

# Jing Shuang (Lisa) Li

Phone: (626) 515-1749 | Email: [jsli@caltech.edu](mailto:jsli@caltech.edu) | Homepage: [flyingpeach.github.io](https://flyingpeach.github.io)

*Last updated November 2022*

## Education

---

**California Institute of Technology** – Ph.D. in Control & Dynamical Systems

*Sep 2018 – Jun 2023 (expected)*

Thesis: Distributed Control Theory for Cyberphysical and Biological Systems (working title)

Advisor: John C. Doyle

**University of Toronto** – B.A.Sc. in Engineering Science, Electrical Engineering Major

*Sep 2013 – Jun 2018*

## Awards

---

Best Student Paper Finalist at 2022 IEEE American Control Conference for [5] *Jun 2022*

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

*This award funds doctoral study for up to three years for Canadians; similar to NSF GRFP for Americans*

## Accepted Papers

---

- [8] **J. S. Li**, J. C. Doyle, “Distributed Robust Control for Systems with Structured Uncertainties”, to appear at *IEEE Conference on Decision and Control*, 2022 [[pdf](#)]
- [7] L. Conger, **J. S. Li**, E. Mazumdar, S. L. Brunton, “Nonlinear System Level Synthesis for Polynomial Dynamical Systems”, to appear at *IEEE Conference on Decision and Control*, 2022 [[pdf](#)]
- [6] C. Amo Alonso, **J. S. Li**, J. Anderson, N. Matni, “Distributed and Localized Model Predictive Control. Part I: Synthesis and Implementation”, to appear in *IEEE Transactions on Control of Network Systems*, 2022 [[pdf](#)]
- [5] **J. S. Li**, “Internal Feedback in Biological Control: Locality and System Level Synthesis”, in *IEEE American Control Conference*, pp. 474–479, 2022 [[pdf](#)]. **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”, in *IEEE American Control Conference*, pp. 462–467, 2022 [[pdf](#)]
- [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: Constraints and Layered Architectures”, in *IEEE American Control Conference*, pp. 456–461, 2022 [[pdf](#)]
- [2] **J. S. Li**, C. Amo Alonso, J. C. Doyle, “Frontiers in Scalable Distributed Control: SLS, MPC, and Beyond”, in *IEEE American Control Conference*, pp. 2720–2725, 2021 [[pdf](#)]
- [1] **J. S. Li**, D. Ho, “Separating Controller Design from Closed-Loop Design: A New Perspective on System-Level Controller Synthesis”, in *IEEE American Control Conference*, pp. 3529–3534, 2020 [[pdf](#)]

## Papers in Preparation & Under Review

---

- [P3] P. Karashchuk\*, **J. S. Li\***, S. L. Brunton, J. C. Tuthill, B. W. Brunton, “A Layered Architecture Models Robust Multi-Legged Locomotion of *Drosophila*”, in preparation
- [P2] **J. S. Li**, C. Amo Alonso, “How to Use Localized Computations for Model Predictive Control without Sacrificing Performance”, in preparation
- [P1] **J. S. Li\***, A. A. Sarma\*, T. J. Sejnowski, J. C. Doyle, “Why internal feedback is necessary in the perception-action loop”, in preparation [[pdf](#)]
- [R2] F. Xiao, **J. S. Li**, J. C. Doyle, “Flux Exponent Control Enables Prediction of Metabolism Dynamics”, submitted to *IEEE American Control Conference*
- [R1] C. Amo Alonso, **J. S. Li**, N. Matni, J. Anderson, “Distributed and Localized Model Predictive Control. Part II: Theoretical Guarantees”, submitted to *IEEE Transactions on Control of Network Systems*, 2022 [[pdf](#)]

## 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](#)]

## Workshops, Talks, Posters

---

- J. S. Li**, J. Yu, C. Amo Alonso, J. C. Doyle, “System Level Synthesis: New Frontiers in Distributed Control”. Organizer and speaker for full-day workshop to appear at *IEEE Conference on Decision and Control*, 2022
- J. S. Li**, “Control Theory for Biology: Internal Feedback and Other Models”. Talk at *40<sup>th</sup> Southern California Control Workshop*, 2022
- 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”. Poster at *8<sup>th</sup> Build-a-Cell Workshop*, 2022
- J. S. Li**, “Internal Feedback Pathways: From Control Theory to Sensorimotor Systems (and beyond)”. Invited seminar talk at *Center for Computational Neuroscience, Flatiron Institute* (Simons Foundation), 2021
- J. S. Li**, “Internal Feedback: From Optimal Control to the Sensorimotor System”. Poster at *Chen Institute for Neuroscience Poster Session*, 2021
- J. S. Li**, S. H. Tseng, “SLS-MATLAB Toolbox: Do-It-Yourself System Level Synthesis”. Poster at *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*, 2020

## Funding History

---

NSERC PGSD (ranked 4/72 in electrical engineering)

Awarded Apr 2021

## Teaching

---

TA, Introduction to Distributed Algorithms (CS 142), Instructor: K. M. Chandy	<i>Fall 2021, 2022</i>
TA, Robust Control Theory (CDS 231), Instructor: J. Doyle	<i>Winter 2020, 2022</i>
TA, Introduction to Feedback Control Systems (CDS 110), Instructor: J. Seinfeld	<i>Spring 2021</i>
Head TA, Relational Databases (CS 121), Instructor: M. Hovik	<i>Winter 2021</i>
TA, Network Control Systems (CDS 141), Instructor: J. Doyle	<i>Spring 2020</i>

## Advising & Mentorship

---

Lauren Conger, PhD student at Caltech  
 Josefin Stenberg, summer student at Caltech

## Diversity, Equity, & Inclusion (DEI)

---

Treasurer, Caltech Canadian Club	<i>May 2021 – Present</i>
Catalina Community Associate	<i>Nov 2020 – Jun 2022</i>
Mentor for international, departmental, and diversity programs	<i>Oct 2020 – Jun 2022</i>
Chair, Graduate Women in CMS	<i>Feb 2020 – May 2022</i>
Member (1 of 9), departmental Graduate Advisory Council	<i>Oct 2019 – Oct 2021</i>
Organizer (1 of 2), departmental PhD Preliminary Exam Prep Sessions	<i>Oct 2019 – Aug 2020</i>
Organizer (1 of 4), departmental town hall on diversity, equity, and inclusion	<i>Jun 2020 – July 2020</i>
Orientation leader and panelist, international and departmental orientation	<i>Sep 2019, Sep 2020, Sep 2022</i>

## Academic Service

---

Conference reviewer: IEEE Conference on Decision and Control 2021, 2022; IEEE American Control Conference 2023  
 Journal reviewer: IEEE Transactions on Vehicular Technology

## Additional Work and Research Experience

---

<b>Piano and Voice Instructor, Lippert Music Center</b>	<i>Sep 2012 – Jun 2018</i>
Taught private music lessons and prepared students for Royal Conservatory exams and competitions	
<b>Undergraduate Thesis, Reconfigurable Antenna Lab</b> (with Prof. Sean Hum)	<i>Sep 2017 – Apr 2018</i>
Project: Neural network inverse models for electromagnetic metasurface design	
<b>Full-Time Software Engineering Intern, Verity Studios AG</b>	<i>Sep 2016 – Aug 2017</i>
Wrote code in Python, C++, and SQL to support drone flight planning, evaluation, and simulation	
<b>Student Researcher, Reconfigurable Antenna Lab</b> (with Prof. Sean Hum)	<i>May 2016 – Aug 2016</i>

---

Project: C++ simulation tool for periodic electromagnetic scatterers

**Student Researcher, Lab for Advanced Power Conversion** (with Prof. Peter Lehn) *May 2015 – Aug 2015*

Project: Wireless energy harvester for smart-grid monitoring applications

**Student Researcher, Nanomaterials Lab** (with Prof. Ho Ghim 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, 1<sup>st</sup> Class Honours (practical only)

Grade 10 comprehensive certificate in Piano Performance, 1<sup>st</sup> Class Honours

Grade 10 comprehensive certificate in Vocal Performance, 1<sup>st</sup> Class Honours

---

## References

**John C. Doyle** [doyle@caltech.edu](mailto:doyle@caltech.edu)

Professor of Control and Dynamical Systems, Electrical Engineering, and Bioengineering  
*California Institute of Technology*

**Bing W. Brunton** [bbrunton@uw.edu](mailto:bbrunton@uw.edu)

Associate Professor, Department of Biology  
*University of Washington, Seattle*

**Richard M. Murray** [murray@cds.caltech.edu](mailto:murray@cds.caltech.edu)

Professor of Control and Dynamical Systems and Bioengineering  
Chair of Biology and Biological Engineering  
*California Institute of Technology*

**James Anderson** [james.anderson@columbia.edu](mailto:james.anderson@columbia.edu)

Assistant Professor, Department of Electrical Engineering  
*Columbia University*

**Steven L. Brunton** [sbrunton@uw.edu](mailto:sbrunton@uw.edu)

Professor, Department of Mechanical Engineering  
*University of Washington, Seattle*

**Steven Low** [slow@caltech.edu](mailto:slow@caltech.edu)

Professor of Computing and Mathematical Sciences and Electrical Engineering  
*California Institute of Technology*