

YU LUO

University of Delaware, 150 Academy St., Newark, DE 19716

<https://l16cn.github.io>

EDUCATION

- Columbia University, Graduate School of Arts and Sciences** 02/2017
Doctor of Philosophy, Chemical Engineering
- Columbia University, Fu Foundation School of Engineering and Applied Science** 05/2012
Master of Science, Chemical Engineering
Full GPA
- National University of Singapore, Faculty of Engineering** 06/2011
Bachelor of Engineering, Chemical Engineering
First Class Honors

PUBLICATIONS

- Yu Luo, Garud Iyengar, and Venkat Venkatasubramanian. A one-third advice rule based on a control-theoretic opinion dynamics model. *IEEE Transactions on Computational Social Systems*, 2019. Accepted for publication
- Venkat Venkatasubramanian, Yu Luo, and Zhizun Zhang. Control of complex sociotechnical systems: importance of causal models and game theory. *Computers & Chemical Engineering*, 123:1 – 11, 2019
- Yu Luo, Garud Iyengar, and Venkat Venkatasubramanian. Social influence makes self-interested crowds smarter: an optimal control perspective. *IEEE Transactions on Computational Social Systems*, 5(1):200–209, March 2018
- Garud Iyengar, Yu Luo, Shivaram Rajgopal, Venkat Venkatasubramanian, and Zhizun Zhang. Towards a financial statement based approach to modeling systemic risk in insurance and banking. *Columbia Business School Research Paper*, 17(177), 2017. Available at SSRN. **Featured by the “SSRN Top Ten List” in Banking and Insurance; Risk Management and Analysis in Financial Institutions; Risk Management; and Financial Crises categories**
- Yu Luo, Garud Iyengar, and Venkat Venkatasubramanian. Soft regulation with crowd recommendation: coordinating self-interested agents in sociotechnical systems under imperfect information. *PLoS ONE*, 11(3):e0150343, 2016
- Venkat Venkatasubramanian, Yu Luo, and Jay Sethuraman. How much inequality in income is fair? A microeconomic game theoretic perspective. *Physica A: Statistical Mechanics and its Applications*, 435:120–138, 2015. **Featured by the “ScienceDirect Top 25 List of Most Downloaded Articles”**
- Richard Bookstaber, Paul Glasserman, Garud Iyengar, Yu Luo, Venkat Venkatasubramanian, and Zhizun Zhang. Process systems engineering as a modeling paradigm for analyzing systemic risk in financial networks. *The Journal of Investing*, 24(2):147–162, 2015

EXPERIENCE

University of Delaware, Chemical and Biomolecular Engineering

Postdoctoral Researcher

06/2017–Present

Newark, DE

- **Advisors:** Prof. Babatunde A. Ogunnaike and Prof. Kelvin H. Lee
- **Projects:** Modeling, design, and control of antibody production and glycosylation processes
- Collaborated with J&J to model and design upstream antibody manufacturing processes
- Worked with CMU, JHU, and UMD on model-based titer and glycosylation control
- Employed a modular modeling approach that efficiently adapts existing models to new processes
- Implemented a user interface to assist decision-making in process development
- Optimized MATLAB codes to run 60 times faster
- Presented work at CCE, ACS, GRC, and AIChE meetings

Columbia University, Chemical Engineering

Doctoral Student (2011–2016) and Postdoctoral Researcher (2017)

09/2011–05/2017

New York, NY

- **Advisors:** Prof. Venkat Venkatasubramanian and Prof. Garud Iyengar
- **Dissertation:** Multi-agent control in sociotechnical systems
- Collaborated with both world-class scholars and executive-level practitioners on systemic risk research
- Led multiple interdisciplinary research teams of graduate and undergraduate students
- Guest-lectured graduate-level courses including “Managing Systemic Risk in Complex Systems”
- Modeled collective dynamics of interacting and intelligent agents using control theory
- Designed feedback mechanisms to improve decision-making efficiency for intelligent groups
- Discovered deep connections through game theory between income inequality and thermodynamics
- Conducted behavioral research experiments with human subjects on Amazon Mechanical Turk
- Developed a data-driven early warning system to predict mine accidents based on regulatory data
- Applied process hazard analysis techniques to identifying vulnerabilities in financial networks
- Worked with Prudential to develop a risk measure based on financial statements for insurers and banks
- Implemented an agent-based model to understand high-frequency trading and its market impacts
- Managed website and assisted in organizing three university-level symposia and workshops

PNC Bank

Quantitative Analyst Intern

08/2015–12/2015

New York, NY

- **Manager:** Dr. Brian Burk
- Supervised two graduate students and collaborated with finance professionals at PNC Bank
- Built an operational risk model based on the loss distribution approach

Singapore-MIT Alliance, Environmental Sensing and Modeling

Undergraduate Research Assistant

05/2010–06/2011

Singapore

- **Advisor:** Prof. Adrian Wing-Keung Law
- Modeled and simulated sand sedimentation dynamics
- Improved image processing algorithm and numerical model for sand sedimentation experiments

PRESENTATIONS

Yu Luo, J. Vincent Price, Robert J. Lovelett, Devesh Radhakrishnan, Kristopher Barnthouse, Gene Schaefer, John Cunningham, Ping Hu, Kelvin H. Lee, and Babatunde A. Ogunnaike. Multiscale modeling of antibody production and glycosylation for improved upstream process design. In *ACS National Meeting & Expo*, Orlando, FL, 2019. Oral presentation

Yu Luo, J. Vincent Price, Robert J. Lovelett, Devesh Radhakrishnan, Kristopher Barnthouse, Gene Schaefer, John Cunningham, Ping Hu, Kelvin H. Lee, Raghu Shivappa, and Babatunde A. Ogunnaike. Multiscale modeling of monoclonal antibody (mAb) production and glycosylation in a Chinese hamster ovary (CHO) cell culture process. In *AICHE Annual Meeting*, Pittsburg, PA, 2018. Oral presentation

Yu Luo, Garud Iyengar, and Venkat Venkatasubramanian. Control with soft feedback in social systems: mathematical principles, empirical evidence, and applications. In *AICHE Annual Meeting*, Minneapolis, MN, 2017. Oral presentation

Yu Luo, Ashutosh Nanda, Shivaram Rajgopal, Vinay Ramesh, Zhizun Zhang, Catherine Zhao, and Venkat Venkatasubramanian. A data-driven early warning system for mining accidents. In *Global Congress on Process Safety*, San Antonio, TX, 2017. Oral presentation

Yu Luo, Garud Iyengar, and Venkat Venkatasubramanian. The control of self-interested agents: learning from nature's wisdom of crowds. In *AICHE Annual Meeting*, San Francisco, CA, 2016. Oral presentation. **Finalist and travel grant recipient for the AIChE CAST Division Director's Student Presentation Award**

Yu Luo, Richard Bookstaber, Paul Glasserman, Garud Iyengar, Zhizun Zhang, and Venkat Venkatasubramanian. Process systems engineering beyond chemical plants: signed digraph as a modeling tool for analyzing systemic risk in financial networks. In *AICHE Annual Meeting*, San Francisco, CA, 2016. Oral presentation

Yu Luo, Garud Iyengar, and Venkat Venkatasubramanian. Soft regulation: coordinating distributed self-interested agents in sociotechnical systems. In *AICHE Annual Meeting*, Atlanta, GA, 2014. Oral presentation

PROFESSIONAL SERVICE

Journal of Computers and Chemical Engineering	12/2012–Present
<i>Outstanding Reviewer</i>	<i>New York, NY</i>

- Reviewed 20+ manuscripts on fault detection, fault diagnosis, optimization, risk management, etc.

AIChE	11/2014–Present
<i>Member</i>	<i>New York, NY</i>

- Served as session chair for the Pharmaceutical Discovery, Development, and Manufacturing Forum

TECHNICAL STRENGTHS

Language	Python, R, MATLAB, JavaScript, SQL, LISP, HTML, and LaTeX
Simulation	SimuLink, COMSOL, NetLogo, and Aspen HYSYS
Media	Adobe Photoshop, Adobe Illustrator, Adobe Premiere, and Adobe After Effects
Graphic Design	Vector art, brochure design, and event poster
Traditional Art	Portrait painting, calligraphy, and piano
Creative Art	Musical composition, song writing, and video editing