

Can Chen

Updated September 6, 2024

Assistant Professor of Data Science
Adjunct Assistant Professor of Mathematics
University of North Carolina at Chapel Hill

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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 & 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 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*, *IEEE Transactions on Network Science and Engineering*, *American Control Conference*, *Advanced Science*, *European Control Conference*, *IEEE Internet of Things Journal*, *IEEE Transactions on Control of Network Systems*, *Nature Communications*, *IEEE Conference on Decision and Control*

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

Books/Chapters C. Chen. Tensor-based Dynamical Systems – Theory and Applications. *Synthesis Lectures on Mathematics & Statistics*, Springer Nature, 2024.

Journal Articles J. Pickard, C. Chen, C. Stansbury, A. Surana, A. M. Bloch, and I. Rajapakse. Kronecker Product of Tensors and Hypergraphs: Structure and Dynamics. *SIAM Journal on Matrix Analysis and Applications* 45 (3): 1621-1642, 2024.

C. Chen, X.-W. Wang, and Y.-Y. Liu. Stability of Ecological Systems: A Theoretical Review. *Physics Reports* 1088: 1-41, 2024.

S. Purohit, C. Chen, and R. Vasudevan. Reachable Sets of Homogeneous Polynomial Dynamical Systems Using Exact Solutions. *IEEE Control Systems Letters* 8: 742-747, 2024.

C. Chen. On the Stability of Discrete-time Homogeneous Polynomial Dynamical Systems. *Computational and Applied Mathematics* 43: 75, 2024.

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

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

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

C. Chen, S. T. Weiss, and Y.-Y. Liu. Graph Convolutional Network-based Feature Selection for High-dimensional and Low-sample Size Data. *Bioinformatics* 39 (4): btad135, 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, and S. T. Weiss. Benchmarking Omics-based Prediction of Asthma Development in Children. *Respiratory Research* 26: 63, 2023.

A. Surana, C. Chen, and I. Rajapakse. Hypergraph Similarity Measures. *IEEE Transactions on Network Science and Engineering* 10 (2): 658-674, 2023 (published in 2022).

C. Chen. Explicit Solutions and Stability Properties of Homogeneous Polynomial Dynamical Systems. *IEEE Transactions on Automatic Control* 68 (8): 4962-4969, 2023 (published in 2022).

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, and I. Rajapakse. Deciphering Multi-way Interactions in the Human Genome. *Nature Communications* 13: 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, and I. Rajapakse. Functional Organization of the Maternal and Paternal Human 4D Nucleome. *iScience* 26 (12): 103452, 2021.

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

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

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

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

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

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

* indicates co-first authors

Conference Proceedings

A. Dong, C. Chen, and T. Georgiou. Network Learning with Directional Sign Patterns. *Proceedings of the 2024 IEEE Conference on Decision and Control*, IEEE, 2025 (accepted).

A. Dong and C. Chen. On Complexity of Stability Analysis in Higher-order Ecological Networks through Tensor Decompositions. *Proceedings of the 2024 European Control Conference*: 2934-2939, IEEE, 2024.

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

Patents

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

Talks

Dr. Yun Li's Lab Meeting (UNC), Chapel Hill, NC, September 2024.

Computational Medicine Research in Progress, Chapel Hill, NC, September 2024.

2024 SIAM Student Mini-symposium in Applied Mathematics (keynote speaker), Ann Arbor, MI, September 2024.

Dr. Yun Li's Lab Meeting (UNC), Chapel Hill, NC, May 2024.

RENCI ROBOKOP Meeting, Virtual, May 2024.

Math/STOR Joint FRG Meeting, Chapel Hill, NC, April 2024.

STOR Graduate Student Seminar, Chapel Hill, NC, March 2024.

Data Science Flash Talk Networking Event, Chapel Hill, NC, February 2024.

2023 SIAM Conference on Control and Its Applications, Philadelphia, PA, July 2023.

Channing Systems Genetics and Genomics and Systems Pathobiology Laboratory Meeting, Boston, MA, April 2023.

Channing Multi-omics Meeting, Boston, MA, March 2023.

UNC Applied Mathematics Colloquium (job talk), Chapel Hill, NC, March 2023.

Channing Methods Meeting, Boston, MA, February 2023.

Biological Data Science Conference, Cold Spring Harbor, NY, November 2022.

Channing Network Science Meeting, Virtual, March 2022.

Channing Systems Genetics and Genomics and Systems Pathobiology Laboratory Meeting, Virtual, January 2022.

2021 SIAM Conference on Control and Its Applications, Virtual, June 2021.

2019 SIAM Conference on Control and Its Applications, Chengdu, China, June 2019.

2019 SIAM Conference on Applications on Dynamical Systems, Snowbird, UT, May 2019.

Teaching

University of North Carolina at Chapel Hill

- DATA 110: Introduction to Data Science (Spring 2025)
- DATA 890: Special Topic in Data Science – Graphs and Hypergraphs (Fall 2024)
- DATA 890: Special Topics in Data Science, Guest Lecture (Spring 2024)

University of Michigan

- MATH 547: Mathematics of Data, Guest Lecture (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)