Can Chen

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Assistant Professor of Data Science and Society
Adjunct Assistant Professor of Mathematics
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Research Interests

Control Theory, Network Science, Tensor Algebra, Numerical Analysis, Data Science, Machine Learning, Deep Learning, Hypergraph Learning, Data Analysis, Computational Biology

Education

University of Michigan — Ann Arbor, MI
- Ph.D. in Applied & Interdisciplinary Mathematics — 09/2016 – 08/2021
- M.S. in Electrical & Computer Engineering — 01/2019 – 12/2020
- Advisors: Prof. Anthony M. Bloch and Prof. Indika Rajapakse
- Ph.D. Thesis: Multilinear Control Systems Theory and its Applications

University of California, Irvine — Irvine, CA
- B.S. in Mathematics, minor in Statistics — 09/2013 – 06/2016
- Advisor: Prof. John Lowengrub
- Undergraduate Thesis: Two Branched Cell Lineages for Proliferative Control

Employment

University of North Carolina at Chapel Hill — Chapel Hill, NC
- Assistant Professor of Data Science and Society — 01/2024 – Present
- Adjunct Assistant Professor of Mathematics — 01/2024 – Present

Brigham and Women's Hospital, Harvard Medical School — Boston, MA
- Postdoctoral Research Fellow — 10/2021 – 12/2023

University of Michigan — Ann Arbor, MI
- Graduate Student Instructor/Research Assistant — 09/2016 – 12/2020

The MathWorks, Inc. — Natick, MA
- MATLAB Math Numerical Methods Intern — 05/2020 – 08/2020

Professional Services

Referee for *Information Systems*, *SIAM Journal on Control and Optimization*, *An International Journal of Optimization and Control: Theories & Applications*, *Mathematics*, *Applied Sciences*, *Algorithms*, *Symmetry*, *Axioms*, *Entropy*, *Viruses*, *Frontiers in Sociology*, *IEEE Transactions on Network Science and Engineering*, *American Control Conference*, *Advanced Science*, *European Control Conference*, *Sensors*

Organizer for *2023 SIAM Conference on Control and its Applications* (mini-symposium), *Channing Network Science Seminar*, *Smale Institute Virtual Meeting*, *Dr. Steve Smale's 90th Birthday Celebration Conference*

Awards

University of Michigan
- Rackham One-term Dissertation Fellowship — 12/2020

- Rackham Travel Grant Award 05/2019
- Michigan Mathematics Graduate Fellowship 2017 – 2019

University of California, Irvine
- University Honor Award 06/2016
- Dean Honor List 2013 – 2016

Journal Articles

C. Chen. On the Stability of Discrete-time Homogeneous Polynomial Dynamical Systems. *Computational and Applied Mathematics*, In press, 2024.

C. Chen, Y.-Y. Liu. A Survey on Hyperlink Prediction. *IEEE Transactions on Neural Networks and Learning Systems*, In press, 2023.

C. Chen. Explicit Solutions and Stability Properties of Homogeneous Polynomial Dynamical Systems. *IEEE Transactions on Automatic Control* 68 (8), pp. 4962-4969, 2023.

J. Pickard, C. Chen, R. Salman, C. Stansbury, S. Kim, A. Surana, A. M. Bloch, I. Rajapakse. HAT: Hypergraph Analysis Toolbox. *PLOS Computational Biology* 19 (6), p. e1011190, 2023.

C. Chen*, L. Chen*, Y.-Y. Liu. Teasing out Missing Reactions in Genome-scale Metabolic Networks through Hypergraph Learning. *Nature Communications* 14, p. 2375, 2023.

C. Chen, S. T. Weiss, Y.-Y. Liu. Graph Convolutional Network-based Feature Selection for High-dimensional and Low-sample Size Data. *Bioinformatics* 39 (4), p. btad135, 2023.

A. Surana, C. Chen, I. Rajapakse. Hypergraph Similarity Measures. *IEEE Transactions on Network Science and Engineering* 10 (2), pp. 658-674, 2023.

X.-W. Wang, T. Wang, D. P. Schaub, C. Chen, Z. Sun, S. Ke, J. Hecker, A. Maaser-Hecker, O. A. Zeleznik, R. Zeleznik, A. A. Litonjua, D. L. DeMeo, J. Lasky-Su, E. K. Silverman, Y.-Y. Liu, S. T. Weiss. Benchmarking Omics-based Prediction of Asthma Development in Children. *Respiratory Research* 26 (1), pp. 1-8, 2023.

G. A. Dotson*, C. Chen*, S. Lindsly*, A. Cicalo, S. Dilworth, C. Ryan, S. Jeyarajan, W. Meixner, C. Stansbury, J. Pickard, N. Beckloff, A. Surana, M. Wicha, L. A. Muir, I. Rajapakse. Deciphering Multi-way Interactions in the Human Genome. *Nature Communications* 13, p. 5498, 2022.

S. Lindsly, W. Jia, H. Chen, S. Liu, S. Ronquist, C. Chen, X. Wen, C. Stansbury, G. A. Dotson, C. Ryan, A. Rehemtulla, G. S. Omenn, M. Wicha, S. C. Li, L. A. Muir, I. Rajapakse. Functional Organization of the Maternal and Paternal Human 4D Nucleome. *iScience* 26 (12), p. 103452, 2021.

S. Lindsly, C. Chen, S. Liu, S. Ronquist, S. Dilworth, M. Perlman, I. Rajapakse. 4DNvestigator: Time Series Genomic Data Analysis Toolbox. *Nucleus* 12 (1), pp. 58-64, 2021.

G. A. Dotson, C. Ryan, C. Chen, L. A. Muir, I. Rajapakse. Cellular Reprogramming: Mathematics Meets Medicine. *Wiley Interdisciplinary Reviews: Mechanisms of Disease* 13 (4), p. e1515, 2021.

P. Sweeney*, C. Chen*, I. Rajapakse, R. D. Cone. Network Dynamics of Hypothalamic Feeding Neurons. *Proceedings of the National Academy of Sciences* 118 (14), p. e2011140118, 2021.

C. Chen, A. Surana, A. M. Bloch, I. Rajapakse. Controllability of Hypergraphs. *IEEE Transactions on Network Science and Engineering* 8 (2), pp. 1646-1657, 2021.

C. Chen, A, Surana, A. M. Bloch, I. Rajapakse. Multilinear Control Systems Theory. *SIAM Journal on Control and Optimization* 59 (1), pp. 749-776, 2021.

C. Chen, I. Rajapakse. Tensor Entropy for Uniform Hypergraphs. *IEEE Transactions on Network Science and Engineering* 7 (4), pp. 2889-2900, 2020.

* indicates co-first authors

Conference Proceedings

C. Chen, A. Surana, A. M. Bloch, I. Rajapakse. Multilinear Time Invariant System Theory. *Proceedings of the Conference on Control and its Applications*, pp. 118-125, SIAM, 2019.

Patents

C. Chen, S. Lindsly, I. Rajapakse. Deciphering Multi-way Interactions in the Human Genome with Use of Hypergraphs. US Patent App. 17/839,937, 2022.

Talks

Teasing out Missing Reactions in Genome-scale Metabolic Networks through Hypergraph Learning. *PKU College of Engineering Colloquium*, Virtual, December 2023.

Stability of Homogeneous Polynomial Dynamical Systems. *SIAM Conference on Control and Its Applications*, Philadelphia, PA, July 2023.

Teasing out Missing Reactions in Genome-scale Metabolic Networks through Hypergraph Learning. *Channing Systems Genetics and Genomics and Systems Pathobiology Laboratory Meeting*, Boston, MA, April 2023.

Graph Convolutional Network-based Feature Selection for High-dimensional and Low-sample Size Data. *Channing Multi-omics Meeting*, Boston, MA, March 2023.

Deciphering Biological Networks through Hypergraph Learning. *UNC Applied Mathematics Colloquium*, Chapel Hill, NC, March 2023.

Deciphering Biological Networks through Hypergraph Learning. *Channing Methods Meeting*, Boston, MA, February 2023.

Teasing out Missing Reactions in Genome-scale Metabolic Networks through Deep Learning. *Biological Data Science Conference*, Cold Spring Harbor, NY, November 2022.

Teasing out Missing Reactions in Genome-scale Metabolic Networks through Deep Learning. *Channing Network Science Seminar*, Virtual, March 2022.

Teasing out Missing Reactions in Genome-scale Metabolic Networks through Deep Learning. *Channing Systems Genetics and Genomics and Systems Pathobiology Laboratory Meeting*, Virtual, January 2022.

Controllability of Hypergraphs. *SIAM Conference on Control and Its Applications*, Virtual, June 2021.

Multilinear Time Invariant System Theory. *SIAM Conference on Control and Its Applications*, Chengdu, China, June 2019.

DMD-based Control of Multiway Dynamical Systems. *SIAM Conference on Applications on Dynamical Systems*, Snowbird, UT, May 2019.

Teaching

University of Michigan
- MATH 547: Mathematics of Data (Winter 2019, Winter 2020, Winter 2021)
- MATH 115: Calculus I (Fall 2017, Winter 2018, Fall 2018, Fall 2019, Fall 2020)
- MATH 216: Introduction to Differential Equations Lab (Winter 2020)
- MATH 105: Data, Functions, and Graphs (Fall 2016, Winter 2017)