长江学者

2021 上海交大烛光奖一等奖

2020 上海交大青年教师教学竞赛一等奖

2019 上海市青年科技英才扬帆计划

2018 上海市晨光计划

Publications

* denotes corresponding authorship

Liu C, Ma J, Li S*, Zhou D*.
Dendritic integration inspired artificial neural networks enhance data correlation.
Accepted by NeurIPS 2024.

Mei J, Chen K, Xiao Y, Li S*, Zhou D*.
The Asymptotic Behavior of Conditional Granger Causality with Respect to Sampling Interval.
CSIAM Transactions on Life Sciences. 1(1), 22-43, 2024.

Tian Z, Chen K, **Li S***, McLaughlin D*, Zhou D*.
Causal Connectivity Measures for Pulse-Output Network Reconstruction: Analysis and Applications.
Proceedings of the National Academy of Sciences of the USA (PNAS). 121 (14) e2305297121，2024.

Li S*, McLaughlin D*, Zhou D*.
Mathematical modeling and analysis of spatial neuron dynamics: dendritic integration and beyond.
Communications on Pure and Applied Mathematics (CPAM), 76(1), 114-162, 2023.

Qian D, Li W, Xue J, Wu Y, Wang Z, Shi T, **Li S**, Yang J, Qiu S, Wang S, Wang Q, Yuan T, Zhou D*, Lu W*.
A striatal SOM-driven ChAT-iMSN loop generates beta oscillations and produces motor deficits.
Cell Reports, 40(3), 111111, 2022.

Marius’ t Hart, B, ..., **Li S**, ..., Viegen, T.
Neuromatch Academy: a 3-week, online summer school in computational neuroscience.
Journal of Open Source Education, 5(49), 118, 2022.

Li S*, Wang X-J*.
Hierarchical timescales in the neocortex: mathematical mechanism and biological insights.
Proceedings of the National Academy of Sciences of the USA (PNAS), 119, 6, e2110274119, 2022.

Song Y, Zhou D*, **Li S***.
Maximum entropy principle underlies the wiring length distribution in brain networks.
Cerebral Cortex, 31(10): 4628–4641, 2021. (*selected as cover story in issue 32(7)*)

Viegen T*, ..., **Li S**, ... Peters M.
Neuromatch academy: teaching computational neuroscience with global accessibility.
Trends in Cognitive Sciences, 25(7), 535-538, 2021.

Li S, Liu N, Zhang Xh*, McLaughlin D*, Zhou D*, Cai D.
Dendritic computation captured by an effective point neuron model.
Proceedings of the National Academy of Sciences of the USA (PNAS), 116, 39, 15244-15252, 2019.

Li S, Liu N, Yao L, Zhang Xh*, Zhou D*, Cai D.
Determination of effective synaptic conductances using somatic voltage clamp.
PLoS Computational Biology, 15, 3, e1006871, 2019. (*highlighted by the journal*)

Xiao Y*, **Li S***, Zhou D*.
Representing conditional granger causality by vector auto-regressive parameters.
Communications in Mathematical Sciences, 17(5):1353-1386, 2019.

Dai W*, **Li S***, Zhou D*.
Fast algorithms for simulation of neuronal dynamics based on the bilinear dendritic integration rule.
Communications in Mathematical Sciences, 17(5):1313-1331, 2019.

Gu Q, Xiao Y, **Li S***, Zhou D*.
The emergence of spatially periodic diffusive waves in small-world neuronal networks.
Physical Review E, 100, 042401， 2019.

Gu Q, **Li S***, Dai W, Zhou D*, Cai D.
Balanced active core in heterogeneous neuronal networks.
Frontiers in Computational Neuroscience, 12, 109, 2019.

Li S, Xiao Y, Zhou D*, Cai D.
Causal inference in nonlinear systems: Granger causality versus time-delayed mutual information.
Physical Review E, 97, 052216, 2018.

Li S, Xu J, Chen G, Lin L*, Zhou D*, Cai D*.
The characterization of hippocampal theta-driving neurons — a time-delayed mutual information approach.
Scientific Reports, 7, 5637. 2017.

Li S, Zhou D*, Cai D*.
Analysis of the dendritic integration of excitatory and inhibitory inputs from cable models.
Communications in Mathematical Sciences, 13, 565-575. 2015.

Li S, Liu N, Zhang Xh, Zhou D*, Cai D*.
Bilinearity in spatiotemporal integration of synaptic inputs.
PLoS Computational Biology, 10, e1004014. 2014. (*highlighted by the journal*)

Zhou D, **Li S**, Zhang Xh, Cai D*.
Phenomenological incorporation of nonlinear dendritic integration using integrate-and-fire neuronal frameworks.
PLoS One, e53508. 2013.

Grants

2023-2025, 科技部国家重点研发项目课题, 320 万, 主持

2023-2026, 国家自然科学基金委面上项目, 46 万, 主持

2022-2024, 上海脑科学与类脑研究中心 -临港实验室求索杰出青年计划, 300 万, 主持

2020-2022, 国家自然科学基金委青年科学基金, 21 万, 主持

2019-2022, 上海市科委扬帆计划, 20 万, 主持

2018-2020, 上海市教委晨光计划, 6 万, 主持

Organized Conference

mathematical modeling, analysis, and simulation for complex neural systems
Mini-symposium at ICIAM, Tokyo, 2023

The 4th Chinese Computational and Cognitive Neuroscience Conference, online, 2022

The Organization and Dynamics of Complex Brain Networks
Mini-symposium at SIAM Conference on the Life Sciences, online, 2020

The Dynamics and Structure of Neuronal Networks.
Mini-symposium atSIAM Conference on Applications of Dynamical Systems, online, 2019

The Connectivity and Dynamics in Neuronal Computation.
SIAM Conference on the Life Sciences,Minneapolis, USA, 2018

The Dynamics and Function of Neuronal Networks.
SIAM Conference on Applications of Dynamical Systems, Snowbird, USA, 2017

Organized Academic Activity

Computational and Cognitive Neuroscience Summer School at Cold Spring Harbor Asia.
Co-organizer, 2023-present

SJTU Computational Neuroscience Winter School.
Co-organizer, 2018-present

Neuromatch Academy: International Online School for Computational Neuroscience.
Outreach and China Regional Tech, 2021
Asian Region Subchair, 2020

Professional Services

Editorial Board:
2024-present: CSIAM Transactions on Life Sciences
2023-present: IEEE Transactions on Cognitive and Developmental Systems
2022-present: Cognitive Neurodynamics
2022-present: Frontiers in Computational Neuroscience (Review Editor)
2021-present: Frontiers in Network Physiology (Review Editor)

Reviewer for *PNAS*, *Nature Communications*,*Trends in Neurosciences*, *Journal of Neuroscience*, *Patterns*, *Chaos, Solitons and Fractals*, *PLoS Computational Biology*, *Scientific Reports*, *Plos One*, *Physical Review E*, *Cognitive Neurodynamics*, *Bulletin in Mathematical Biology*, *Frontiers in Neuroscience*, *Frontiers in Applied Mathematics and Statistics*, *Frontiers in Computational Neuroscience*, *Frontiers in Psychology*, *Frontiers in Physiology*, *Journal of Mathematical Neuroscience*, *Communications in Mathematical Sciences*...

Selected Professional Affiliations

Associate Chair of Computational Neuroscience Division at Chinese Neuroscience Society

Member of CSIAM Mathematical Life Sciences

Member of Chinese Society for Industrial and Applied Mathematics (CSIAM)

Member of Qinyuan Club at BAAI

Course Teaching

Linear Algebra (honors), 2024 Fall

Probability Theory, 2024 Fall

Undergraduate Seminar, 2024 Spring

Linear Algebra (honors), 2023 Fall

Probability Theory, 2023 Fall

Probability and Statistics, 2023 Spring

Probability and Statistics, 2022 Fall

Linear Algebra (honors), 2022 Fall

Probability and Statistics, 2022 Spring

High Performance Computing on Solving Differential Equations, 2022, Spring

Probability and Statistics, 2021 Fall

High Performance Computing on Solving Differential Equations, 2020, Fall

Probability and Statistics, 2020 Fall

Methods in Mathematical Physics, 2019 Fall

Probability and Statistics, 2019 Spring

High Performance Computing on Solving Differential Equations, 2019, Spring