# YU LUO

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## 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 AND PREPRINTS

Venkat Venkatasubramanian and Yu Luo. How much income inequality is fair? Nash bargaining solution and its connection to entropy. *arXiv preprint arXiv:1806.05262*, 2018

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

## AWARDS AND HONORS

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|---|---|
| SSRN Top Ten List (4) | 08/2017–10/2017 |
| Elsevier Outstanding Contribution in Reviewing | 07/2017 |
| AIChE CAST Division Director's Student Presentation Award (Finalist) | 05/2016 |
| ScienceDirect Top 25 List of Most Downloaded Articles | 06/2015 |
| Undergraduate Degree with First Class Honors | 06/2011 |
| National University of Singapore Dean's List (3) | 08/2007–06/2011 |

## EXPERIENCE

**University of Delaware, Chemical and Biomolecular Engineering**  06/2017–Present
*Postdoctoral Researcher*  *Newark, DE*

- **Advisors**: Prof. Babatunde Ogunnaike and Prof. Kelvin Lee

- Developed a predictive model of antibody and glycosylation for Chinese hamster ovary (CHO) cells
- Collaborated closely with a major pharmaceutical company
- Implemented an algorithmic decision-making tool to meet production and product quality targets
- Created an empirical model to study amino acid and trace metal effects on cell growth and glycosylation
- Optimized MATLAB codes and made them run 60 times faster than the previous version

**Columbia University, Chemical Engineering**  09/2011–05/2017
*Doctoral Student (2011–2016) and Postdoctoral Researcher (2017)*  *New York, NY*

- **Advisors**: Prof. Venkat Venkatasubramanian and Prof. Garud Iyengar
- **Dissertation**: Multi-agent control in sociotechnical systems

- Designed control-theoretic soft feedback mechanisms that could make intelligent crowds "smarter"
- Discovered deep connections through game theory between income inequality and thermodynamics
- Conducted behavioral research experiments on social influence with human subjects
- Developed a data-driven early warning system to predict mine accidents based on regulatory data
- Applied process hazard analysis (signed digraph) to identifying vulnerabilities in financial networks
- Worked with Prudential Financial on a financial statement-based risk measure for insurers and banks
- Implemented an agent-based model to understand high-frequency trading and its market impacts
- Modeled collective dynamics of multiple interacting and intelligent agents
- Managed website and assisted in organizing three university-level symposia and workshops
- 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"

**PNC Bank**  08/2015–12/2015
*Quantitative Analyst Intern*  *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**  05/2010–06/2011
*Undergraduate Research Assistant*  *Singapore*

- **Advisor**: Prof. 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 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. Process systems engineering and artificial intelligence for advanced manufacturing: including applications to biopharmaceuticals. In *AIChE Annual Meeting*, Pittsburg, PA, 2018. Poster presentation

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 monoclonal antibody (mAb) production and glycosylation in a CHO cell culture process. In *AMBIC Semiannual Meeting*, Fremont, CA, 2018. Poster presentation

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 monoclonal antibody (mAb) production and glycosylation in a CHO cell culture process. In *Cell Culture Engineering XVI*, Tampa, FL, 2018. Poster 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. Process systems engineering beyond chemical plants. In *AIChE Annual Meeting*, San Francisco, CA, 2016. Poster 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
*Outstanding Reviewer* — *New York, NY*

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

**Columbia University, Center for the Management of Systemic Risk** — 12/2012–05/2017
*Webmaster and Event Assistant* — *New York, NY*

· Designed print media, assisted event logistics, and facilitated coordination between schools
· Assisted organizing Symposium on the Management of Systemic Risk in Finance
· Assisted organizing Symposium on Managing Systemic Risk in Energy, Environment, and Infrastructure
· Assisted organizing Workshop on Systemic Risk in Insurance

## TECHNICAL STRENGTHS

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| **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 |