

GUANHUA SUN

Courant Institute of Mathematical Sciences

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INTERESTS

My current research focuses on large-scale simulation of the mouse brain, where I use advanced computational techniques to explore how network connectivity and neuronal dynamics influence the collective behavior of the cortical network. Prior to neuroscience, I worked on fluid-structure interaction problems in physics and physiology.

Besides research, I'm the co-founder of Veritas China(2015-), the largest student-run non-profit organization that aims to promote liberal arts education in China.

EDUCATION

University of Michigan

- Ph.D., Applied Interdisciplinary Mathematics (2025).
- Advisor: Daniel B. Forger and Brendon Watson.

New York University

- B.A., Mathematics with honors, minor in Physics (2019).
- References: Charles Peskin, Leif Ristroph and Miranda-Holmes Cerfon

PUBLICATIONS AND PREPRINTS

1. **Sun G**, Hazeldn J, Kim R and Forger DB **Realistic coupling enables flexible macroscopic traveling waves in the mouse cortex**, *eLife*, 2025
2. **Sun G**, Tomoyuki M, Kompotis K, Wang N, Shi S, Brown S, Forger DB, **A Framework to Determine Active Connectivity within the Mouse Brain**, *PLoS Biology*, 2025
3. ElGrawani W, **Sun G**,..., Brown S, Forger DB, **BDNF-TrkB signaling orchestrates the buildup process for local sleep**, *Cell Reports*, 2024
4. Nguyen QM, Oza AU, Abouezzi J, **Sun G**, S Childress, Ristroph L, **Flow Rectification in Loopy Network Models of bird Lungs**, *Physical Review Letters*, 2021
5. Sanaei P, **Sun G**, Li H, Peskin CS, Ristroph L, **Flight Stability of Wedges**, *Journal of Fluids and Structures*, 2021

TALKS AND POSTERS

1. *Simulation of projection-based connectome reproduces cortical responses to different sensory stimuli.* Society for Neuroscience, Chicago, US, Oct 2024.
2. *Spatiotemporal patterns in large-scale cortical simulations.* Courant Institute of Mathematical Sciences, New York, US, Apr 2024.

¹Updated April 13, 2026

3. *How a pencil rolls down a slope?*. Math Club, Ann Arbor, US, 2024 Feb.
4. *NeuroWiz-A platform for large-scale neuronal simulation*. Nanosymposium, Society for Neuroscience, Washington DC, US, 2023 Nov.
5. *Spontaneous Sleep Wake Transition Induced by Synaptic Weight Dynamics*. Courant Institute of Mathematical Sciences, New York, US, May 2023.
6. *Spontaneous Sleep Wake Transition Induced by Synaptic Weight Dynamics*. Society for Neuroscience, San Diego, US, 2022 Nov.
7. *Flip a Biased Coin*. Math Club, Ann Arbor, US, 2022 Sep.
8. *Spontaneous Sleep Wake Transition Induced by Synaptic Weight Dynamics*. European Biological Rhythms Society, Zurich, CH, 2022 Aug.
9. *Why do we sleep: three sleeping hypothesis*. MCAIM Graduate Seminar, Ann Arbor, US, 2021 Oct.
10. *The Cheerios Effect*. Math Club, Ann Arbor, US, 2021 Sep.

AWARDS

- Cameron&Jon Courtney Scholarship, Department of Mathematics, University of Michigan, (2023-2024)
- MCAIM Award, University of Michigan, (2022-2023)
- EBRS Poster Award, European Biological Rhythms Society (2022)
- Mathematics Award, Courant Institute of Mathematical Sciences (2019).
- Dean's Undergraduate Research Funds, College of Arts and Science, New York University (2017-2018)
- Presidential Honors Scholar, College of Arts and Sciences, New York University (2015-2016)

TEACHING EXPERIENCE

- Instructor, Intro to Math Modeling (2026 Spring, NYU)
- Instructor, Numerical Analysis (2025 Fall, NYU)
- Instructor, Calculus I (2025 Spring, University of Michigan).
- Instructor, Eight Lectures in Applied Math (2024 Summer, Veritas Academy).
- Lab instructor, Introduction to Differential Equations (2024 Winter, University of Michigan).
- Instructor, Intro to Applied Math (2021 Summer, Veritas Workshop).
- Teaching Assistant, Introduction to Computer Simulation. (2020 Spring, NYU).
- Teaching Assistant, Special Topics in Modeling and Simulation. (2019 Fall, NYU).
- Grader, Calculus I (2018 Fall, NYU).

ORGANIZATION

Seminars

- Coordinator for the [Computational Neuroscience Seminar](#) at the Courant Institute (2025 -).
- Co-organizer of [MCAIM Graduate Seminar](#), with Jiajia Guo and Shirlyn Wang (2022-2023).
- Co-organizer of [Student Applied Math Seminar](#), with Kashvi Srivastava, Preetham Mohan and C. Mavroyiakoumou (2021-2023).

PROFESSIONAL

- Co-founder and President, Veritas China [website](#) (2015-).