Jing Shuang (Lisa) Li

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Academic Positions

Assistant Professor of Electrical Engineering and Computer Science — Sep 2023 –
Michigan Neuroscience Institute Affiliate
University of Michigan, Ann Arbor MI

Ph.D. in Control & Dynamical Systems — Sep 2018 – Jun 2023
Thesis: Distributed Control Theory for Cyberphysical and Biological Systems
California Institute of Technology, Pasadena CA

B.A.Sc. in Engineering Science, Electrical and Computer Engineering Major — Sep 2013 – Jun 2018
University of Toronto, Toronto ON

Publications

* denotes equal contribution

[14] L. Karashchuk*, **J. S. Li***, G. M. Chou, S. Walling-Bell, S. L. Brunton, J. C. Tuthill, B. W. Brunton, "Sensorimotor delays constrain robust locomotion in a 3D kinematic model of fly walking", 2024. In submission, preprint available here.

[13] A. Aspeel, J. Nylof, **J. S. Li**, N. Ozay, "A Low Rank Approach to Minimize Sensor-to-Actuator Communication in Finite Horizon Output Feedback", *IEEE Control Systems Letters (L-CSS)*, pp. 3609–3614, 2023.

[12] **J. S. Li**, C. Amo Alonso, "Global Performance Guarantees for Localized Model Predictive Control", *IEEE Open Journal of Control Systems*, vol. 2, pp. 325–336, 2023

[11] **J. S. Li***, A. A. Sarma*, T. J. Sejnowski, J. C. Doyle, "Internal feedback in the cortical perception–action loop enables fast and accurate behavior", *Proceedings of the National Academy of Sciences (PNAS)*, vol. 120 (39), pp. e2300445120, 2023

[10] C. Amo Alonso, **J. S. Li**, N. Matni, J. Anderson, "Distributed and Localized Model Predictive Control—Part II: Theoretical Guarantees", *IEEE Transactions on Control of Network Systems*, vol. 10 (3), pp. 1113–1123, 2023

[9] F. Xiao, **J. S. Li**, J. C. Doyle, "Flux Exponent Control Enables Prediction of Metabolism Dynamics", *IEEE American Control Conference*, pp. 1189–1194, 2023

[8] **J. S. Li**, J. C. Doyle, "Distributed Robust Control for Systems with Structured Uncertainties", *IEEE Conference on Decision and Control*, pp. 1702–1707, 2022

[7] L. Conger, **J. S. Li**, E. Mazumdar, S. L. Brunton, "Nonlinear System Level Synthesis for Polynomial Dynamical Systems", *IEEE Conference on Decision and Control*, pp. 3846–3852, 2022

[6] C. Amo Alonso, **J. S. Li**, J. Anderson, N. Matni, "Distributed and Localized Model Predictive Control—Part I: Synthesis and Implementation", *IEEE Transactions on Control of Network Systems*, vol. 10 (2), pp. 1058–1068, 2023

[5] **J. S. Li**, "Internal Feedback in Biological Control: Locality and System Level Synthesis", *IEEE American Control Conference*, pp. 474–479, 2022. ***Best student paper finalist***

[4] J. Stenberg, **J. S. Li**, A. A. Sarma, J. C. Doyle, "Internal Feedback in Biological Control: Diversity, Delays, and Standard Theory", *IEEE American Control Conference*, pp. 462–467, 2022

[3] A. A. Sarma, **J. S. Li**, J. Stenberg, G. Card, E. S. Heckscher, N. Kasthuri, T. J. Sejnowski, J. C. Doyle, "Internal Feedback in Biological Control: Architectures and Examples", *IEEE American Control Conference*, pp. 456–461, 2022

[2] **J. S. Li**, C. Amo Alonso, J. C. Doyle, "Frontiers in Scalable Distributed Control: SLS, MPC, and Beyond", *IEEE American Control Conference*, pp. 2720–2725, 2021

[1] **J. S. Li**, D. Ho, "Separating Controller Design from Closed-Loop Design: A New Perspective on System-Level Controller Synthesis", *IEEE American Control Conference*, pp. 3529–3534, 2020

Toolboxes

[T2] S. H. Tseng, **J. S. Li**, "SLSpy: Python-Based System-Level Controller Synthesis Framework", 2020 [pdf] [code]

[T1] **J. S. Li**, "SLS-MATLAB: MATLAB Toolbox for System Level Synthesis", 2019. [code]

Invited Talks

"Optimal control in sensorimotor systems". *Autonomy Talks*, Jun 2024

"Optimal control in animal sensorimotor systems". *10th Midwest Workshop on Control and Game Theory*, Apr 2024

"Optimal feedback control in sensorimotor systems: behavior and implementation". *Manifolds in Nature Workshop*, Mar 2024

"Optimal and distributed control in animals". University of Michigan, Jan 2024

"Control theory for neuroscience: from internal feedback to legged locomotion". *Woods Hole Workshop on Computational Neuroscience/Telluride Neuromorphic Engineering Workshop*, Jul 2023

"Introduction to System Level Synthesis". *System Level Synthesis: New Frontiers in Distributed Control* workshop at *IEEE Conference on Decision and Control*, Dec 2022.

"Internal Feedback Pathways: From Control Theory to Sensorimotor Systems (and beyond)". Center for Computational Neuroscience, Flatiron Institute, Nov 2021

Posters

J. C. Doyle, C. Amo Alonso, **J. S. Li**, F. Xiao, "Rule-Based Systems Theory for Regulation in Networks of Biomolecules, Microbial Cells and Populations", *8th Build-a-Cell Workshop*, 2022

J. S. Li, "Internal Feedback: From Optimal Control to the Sensorimotor System", *Chen Institute for Neuroscience Poster* Session, 2021

J. S. Li, S. H. Tseng, "SLS-MATLAB Toolbox: Do-It-Yourself System Level Synthesis", *IEEE American Control Conference*, 2020

J. S. Li, J. Yu, C. Amo Alonso, J. C. Doyle, "System Level Synthesis: Distributed Control Made Easy", Poster at *Center for Autonomous Systems and Technologies (CAST) Scientific Showcase*, Caltech, 2020

Academic Service

Conference reviewer: IEEE American Control Conference (ACC), IEEE Conference on Decision and Control (CDC)
Journal reviewer: IEEE Control Systems Letters (L-CSS), IEEE Open Journal of Control Systems (OJCSYS), IEEE Transactions on Automatic Control (TAC), IEEE Transactions on Control of Networked Systems (TCNS), IEEE Transactions on Vehicular Technology, Neural Computation

Panel reviewer: Directorate for Engineering (ENG), NSF

Poster/Demo Chair, 2024 ACM/IEEE International Conference on Cyber-Physical Systems

Lead workshop organizer, "System Level Synthesis: New Frontiers in Distributed Control" at IEEE Conference on Decision and Control (2022)

Funding Awarded

NSERC PGSD (ranked 4/72 in electrical engineering) Apr 2021

NSERC USRA (awarded twice) May 2015, May 2016

Teaching

Instructor (shared with B. Gillespie), Linear Systems Theory (EECS 560) F2023

Instructor, Control Theory for Biological Sensorimotor Systems (EECS 598 017) W2024

Advising & Mentorship

PhD	Master's	Undergraduate
Jaidev Gill, F2024 –	Riley Bridges, S/S2024 –	Aida Ruan, S/S2024
Eric (Qin) He, F2024 –	Ethan Parham, S/S2024 –	Anisha Sharma, S/S2024
Justin Ting, W2024 –	Prerana Lakshmanan, S/S2024	Mo Yang, S/S2024 –
Co-advised with Zhengya Zhang	Yaozhi Du, W2024 –	Jiayi Zhao, S/S2024 –
	Qunzhuo Feng, F2023 – W2024	

Additional Experience

Piano and Voice Instructor, Lippert Music Center Sep 2012 – Jun 2018
Taught private music lessons and prepared students for Royal Conservatory exams and competitions

Undergraduate Thesis, Reconfigurable Antenna Lab (advisor: S. Hum) Sep 2017 – Apr 2018
Project: Neural network inverse models for electromagnetic metasurface design

Full-Time Software Engineering Intern, Verity Studios AG Sep 2016 – Aug 2017
Wrote code in Python, C++, and SQL to support drone flight planning, evaluation, and simulation

Student Researcher, Reconfigurable Antenna Lab (advisor: S. Hum) May 2016 – Aug 2016
Project: C++ simulation tool for periodic electromagnetic scatterers

Student Researcher, Lab for Advanced Power Conversion (advisor: P. Lehn) May 2015 – Aug 2015
Project: Wireless energy harvester for smart-grid monitoring applications

Student Researcher, Nanomaterials Lab (advisor: H. G. Wei) May 2014 – Aug 2014
Project: Copper-based nanostructures for photocatalytic hydrogen production

Additional Skills

Programming and scripting: MATLAB, Python, C++, SQL

Foreign languages: Mandarin Chinese (fluent), French (basic)

Instruments: piano, voice (classical, musical theatre, pop), cello, guitar
Certifications from the Royal Conservatory of Music:

- Associate (ARCT) in Piano Performance, 1st Class Honours (practical only)
- Grade 10 comprehensive certificate in Piano Performance, 1st Class Honours
- Grade 10 comprehensive certificate in Vocal Performance, 1st Class Honours