

# ZHEYU JIANG

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## EDUCATION

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<b>Ph.D., Purdue University</b> , Chemical Engineering	2014 – 2018
<b>B.Ch.E. (Honors), University of Minnesota</b>	2010 – 2014

## APPOINTMENTS

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**Oklahoma State University** August 2021 – Present  
*Assistant Professor of Chemical Engineering*

- Leading the Computational Laboratory of Advanced Manufacturing and Sustainability (CLAMS) in the School of Chemical Engineering

**Corteva Agriscience** July 2019 – July 2021  
*Research Investigator - Process Development Engineer*

- Developed and optimized robust and cost-effective synthesis routes to deliver new fungicide products and reduced their solvent consumption by 60% and costs of manufacturing by 40%
- Conducted process development and optimization research to enable registration/launch for multiple crop protection actives and developed robust, cost-effective, and sustainable manufacturing technologies
- As the company's subject matter expert on liquid separations, designed, optimized, and implemented several novel solvent purification and recovery processes in the production of crop protection actives

**Prof. Rakesh Agrawal Group, Purdue University** August 2014 – October 2018  
*Graduate Research Assistant*

- Solved a longstanding problem in chemical engineering of developing a shortcut method for minimum reflux calculation for multicomponent distillation in multi-feed, multi-product columns
- Developed the first enumeration based global optimization algorithm to identify distillation configurations that can save up to 50% of total cost or total exergy loss compared to conventional schemes
- For the first time, proposed a systematic multi-layer approach for process intensification in multicomponent distillation, offering industrial practitioners an easy-to-follow recipe to synthesize numerous new and intensified configurations that further enhance operability, improve efficiency, and reduce total costs

**The Dow Chemical Company** May 2016 – August 2016  
*PhD R&D Intern*

- Synthesized novel multicomponent distillation sequences for several Dow's core processes that could save up to 10-15% in energy consumption and capital cost compared to current most effective technologies
- Hosted weekly meetings involving R&D, engineering, and business experts regarding potential innovation and retrofit opportunities for implementing these newly identified configurations

**Prof. Michael Tsapatsis Group, University of Minnesota** November 2012 – May 2014  
*Undergraduate Research Assistant*

- Developed the first solution processable method to achieve purification of sub-100 nm thin film of exfoliated MFI zeolite nanosheets using density gradient centrifugation
- Optimized experimental procedure that fabricated high-quality  $\alpha$ -alumina membrane supports based on colloidal dispersion processing for MFI nanosheet coating
- Studied complete removal of organic structural directing agent in MFI nanosheets by acid treatment

**Honeywell UOP** June 2013 – August 2013  
*Engineering Support Specialist*

- Created new UniSim based process simulations for UOP's Oleflex and FCC technologies and successfully built activity coefficient based models to describe the VLE and LLE for all major components involved
- Established a crude oil thermodynamic properties databank for major global oil reserves

## PUBLICATIONS

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8. Jiang Z, Tawarmalani M, Agrawal R. Minimum Reflux Calculation for Multicomponent Distillation in Multi-Feed, Multi-Product Columns: Mathematical Model. *AIChE Journal*. 2022;forthcoming.
  - Invited article in the 2022 Futures Issue of AIChE Journal
7. Jiang Z. A shortcut minimum reflux calculation method for distillation columns separating multicomponent homogeneous azeotropic mixtures. *Le Scientifique*. 2020;2020(1):17–25.
  - Featured in the inaugural issue of *Le Scientifique*, the peer-reviewed academic journal for Corteva scientists
6. Jiang Z, Chen Z, Huff J, Shenvi A, Tawarmalani M, Agrawal R. Global Minimization of Total Exergy Loss of Multicomponent Distillation Configurations. *AIChE Journal*. 2019;65(11):e16737
5. Jiang Z, Mathew TJ, Huff J, Nallasivam U, Tawarmalani M, Agrawal R. Global optimization of multicomponent distillation configurations: Global minimization of total cost for multicomponent mixture separations. *Computers & Chemical Engineering*. 2019;126:249–262
4. Jiang Z, Agrawal R. Process intensification in multicomponent distillation: A review of recent advancements. *Chemical Engineering Research and Design*. 2019;147:122–145.
  - Invited review article in the special issue on 11<sup>th</sup> International Conference on Distillation & Absorption
3. Jiang Z, Madenoor Ramapriya G, Tawarmalani M, Agrawal R. Process Intensification in Multicomponent Distillation. *Chemical Engineering Transactions*. 2018;69:841–846
2. Jiang Z, Madenoor Ramapriya G, Tawarmalani M, Agrawal R. Minimum energy of multicomponent distillation systems using minimum additional heat and mass integration sections. *AIChE Journal*. 2018;64(9):3410–3418
1. Agrawal KV, Topuz B, Jiang Z, Nguenkam K, Elyassi B, Francis LF, Tsapatsis M, Navarro M. Solution-processable exfoliated zeolite nanosheets purified by density gradient centrifugation. *AIChE Journal*. 2013;59(9):3458–3467.
  - Invited article in the special issue of AIChE Journal Founders Tribute to Neal R. Amundson

## WORKING MANUSCRIPTS

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4. Ghasemi Naraghi S, Jiang Z. Stochastic Optimization of Global Agrochemical Supply Chains with Risk Management: Modeling and Reformulation. In preparation
3. Song Z, Jiang Z. A data-driven random walk approach for solving water flow dynamics in soil systems; Under review in Computer Aided Chemical Engineering
2. Jiang Z. A Shortcut model for multicomponent homogeneous azeotropic distillation. Under review in Computer Aided Chemical Engineering
1. Jiang Z, Tawarmalani M, Agrawal R. Minimum Reflux Calculation for Multicomponent Distillation in Multi-Feed, Multi-Product Columns: Optimization algorithm. Under review in Chemical Engineering Science.

## PATENTS

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1. “Polymorphs of compounds having pesticidal activity”. WO 2022/072650 A1, published on April 7, 2022

## PRESENTATIONS

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17. Jiang Z. Creating a sustainable manufacturing and food future via process systems engineering innovations. 2021. Oklahoma State University, Stillwater, OK (**INVITED**)
16. Jiang Z. Advancing future-generation separation technologies via systems engineering innovations: Multicomponent distillation and beyond. 2021. Oklahoma State University, Stillwater, OK (**INVITED**)

15. Jiang Z. Creating a sustainable food future by 2050 via systems engineering innovations. 2021. University of Wisconsin, Madison, WI **(INVITED)**
14. Jiang Z. Advancing future-generation separation technologies via process systems engineering innovations. 2021. University of Wisconsin, Madison, WI **(INVITED)**
13. Jiang Z. Innovating future-generation separation technologies via process systems engineering. 2020. Virtual AIChE Annual Meeting
12. Jiang Z. Innovating future-generation separation processes via systems engineering. 2020. Cornell University, Ithaca, NY **(INVITED)**
11. Jiang Z. Innovating future-generation separation processes via systems engineering: Multicomponent distillation and beyond. 2020. University of Wisconsin, Madison, WI **(INVITED)**
10. Jiang Z. Minimum reflux calculation for multicomponent azeotropic distillation using shortcut method. 2019. AIChE Annual Meeting, Orlando, FL
9. Jiang Z. A shortcut model for multicomponent azeotropic distillation column design. 2019. AIChE Annual Meeting, Orlando, FL
8. Jiang Z. A modeling approach to designing effective solvent exchange and recycle processes. 2019. Crop Protection Product Design & Process Summit, Indianapolis, IN **(INVITED)**
7. Jiang Z, Tawarmalani M, Agrawal R. Minimum reflux behavior of multicomponent mixture separation using complex distillation columns. 2018. AIChE Annual Meeting, Pittsburgh, PA
6. Jiang Z, Tawarmalani M, Agrawal R. A new minimum reflux calculation method for multiple-feed distillation columns distilling ideal multicomponent mixtures. 2017. AIChE Annual Meeting, Minneapolis, MN
5. Jiang Z, Tawarmalani M, Agrawal R. Process intensification in multicomponent distillation. 2017. AIChE Annual Meeting, Minneapolis, MN
4. Jiang Z, Tawarmalani M, Agrawal R. Process intensification in multicomponent distillation. 2017. AIChE Spring Meeting, San Antonio, TX
3. Jiang Z, Madenoor Ramapriya G, Tumbalam Gooty R, Tawarmalani M, Agrawal R. Minimum energy of multicomponent distillation systems using minimum additional number of heat and mass integration sections. 2016. AIChE Annual Meeting, San Francisco, CA
2. Jiang Z, Madenoor Ramapriya G, Tumbalam Gooty R, Tawarmalani M, Agrawal R. Process intensification of multicomponent distillation configurations using minimum additional number of heat and mass integration sections. 2016. AIChE Annual Meeting, San Francisco, CA
1. Jiang Z, Madenoor Ramapriya G, Tumbalam Gooty R, Tawarmalani M, Agrawal R. A method for minimization of total exergy loss over the complete search space of regular distillation configurations. 2016. AIChE Annual Meeting, San Francisco, CA

## HONORS AND AWARDS

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Ace of Innovation Award, Corteva Agriscience	2020
People's Choice Award, Corteva Agriscience	2019
AIChE Separations Division Graduate Student Research Award	2018
Eastman Graduate Travel Grant, Purdue University	2017
Purdue Graduate Student Government Travel Grant, Purdue University	2016
Global Excellence Scholarship, UMN	2010 – 2014
College of Science and Engineering Merit Scholarship, UMN	2012
Charles A. Mann Award, Department of Chemical Engineering, UMN	2012