

# Can Li

Assistant Professor

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## EDUCATION

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### **Carnegie Mellon University**

*August 2016-May 2021*

Ph.D. in Chemical Engineering

- Research advisor: Prof. Ignacio E. Grossmann
- Thesis: Algorithms for Stochastic Mixed-Integer Nonlinear Programming and Long Term Optimization of Electric Power Systems

### **Tsinghua University**

*August 2012-July 2016*

B.Eng. in Chemical Engineering

- Research advisor: Prof. Yushan Zhu, Prof. Chu Wang
- Thesis: Sequence-Based Prediction of Cysteine Reactivity Using Machine Learning

### **University of Wisconsin, Madison**

*August 2014-December 2014*

Exchange Student, Department of Chemical and Biological Engineering

## APPOINTMENTS

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### **Davidson School of Chemical Engineering, Purdue University, IN**

*June 2022-*

*Assistant Professor*

Research expertise: Stochastic Programming; Mixed-Integer Programming; Energy Systems

### **Polytechnique Montreal**

*June 2021-June 2022*

*Post-doctoral Researcher, Department of Mathematics and Industrial Engineering*      *Advisor: Prof. Andrea Lodi*

- Develop machine learning methods for global optimization problems
- Develop first-order methods for solving semidefinite programming problems

### **Argonne National Laboratory, Lemont, IL**

*May 2020-August 2020*

*Givens Associate at Mathematics and Computer Science Division*

*Supervisor: Dr. Kibaek Kim*

- Decision rule-based algorithm for two-stage stochastic programs

### **ExxonMobil Upstream Research Company, Spring, TX**

*May 2018-August 2018*

*Research intern in Decision Support and Optimization team*

*Supervisor: Dr. Kevin Furman*

- Feasibility detector for LNG ship scheduling problems

## TEACHING EXPERIENCE

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### **Purdue University, Davidson School of Chemical Engineering**

*Fall 2022*

*Course Instructor*

- Course: Statistical Modeling and Quality Enhancement

## RESEARCH MENTORING

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- Gonzalo Constante Flores, Postdoctoral Researcher at Purdue ChemE** *January 2023-present*
- Project title: Power Systems Optimization
- Yen-Chun Li, PhD student at Purdue ChemE** *November 2022-present*
- Project title: Machine learning for stem cell
- Hao Chen, PhD student at Purdue ChemE** *November 2022-present*
- Project title: Explainable machine learning
- Kaiyu Cao, Postdoctoral Researcher at Purdue ChemE** *August 2022-present*
- Project title: Multiscale algorithms
- Chi Zhang, Postdoctoral Researcher at Purdue ChemE** *August 2022-present*
- Project title: End-to-end machine learning
- Asha Ramanujam, PhD student at Purdue ChemE** *November 2021-present*
- Project title: Stochastic Programming for Electrification

## CONFERENCE PRESENTATIONS

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- [1] **Can Li**, Kibaek Kim (2022) Piecewise Linear Decision Rules via Adaptive Partition for Two Stage Stochastic Mixed Integer Linear Programs. AICHE Annual Meeting, Phoenix.
- [2] **Can Li**, Kibaek Kim (2022) Piecewise Linear Decision Rules via Adaptive Partition for Two Stage Stochastic Mixed Integer Linear Programs. ICCOPT
- [3] **Can Li**, Antonio J. Conejo, Peng Liu, Benjamin P. Omell, John D. Siirola, Ignacio E. Grossmann (2021) Mixed-integer Linear Programming Models And Algorithms For Generation And Transmission Expansion Planning Of Power Systems. INFORMS Annual Meeting
- [4] **Can Li**, Antonio J. Conejo, John D. Siirola, Ignacio E. Grossmann (2021) On representative day selection for capacity expansion planning of power systems under extreme events. AICHE Annual Meeting, Boston.
- [5] **Can Li**, Antonio J. Conejo, Peng Liu, Benjamin P. Omell, John D. Siirola, Ignacio E. Grossmann (2020) Power Systems Infrastructure Planning with High Renewables Penetration. AICHE Annual Meeting, San Francisco.
- [6] **Can Li**, David E. Bernal, Kevin C. Furman, Marco A. Duran, Ignacio E. Grossmann (2020) Sample Average Approximation for Stochastic Nonconvex Mixed Integer Nonlinear Programming via Outer-Approximation. AICHE Annual Meeting, San Francisco.
- [7] **Can Li**, David E. Bernal, Kevin C. Furman, Marco A. Duran, Ignacio E. Grossmann (2020) Sample Average Approximation for Stochastic Nonconvex Mixed Integer Nonlinear Programming via Outer-Approximation. INFORMS Annual Meeting.
- [8] **Can Li**, Ignacio E. Grossmann (2019). A finite  $\epsilon$ -convergence algorithm for two-stage stochastic convex nonlinear programs with mixed-binary first and second stage variables. XV ICSP conference, Trondheim.
- [9] **Can Li**, Ignacio E. Grossmann (2019). On Solving Nonconvex Two-stage Stochastic Programs With Generalized Benders Decomposition. INFORMS Annual Meeting, Seattle.
- [10] **Can Li**, Ignacio E. Grossmann, John P. Eason, Markus G. Drouven (2019). Single Pad Planning Under Uncertainty for Shale Gas Development. AICHE Annual Meeting, Orlando.
- [11] **Can Li**, Ignacio E. Grossmann (2018). On Solving Nonconvex Two-stage Stochastic Programs with Generalized Benders Decomposition. AICHE Annual Meeting, Pittsburgh.
- [12] **Can Li**, Ignacio E. Grossmann (2018). A finite  $\epsilon$ -convergence algorithm for two-stage convex 0-1 mixed-integer nonlinear stochastic programs with mixed-integer first and second stage variables. INFORMS Annual Meeting, Phoenix.
- [13] **Can Li**, Ignacio E. Grossmann (2018). An Improved L-shaped Method for Two-stage Convex 0-1 Mixed Integer Nonlinear Stochastic Programs. PSE 2018, San Diego.

## INVITED SEMINAR

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- [1] Can Li (2022). LANS seminar at Argonne National Laboratory. Invited by Dr. Kibaek Kim
- [2] Can Li (2022). Algorithms and Software for Two-stage Stochastic Mixed-integer Nonlinear Programs. Group meeting at Imperial College London and Manchester University. Invited by Prof. Antonio Del Rio Chanona and Prof. Dongda Zhang
- [3] Can Li (2022). Algorithms and Software for Two-stage Stochastic Mixed-integer Nonlinear Programs. Coffee talk at Polytechnique Montreal. Invited by Prof. Andrea Lodi
- [4] Can Li (2021). Decision-making under uncertainty through mathematical programming: Optimization of sustainable energy systems design and operation. Davidson School of Chemical Engineering, Purdue University.
- [5] Can Li (2021). Algorithms and Software for Two-stage Stochastic Mixed-integer Nonlinear Programs. Los Alamos National Laboratory, invited by Dr. Harsha Nagarajan
- [6] Can Li (2018). On Solving Stochastic Mixed-integer Nonlinear Programs. Department of Chemical Engineering, Tsinghua University, invited by Prof. Yushan Zhu

## HONORS AND AWARDS

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- CAST Division Student Presentation Award, 3rd place, 2021
- Honorable mention award, 42nd Annual CHEGSA Symposium, Carnegie Mellon University, 2020
- Best Poster Award, Center for Advanced Process Decision-making (CAPD) annual meeting, 2018
- Jinyong Award, Department of Chemical Engineering, Tsinghua University, 2015
- CSC Scholarship, Exchange Student at UW-Madison, 2014
- Lijieshen Award, Department of Chemical Engineering, Tsinghua University, 2014
- Second Prize, Physics Olympiad for Undergraduates in Beijing, 2014
- Member, Spark Talents Program for Technological Innovation, Tsinghua University, 2014
- Comprehensive Excellent Scholarship (3/116 in Department of Chemical Engineering), Tsinghua University, 2013
- First Prize (1st of Henan Province), National Olympiad in Chemistry, 2011

## REVIEW SERVICE

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- Optimization and Engineering
- Computers & Chemical Engineering
- Journal of Global Optimization
- SIAM Journal on Optimization
- Mathematical Programming
- INFORMS Journal on Computing
- International Journal of Electrical Power and Energy Systems
- Computers and Electrical Engineering
- SN Operations Research Forum
- AIChE Journal
- IEEE Transactions on Control Systems Technology
- ACS Sustainable Chemistry & Engineering
- Transportation Research Part E
- Networks and Spatial Economics

## CONFERENCE ORGANIZATION

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- Session Chair, ICCOPT, 2022
- Session Chair, INFORMS Annual Meeting, 2021
- Cluster Chair, INFORMS Annual Meeting, 2020
- Session Chair, INFORMS Annual Meeting, 2020

- Session Chair, XV ICSP conference, Trondheim, 2019.

## PUBLICATIONS

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- [1] Cho, S., Li, C., Grossmann, I. E. (2022). Recent advances and challenges in optimization models for expansion planning of power systems and reliability optimization. *Computers & Chemical Engineering*, 107924.
- [2] Chang, Y., Syahirah, R., Wang, X., Jin, G., Torregrosa-Allen, S., Elzey, B. D., ... Bao, X. (2022). Engineering chimeric antigen receptor neutrophils from human pluripotent stem cells for targeted cancer immunotherapy. *Cell reports*, 40(3), 111128.
- [3] Torres, J. J., Li, C., Apap, R. M., Grossmann, I. E. (2022). A Review on the Performance of Linear and Mixed Integer Two-Stage Stochastic Programming Software. *Algorithms*, 15(4), 103.
- [4] Li, C., Conejo, A. J., Siirola, J. D., & Grossmann, I. E. (2021). On representative day selection for capacity expansion planning of power systems under extreme operating conditions. *International Journal of Electrical Power Energy Systems*, 107697.
- [5] Peng, Z., Li, C., Grossmann, I. E., Kwon, K., Ko, S., Shin, J., & Feng, Y. (2021). Shale gas field development planning under production profile uncertainty. *AIChE Journal*, e17439.
- [6] Peng, Z., Li, C., Grossmann, I. E., Kwon, K., Ko, S., Shin, J., & Feng, Y. (2021). Multiperiod design and planning model of shale gas field development. *AIChE Journal*, 67(8), e17195.
- [7] Li, C., Conejo, A. J., Liu, P., Omell, B. P., Siirola, J. D., & Grossmann, I. E. (2021). Mixed-integer linear programming models and algorithms for generation and transmission expansion planning of power systems. *European Journal of Operational Research*.
- [8] Li, C., & Grossmann, I. E. (2021). A review of stochastic programming methods for optimization of process systems under uncertainty. *Front. Chem. Eng.*, 2, 1-20.
- [9] Perez, H. D., Hubbs, C. D., Li, C., & Grossmann, I. E. (2021). Algorithmic Approaches to Inventory Management Optimization. *Processes*, 9(1), 102.
- [10] Li, C., Bernal, D.E., Furman, K.C., Duran, M.A. and Grossmann, I.E., 2020. Sample average approximation for stochastic nonconvex mixed integer nonlinear programming via outer-approximation. *Optimization and Engineering*, pp.1-29.
- [11] Hubbs, C.D., Li, C., Sahinidis, N.V., Grossmann, I.E. and Wassick, J.M., 2020. A Deep Reinforcement Learning Approach for Chemical Production Scheduling. *Computers & Chemical Engineering*, p.106982.
- [12] Li, C., Eason, J.P., Drouven, M.G. and Grossmann, I.E., 2020. Shale gas pad development planning under price uncertainty. *AIChE Journal*, 66(6), p.e16933.
- [13] Li, C. and Grossmann, I.E., 2019. A generalized Benders decomposition-based branch and cut algorithm for two-stage stochastic programs with nonconvex constraints and mixed-binary first and second stage variables. *Journal of Global Optimization*, 75(2), pp.247-272.
- [14] Li, C. and Grossmann, I.E., 2019. A finite  $\epsilon$ -convergence algorithm for two-stage stochastic convex nonlinear programs with mixed-binary first and second-stage variables. *Journal of Global Optimization*, 75(4), pp.921-947.
- [15] Lara, C.L., Bernal, D.E., Li, C. and Grossmann, I.E., 2019. Global optimization algorithm for multi-period design and planning of centralized and distributed manufacturing networks. *Computers & Chemical Engineering*, 127, pp.295-310.
- [16] Li, C. and Grossmann, I.E., 2018. An improved L-shaped method for two-stage convex 0-1 mixed integer nonlinear stochastic programs. *Computers & Chemical Engineering*, 112, pp.165-179.
- [17] Wang, H.\*, Chen, X.\*, Li, C.\*, Liu, Y., Yang, F. and Wang, C., 2018. Sequence-based prediction of cysteine reactivity using machine learning. *Biochemistry*, 57(4), pp.451-460.

\* = Co-1st-Author