

Jiaze Ma

Department of Chemical and Biological Engineering, University of Wisconsin-Madison

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RESEARCH INTERESTS

Theory: Large-Scale Supply Chain Optimization Algorithms

Graph-based algorithms; Decomposition algorithms; GPU acceleration.

Application: Multi-scale Optimization of Complex Systems

Plastic upcycling; Flexible electrification; Phosphorus recovery; Heat integration.

EDUCATION

University of Wisconsin-Madison

2019-2023

Ph.D. Candidate in Chemical and Biological Engineering. (Minor in Computer Science).

Advisor: Prof. Victor M. Zavala

Project: Computational Strategies for Large-Scale Supply Chain Networks

Cornell University

2018-2019

Visiting Student in Chemical and Biological Engineering.

Project: Energy-Food-Water Nexus

China University of Petroleum

2012-2019

B.S. & M.S. in Chemical Engineering.

Advisor: Prof. Xiao Feng & Prof. Yufei Wang

Project: Cooling Water Systems Design and Optimization

WORK EXPERIENCE

Argonne National Laboratory

2022

Research Intern in Mathematics and Computer Science Division

Advisor: Dr. Kibaek Kim

Project: GPU Acceleration for Large-scale Optimization

TEACHING EXPERIENCE

CBE 470 Process Control, Teaching Assistant

Spring 2020

CBE 450 Process Design, Teaching Assistant

Fall 2021

AWARDS AND HONORS

National Graduate Fellowship, Ministry of Education, China (2018)

Outstanding Graduate of Beijing City, Ministry of Education, China (2019)

Outstanding Dissertation Award, China (2019)

Argonne Givens Associate, Argonne National Lab, US (2022)

PUBLICATIONS

Journal Publications

- [1] Ma, J., Rebarchik, M., Mavrikakis, M., Huber, G. and Zavala, V.M. (2023). **Exploiting Electricity Market Dynamics using Flexible Electrolysis Units for Retrofitting Methanol Synthesis** *Energy and Environmental Science*, 2023 [\[Link\]](#)
- [2] Ma, J. & Zavala, V. M. (2022). **Solution of Large-Scale Supply Chain Models using Graph Sampling & Coarsening**. *Computers & Chemical Engineering*, 163, 107832. [\[Link\]](#)
- [3] Ma, J. & Kim, B. (2022). **GPU Acceleration for Adaptive ADMM-based Large-scale Supply Chain Model** (In preparation)
- [4] Ma, J., Tominac, P., Olafasakin, O., Aguirre-Villegas, H., Wright, M.M., Benson, C.H., Huber, G.W. and Zavala, V.M., (2022). **Economic Evaluation of Infrastructures for Thermochemical Upcycling of Post-Consumer Plastic Waste**. *Green Chemistry* [\[Link\]](#)

- [5] Shao, Y. **Ma, J** and Zavala, V. (2022). **A Spatial Superstructure Approach to the Optimal Design of Modular Processes and Supply Chains.** *Computers & Chemical Engineering* [\[Link\]](#)
- [6] **Ma, J.**, Tominac, P., Pfleger, B.F. and Zavala, V.M. (2021). **Infrastructures for Phosphorus Recovery from Livestock Waste Using Cyanobacteria: Transportation, Techno-Economic, and Policy Implications.** *ACS Sustainable Chemistry & Engineering*, 9(34), 11416-11426. [\[Link\]](#)
- [7] **Ma, J.** & You, F. (2018). **Superstructure optimization of thermal conversion based poultry litter valorization process.** *Journal of Cleaner Production*, 228, pp.1111-1121.
- [8] **Ma, J.** , Chang, C., Wang, Y. and Feng, X. (2018). **Multi-objective Optimization of Multi-period Interplant Heat Integration Using Steam System.** *Energy*, 159, pp.950-960. [\[Link\]](#)
- [9] **Ma, J.** , Wang, Y. and Feng, X. (2018). **Simultaneous Optimization of Pump and Cooler Networks in a Cooling Water System.** *Applied Thermal Engineering*, 125, pp.377-385. [\[Link\]](#)
- [10] **Ma, J.** , Wang, Y. and Feng, X. (2018). **Optimization of Multi-plants Cooling Water System.** *Energy*, 150, pp.797-815. [\[Link\]](#)
- [11] **Ma, J.** , Wang, Y. and Feng, X. (2017). **Synthesis of Cooling Water System with Air Coolers.** *Chemical Engineering Research and Design*, 131, 643-655. [\[Link\]](#)
- [12] **Ma, J.** , Wang, Y. and Feng, X. (2018). **Energy recovery in cooling water system by hydro turbines** *Energy*, 139, pp.329-340.
- [13] **Ma, J.** , Li, C., Liu, F., Wang, Y., Liu, T. and Feng, X. (2018). **Optimization of circulating cooling water networks considering the constraint of return water temperature** *Journal of Cleaner Production*, 199, pp.916-922.
- [14] **Ma, J.** , Irfan, H.M., Wang, Y., Feng, X. and Xu, D. (2018). **Recovering wastewater in a cooling water system with thermal membrane distillation .** *Industrial & Engineering Chemistry Research*, 57(31), pp.10491-10499.
- [15] Liu, F. **Ma, J.** Feng, X and Wang, Y (2017). **Simultaneous integrated design for heat exchanger network and cooling water system.** *Applied Thermal Engineering* 128 (2018): 1510-1519
- [16] Chang, C. Wang, Y. **Ma, J.** Chen, X and Feng, X (2017). **An energy hub approach for direct interplant heat integration.** *Energy* 159 (2018): 878-890
- [17] Wang, Y. Feng, X. **Ma, J** (2017). **Sustainable design of cooling water system.** *Towards Sustainable Chemical Processes*, 2020.241-274

Conference Proceedings

- [1] **Ma, J.** , Wang, Y. and Feng, X. (2017). **Simultaneous optimization of cooler network, pump network, and cooling Tower** *Computer Aided Chemical Engineering* (Vol. 40, pp. 763-768)
- [2] **Ma, J.** , Wang, Y. and Feng, X. (2018). **Optimization of cooling water system with compression refrigeration cycle** *Computer Aided Chemical Engineering* (Vol. 44, pp. 1039-1044).
- [3] **Ma, J.** , Chen, X., Chang, C., Wang, Y. and Feng, X. (2017). **Simultaneous Synthesis of Multi-Period Heat Exchanger Networks for Multi-Plant Heat Integration** *Chemical Engineering Transactions*, 61, pp.757-762.

PEER REVIEW

Industrial & Engineering Chemistry Research; Applied Energy; Chemical Engineering Research & Design; Energy Conversion and Management; Chemical Engineering Research & Design; Journal of Cleaner Production; Process Integration & Optimization for Sustainability; Engineering Report

CONFERENCE TALKS

- [1] **Ma, J. et al.** (2023 Feb), *Using GPUs for Solving Large-Scale Supply Chain Models*, Texas-Wisconsin-California Control Consortium (TWCCC-2023).
- [2] **Ma, J. et al.** (2023 Nov), *Process Design and Operation for the Flexible Electrification of Methanol Synthesis*, American Institute for Chemical Engineers (AIChE) Annual Meeting. [\[Link\]](#)
- [3] **Ma, J. et al.** (2022 Nov), *Economic Evaluation of Infrastructures for Thermochemical Upcycling of Post-Consumer Plastic Waste*, American Institute for Chemical Engineers (AIChE) Annual Meeting. [\[Link\]](#)
- [4] **Ma, J. et al.** (2021, Nov), *A Network-Sampling Algorithm for the Solution of Large-Scale Supply Chain Models*, American Institute for Chemical Engineers (AIChE) Annual Meeting. [\[Link\]](#)

- [5] **Ma.J. et al.** (2017, Oct), *Design and Optimization of Cooling Water Systems*, presented at the 27th European Symposium on Computer Aided Process Engineering (ESCAPE-27).

COMPUTER SKILLS

-Optimization (Julia, GAMS) -Data Analysis (Matlab, R) -Process Simulation (Aspen)

SOFTWARE PRODUCTS

- [1] Economic Evaluation of Infrastructures for Thermochemical Upcycling of Post-Consumer Plastic Waste [\[Link\]](#)
- [2] Exploiting Electricity Market Dynamics using Flexible Electrolysis Units for Retrofitting Methanol Synthesis [\[Link\]](#)
- [3] Solution of Large-Scale Supply Chain Models using Graph Sampling & Coarsening [\[Link\]](#)
- [4] GPU Acceleration for Adaptive ADMM-based Large-scale Supply Chain Model