CURRICULUM VITAE
Yuchi Qiu

Michigan State University,
Department of Mathematics,
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East Lansing, MI

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Employment

2020 - Present

Research Associate
Department of Mathematics,
Michigan State University, East Lansing, MI, USA
Supervisor: Guo-Wei Wei

Education

2016 - 2020

University of California, Irvine, CA, USA
Ph.D. in Mathematics
Advisor: Qing Nie

2014 - 2016

University of California, Irvine, CA, USA
M.S. in Mathematics

2010 – 2014

Nanjing University, China
B.S. in Computational Mathematics

Research Interest

Mathematical/data-driven Biology; Data-driven dynamical systems; Topological data analysis; Multiscale modeling; Bioinformatics; Machine learning/Deep learning; Single-cell genomics; Scientific computing and numerical PDEs; Protein engineering; Morphogenesis; Developmental and cell biology.

Publications

13. **Yuchi Qiu**, Guo-Wei Wei. Persistent spectral theory-guided protein engineering. *Nature Computational Science*

12. Jiahui Chen, Rui Wang, Yuta Hozumi, Gengzhuo Liu, **Yuchi Qiu**, Xiaoqi Wei, Guo-Wei Wei. Emerging dominant SARS-CoV-2 variants. *Journal of chemical information and modeling*, 2022

11. Jiahui Chen, **Yuchi Qiu**, Rui Wang, Guo-Wei Wei. Persistent Laplacian projected Omicron BA.4 and BA.5 to become new dominating variants, *Computers in Biology and Medicine,* 2022

10. **Yuchi Qiu**, Guo-Wei Wei. CLADE 2.0: Evolution-driven cluster learning-assisted directed evolution. *Journal of chemical information and modeling*, 2022

9. Kaifu Gao, Rui Wang, Jiahui Chen, Limei Cheng, Jaclyn Frishcosy, Yuta Huzumi, **Yuchi Qiu**, Tom Schluckbier, Xiaoqi Wei and Guo-Wei Wei. Methodology-centered review of molecular modeling, simulation, and prediction of SARS-CoV-2. *Chemical Reviews (IF=60),* 122 (13),11287-11368, 2021

8. **Yuchi Qiu**, Jian Hu, and Guo-Wei Wei. Cluster learning-assisted directed evolution. *Nature Computational Science*,1, 809-818, 2021

7. Limei Cheng, **Yuchi Qiu**, Brian J. Schmidt, and Guo-Wei Wei. Review of Applications and Challenges of Quantitative Systems Pharmacology Modeling and Machine Learning for Heart Failure. *Journal of Pharmacokinetics and Pharmacodynamics*, 1-12, 2021.

6. **Yuchi Qiu**, Lianna Fung, Thomas Schilling and Qing Nie. Multiple morphogens and rapid elongation promote segmental patterning during development. *PLOS Computational Biology,* 17(6): e1009077, 2021

5. Yilun Zhu, **Yuchi Qiu**, Weitao Chen, Qing Nie, and Arthur D Lander. Scaling a Dpp morphogen gradient through feedback control of receptors and co-receptors. *Developmental Cell*, 53(6), 724-739, 2020

4. Qing Nie, Lingxia Qiao, **Yuchi Qiu**, Lei Zhang, and Wei Zhao. Noise control and utility: from gene regulatory network to spatial patterning. *Science China Mathematics*, 1-16, 2020

3. **Yuchi Qiu**, Weitao Chen, and Qing Nie. A hybrid method for stiff reaction-diffusion equations. *Discrete & Continuous Dynamical Systems-B*, pages 28-34, 2019

2. Yangyang Wang, Christian F Guerrero-Juarez, **Yuchi Qiu**, Huijing Du, Weitao Chen, Seth Figueroa, Maksim V Plikus, and Qing Nie. A multiscale hybrid mathematical model of epidermal-dermal interactions during skin wound healing. *Experimental dermatology*, 28(4): 493–502, 2019

1. **Yuchi Qiu**, Weitao Chen, and Qing Nie. Stochastic dynamics of cell lineage in tissue homeostasis. *Discrete & Continuous Dynamical Systems-B*, pages 853–865, 2019

Submitted

- Yutong Sha, **Yuchi Qiu**, Peijie Zhou, Qing Nie. Reconstruct growth and dynamic trajectories from single-cell transcriptomics data
- Yutong Sha#, **Yuchi Qiu#**, Qing Nie. NeuralGene: Inferring gene regulation and cell fate dynamics from Neural ODEs. #co-first author
- Li Shen, Hongsong Feng, **Yuchi Qiu,** Guo-Wei Wei. SVSBI: sequence-based virtual screening of biomolecular interactions. Arxiv

Awards

- AMS-Simons Travel Grant, 07/2022-06/2024, **$5,000**
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- SIAM Early Career Travel Award for the SIAM Conference on the Life Sciences, 2022 (LS22), $650.
- Kovalevsky outstanding Ph.D. thesis award, 2020. Thesis Title: *Multiscale Modeling for Tissue Patterning: Growth and Stochasticity*.
- Dissertation Fellowship, University of California, Irvine, 2019.
- Center for multiscale cell fate research (CMCF) interdisciplinary opportunity award **($9,800**), University of California, Irvine 2019: *A multiscale nonlinear model of tumor growth within poroelastic tissue and its transition from avascular to vascular stage*.

Conferences

- (Organizer) Mini-symposium *Multiscale and data-driven approaches in complex biological systems* in SIAM Great Lake Annual Meeting, September 24, 2022
- (Invited speaker) Mini-symposium *Modeling for sequence and structure-based molecular analysis* in SIAM conference on life science July 12, 2022, 25 min talk
- (Invited speaker) Colloquium, University of California, Riverside, May 12, 2022
- (Participant) 4th Annual Symposium on Multi-scale Cell Fate, University of California, Irvine, Oct 2021.

- (Invited speaker) Mini-symposium *Numerical Methods in Biomedical Sciences* in SMB 2021 Annual Meeting, virtual meeting, June 16, 2021. Title: Learning biomolecules in mutagenesis via topological and geometric modeling.
- (Invited speaker) Colloquium, Moffitt Cancer Center, March 2, 2020. Title: Mathematical Models on Spatial Pattern Formations.
- (Invited speaker) Mini-symposium *Stochastic Methods for Multi-scale Dynamical System*s in SIAM conference on Application of dynamical systems, Snowbird, Utah, USA, May 2019. Title: *How do tissues maintain their patterns with stochasticity*? 25 minutes talk.
- (Invited speaker) UCI MathBioU & Math ExpLR program, July 2019. Title: *Mathematical model for zebrafish hindbrain pattern formation*.
- (poster) 2nd Annual Symposium on Multi-scale Cell Fate, University of California, Irvine, Oct 2019. Title: *Dissection of multiple morphogens and morphogenesis in zebrafish hindbrain pattern formation*.
- (Participant) 1st Annual Symposium on Multi-scale Cell Fate, University of California, Irvine, Oct 2018.
- (Participant) Multi-scale modeling of cell behavior and tissue growth in patients under stress conditions or with chronic or acute disease, University of California, Riverside, Nov 2017.
- (Participant) Japan-UCI 2D morphogenesis meeting, University of California, Irvine, Jul 2017.

Teaching Experience
MSU (Instructor)
- Math 234: Multivariable Calculus (Fall 2022)
- Math 133: Single Variable Calculus I (Spring 2022)
- Math 134: Single Variable Calculus II (Spring 2021)

UCI (Teaching Assistant):
- Math 2B: Single Variable Calculus II (Fall 2016)
- Math 5A: Single Variable Calculus I for Life-Science (Spring 2017, Fall 2017, Winter 2018, Spring 2018, Fall 2018, Winter 2019)
- Math 5B: Single Variable Calculus II for Life-Science (Winter 2017, Spring 2017, Fall 2017, Winter 2018, Spring 2018, Fall 2018, Winter 2019)
- Math 2D: Multivariable calculus (Spring 2020).

Professional services
Journal Reviewer

PLoS computational biology, Journal of computational physics, Journal of chemical information and modeling, International journal of numerical methods in biomedical engineering, Journal of computational biology, iScience, Computers in Biology and Medicine, Journal of Machine Learning for Modeling and Computing