

# Fangzhou Xiao

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## POSITIONS

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<b>Assistant Professor in Engineering, Westlake University</b> Principle Investigator of the Biomachine Architecture and Control (BMAC) group.	Hangzhou, CHINA 2024.1 –present
<b>Postdoctoral Scholar in Suckjoon Jun lab, UCSD</b> On principles and engineering of microbial survival and growth in dynamic environments.	San Diego, CA 2022.7 –2023.12

## EDUCATION

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<b>California Institute of Technology</b> Ph.D. in Bioengineering, Advisor: John C. Doyle Thesis Title: Biocontrol of biomolecular systems Thesis committee: Richard M. Murray, Erik Winfree, Rob Phillips, Lior Pachter	Pasadena, CA 2016.9 –2022.6
<b>Washington University in St. Louis</b> B.S. in Engineering (Biomolecular Systems) and Mathematics with Highest Distinction	St. Louis, MO 2012.8 –2015.12

## VISITS AND APPOINTMENTS

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- **Visitor** at Khammash group at ETH Zurich Summer 2019

## PUBLICATIONS

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- [1] H. Fu\*, **F. Xiao\***, and S. Jun, “Bacterial replication initiation as precision control by protein counting”, *PRX Life*, **highlighted with Viewpoint**, vol. 1, p. 013011, 1 Aug. 2023.
- [2] **F. Xiao**, J. Shuang Li, and J. C. Doyle, “Flux exponent control predicts metabolic dynamics from network structure”, in *2023 American Control Conference (ACC)*, 2023, pp. 1189–1194.
- [3] M. N. Mayalu, A. Sarma, **F. Xiao**, J. C. Doyle, and R. M. Murray, “Systems level model of dietary effects on cognition via the microbiome-gut-brain axis”, in *2021 European Control Conference (ECC)*, 2021, pp. 312–318.
- [4] **F. Xiao**, M. Khammash, and J. C. Doyle, “Stability and control of biomolecular circuits through structure”, in *2021 Annual American Control Conference (ACC)*, **Best Student Paper Finalist**, 2021.
- [5] V. Galstyan, K. Husain, **F. Xiao**, A. Murugan, and R. Phillips, “Proofreading through spatial gradients”, *eLife*, vol. 9, A. Yildiz and A. M. Walczak, Eds., e60415, Dec. 2020.
- [6] J. P. Marken\*, **F. Xiao\***, and R. M. Murray, “A geometric and structural approach to the analysis and design of biological circuit dynamics: A theory tailored for synthetic biology”, *bioRxiv*, 2020.
- [7] N. Olsman, A.-A. Baetica, **F. Xiao**, Y. P. Leong, R. M. Murray, and J. C. Doyle, “Hard limits and performance tradeoffs in a class of antithetic integral feedback networks”, *Cell Systems*, vol. 9, no. 1, 49–63.e16, 2019.
- [8] N. Olsman, **F. Xiao**, and J. C. Doyle, “Architectural principles for characterizing the performance of antithetic integral feedback networks”, *iScience*, vol. 14, pp. 277–291, 2019.

- [9] **F. Xiao**, M. Fang, J. Yan, and J. C. Doyle, “Coupled reaction networks for noise suppression”, in *2019 American Control Conference (ACC)*, 2019, pp. 1547–1554.
- [10] C. Liu, **F. Xiao**, J. Hoisington-Lopez, K. Lang, P. Quenzel, B. Duffy, and R. D. Mitra, “Accurate typing of human leukocyte antigen class i genes by oxford nanopore sequencing”, *The Journal of Molecular Diagnostics*, vol. 20, no. 4, pp. 428–435, 2018.
- [11] Y. Nakahira, **F. Xiao**, V. Kostina, and J. C. Doyle, “Fundamental limits and achievable performance in biomolecular control”, in *2018 Annual American Control Conference (ACC)*, 2018, pp. 2707–2714.
- [12] N. Olsman, **F. Xiao**, and J. Doyle, “Evaluation of hansen et.al.: Nuance is crucial in comparisons of noise”, *Cell Systems*, vol. 7, no. 4, pp. 352–355, 2018.
- [13] **F. Xiao** and J. Doyle, “Robust perfect adaptation in biomolecular reaction networks”, in *2018 IEEE Conference on Decision and Control (CDC)*, 2018, pp. 4345–4352.

## SCHOLARSHIPS AND AWARDS

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- Best student paper finalist award at Annual American Control Conference (ACC),  
for the paper “Stability and control of biomolecular circuits through structure.” 2021
- U-STAR undergraduate research fellowship at WashU. 2014 – 2015

## GRANT PROPOSALS

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- Rule-based Systems Theory for Regulation in Networks of Biomolecules, Microbial Cells and Populations  
– main writer, in response to 2021 NSF solicitation Understanding the Rules of Life: Emergent Networks.

## TEACHING AND MENTORING

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- **Instructor** at Caltech Winter 2021 & 2022  
*BioTutorials: Analysis and Design of Biological Circuits (Bi 23 Section 5)*  
Video recordings and lecture notes viewable at:  
<https://drive.google.com/drive/folders/1vWiFMJn4BwHijofonwDXYIkdbjhaf9r?usp=sharing>
- **Teaching Assistant** at Caltech Winter 2021  
*Machine Learning and Data Mining (CMS/CS 155) instructed by Lior Pachter*
- **Mentor** for summer research undergraduate student at Caltech Summer 2018  
*Meichen Fang from Peking University. Later went on PhD studies at Caltech Bioengineering.*
- **Teaching Assistant** at Caltech Winter 2018  
*Introduction to Computational Biology and Bioinformatics (Bi/BE/CS 183) instructed by Lior Pachter and Matt Thompson*
- **Teaching Assistant** at WashU Fall 2015  
*Theory of Statistics (Math 5061) instructed by Jimin Ding*

## PRESENTATIONS

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- 2021 American Control Conference, virtual, **best student paper finalist**, 15-min talk, on “Stability and control of biomolecular circuits through structure”. Video recording viewable at:  
[https://drive.google.com/file/d/1u5FYkSI9ZzEP7itai\\_mH1ZQds\\_52gfVt/view?usp=sharing](https://drive.google.com/file/d/1u5FYkSI9ZzEP7itai_mH1ZQds_52gfVt/view?usp=sharing)
- 2020 Winter Q-Bio in Big Island, Hawaii, 15-min talk and a poster, on “Structural analysis and robust design of biomolecular circuits – fast binding and slow catalysis”. Poster viewable at:  
[https://drive.google.com/file/d/1bAivEs2IoqKUG\\_ctObcB7oAjDc2UpX\\_y/view?usp=sharing](https://drive.google.com/file/d/1bAivEs2IoqKUG_ctObcB7oAjDc2UpX_y/view?usp=sharing)

- 2019 American Control Conference in Philadelphia, PA, 15-min talk, on “Coupled reaction networks for noise suppression”.
- 2019 Winter Q-Bio at Oahu, Hawaii, a poster, on “Structural analysis and robust design of biomolecular circuits – fast binding and slow catalysis”. Poster viewable at:
- 2018 Conference on Decision and Control in Miami, FL, 15-min talk, on “Robust perfect adaptation in biomolecular reaction networks”.

## SKILLS

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- **Programming:** Python, Matlab, Mathematica.
- **Experiment:** Cloning.
- **Language:** English and Mandarin.