

# ZHEYU JIANG

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## EDUCATION

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**Ph.D, Purdue University**, Chemical Engineering 2014 – 2018

Advisors: Prof. Rakesh Agrawal and Prof. Mohit Tawarmalani

**B.Ch.E with distinction, *magna cum laude*, University of Minnesota** 2010 – 2014

Advisor: Prof. Michael Tsapatsis

## PROFESSIONAL EXPERIENCE

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**Corteva Agriscience** December 2018 – Present

*Senior Chemical Engineer*

- Joined Corteva Agriscience, the Agriculture Division of DowDuPont, focusing on delivering process technologies and manufacturing opportunities for its active ingredients

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

*Graduate Research Assistant*

- Solved a longstanding challenge in chemical engineering of developing a shortcut based method to determine the minimum reflux condition for any multi-feed, multi-product distillation column separating ideal multicomponent mixtures
- Developed an enumeration based optimization algorithm that guarantees global optimality for the first time in literature to identify optimal distillation configurations that can potentially save up to 50% of total cost or total exergy loss compared to conventional schemes
- Proposed the first 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 Internship*

- Designed new distillation configurations for several Dows processes that could save up to 10-15% in energy consumption compared to Dows 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*

- For the first time, developed a solution processable method to achieve purification of sub-100 nm thin film of exfoliated MFI zeolite nanosheets based on density gradient centrifugation
- Optimized the process that prepared high performance  $\alpha$ -alumina membrane support for MFI nanosheet coating, leading to ten-fold increase in fabrication efficiency and improved support quality
- Investigated on complete removal of structural directing agent in MFI nanosheets by acid treatment

**Honeywell UOP** June 2013 – August 2013

*Internship*

- Constructed new UniSim based simulations for UOP's Oleflex and FCC processes; and optimized their EOS models to successfully 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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1. AGRAWAL, K. V., TOPUZ, B., JIANG, Z., NGUENKAM, K., ELYASSI, B., FRANCIS, L. F., TSAP-ATSI, M., AND NAVARRO, M. Solution-processable exfoliated zeolite nanosheets purified by density gradient centrifugation. *AIChE Journal* 59, 9 (2013), 3458–3467
2. JIANG, Z., MADENOOR RAMAPRIYA, G., TAWARMALANI, M., AND AGRAWAL, R. Minimum energy of multicomponent distillation systems using minimum additional heat and mass integration sections. *AIChE Journal* 64, 9 (2018), 3410–3418
3. JIANG, Z., MADENOOR RAMAPRIYA, G., TAWARMALANI, M., AND AGRAWAL, R. Process intensification in multicomponent distillation. *Chemical Engineering Transactions* 69 (2018), 841–846
4. JIANG, Z., AND AGRAWAL, R. Process intensification in multicomponent distillation: A review on recent advancements. Submitted to the Special Issue of the 11th International Conference on Distillation & Absorption 2018 in *Chemical Engineering Research and Design*
5. JIANG, Z., MATHEW, T., HUFF, J., NALLASIVAM, U., TAWARMALANI, M., AND AGRAWAL, R. Global optimization of multicomponent distillation configurations: 3. Global minimization of total cost for multicomponent mixture separations. (Working Paper)
6. JIANG, Z., MATHEW, T., CHEN, Z., HUFF, J., SHENVI, A., TAWARMALANI, M., AND AGRAWAL, R. Global optimization of multicomponent distillation configurations: 4. Minimization of total exergy loss for multicomponent mixture separations. (Working Paper)
7. JIANG, Z., TAWARMALANI, M., AND AGRAWAL, R. An accurate minimum reflux calculation method for multi-feed, multi-product distillation columns distilling ideal multicomponent mixtures: 1. Mathematical model. (Working Paper)
8. JIANG, Z., TAWARMALANI, M., AND AGRAWAL, R. An accurate minimum reflux calculation method for multi-feed, multi-product distillation columns distilling ideal multicomponent mixtures: 2. Optimization model and case studies. (Working Paper)

## PRESENTATIONS

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1. JIANG, Z., TAWARMALANI, M., AND AGRAWAL, R. Minimum reflux behavior of multicomponent mixture separation using complex distillation columns. 2018 AIChE Annual Meeting, Pittsburg, PA
2. JIANG, Z., TAWARMALANI, M., AND AGRAWAL, R. A new minimum reflux calculation method for multiple-feed distillation columns distilling ideal multicomponent mixtures. 2017 AIChE Annual Meeting, Minneapolis, MN
3. JIANG, Z., TAWARMALANI, M., AND AGRAWAL, R. Process intensification in multicomponent distillation. 2017 AIChE Annual Meeting, Minneapolis, MN
4. JIANG, Z., TAWARMALANI, M., AND AGRAWAL, R. Process intensification in multicomponent distillation. 2017 AIChE Spring Meeting, San Antonio, TX
5. JIANG, Z., MADENOOR RAMAPRIYA, G., TUMBALAM GOOTY, R., TAWARMALANI, M., AND 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
6. JIANG, Z., MADENOOR RAMAPRIYA, G., TUMBALAM GOOTY, R., TAWARMALANI, M., AND 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
7. JIANG, Z., MADENOOR RAMAPRIYA, G., TUMBALAM GOOTY, R., TAWARMALANI, M., AND 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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| Separations Division Graduate Student Research Award, AIChE        | 2018        |
| Eastman Graduate Travel Grant, Purdue University                   | 2017        |
| Purdue Graduate Student Government Travel Grant, Purdue University | 2016        |
| Maroon Global Excellence Scholarship, UMN                          | 2010 – 2014 |
| College of Science and Engineering Merit Scholarship, UMN          | 2012 – 2013 |
| Charles A. Mann Award, Department of Chemical Engineering, UMN     | 2012 – 2013 |

## SKILLS

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| Computer Languages | Java, Python   |
| Software & Tools   | L <sup>A</sup> T <sub>E</sub> X, HTML, MATLAB, GAMS, Aspen Plus, Aspen Hysys, UniSim |
| Characterization   | SEM, basic familiarity of TEM  |
| Laboratory         | Analytical and organic chemistry laboratory instruments and techniques               |

## ACTIVITIES

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| <b>First-Year Representative</b>                                      | 2015 – 2016 |
| <i>Purdue Chemical Engineering Graduate School Organization (GSO)</i> |             |
| <b>Graduate Teaching Assistant</b>                                    | Fall 2015   |
| <i>CHE 378 – Heat and Mass Transfer</i>                               |             |
| <b>Graduate Teaching Assistant</b>                                    | Spring 2017 |
| <i>CHE 450 – Design and Analysis of Process Systems</i>               |             |