

# Aurora del Carmen Munguia-Lopez

Department of Chemical and Biological Engineering  
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## EDUCATION

**Ph.D. in Chemical Engineering (Process Systems Engineering)**, 2021

University of Michoacan, Michoacan, Mexico

**M.Sc. in Chemical Engineering**, 2017

Technical Institute of Celaya, Guanajuato, Mexico

**B.Sc. in Chemical Engineering**, 2014

Technical Institute of Celaya, Guanajuato, Mexico

## APPOINTMENTS

**University at Buffalo, The State University of New York, Department of Chemical and Biological Engineering**

**Assistant Professor (Tenure-Track)**. August 2024

**University of Wisconsin-Madison, Department of Chemical and Biological Engineering**

**Research Associate at Scalable Systems Laboratory**. January 2022 - August 2024

**University of Wisconsin-Madison, Department of Chemical and Biological Engineering**

**Visiting Research Scholar at Scalable Systems Laboratory**. August 2018 - July 2019

**FMC Corporation, Agrochemical Complex, Mexico**

**Engineering Intern**. September 2014 - July 2015

**Technical Institute of Celaya, Language Center**

**English as a Second Language Teacher (Part-Time)**. August 2013 - July 2015

**University of San Luis Potosi, Department of Chemical Engineering**

**Summer Research Intern**. June 2013 - July 2013

## PUBLICATIONS

- [1] J. Yu, **A.C. Munguia-Lopez**, V.S. Cecon, K.L. Sanchez-Rivera, K. Nelson, S. Kolapkar, V.M. Zavala, K.L. Vorst, E. Bar-Ziv, and G.W. Huber (2023). **High-purity Polypropylene from Disposable Face Masks via Solvent-Targeted Recovery and Precipitation**. *Green Chemistry*, 25(12): 4723-4734. [\[link\]](#)
- [2] K.L. Sanchez-Rivera, **A.C. Munguia-Lopez**, P. Zhou, V.S. Cecon, J. Yu, K. Nelson, D. Miller, S. Grey, Z. Xu, E. Bar-Ziv, K.L. Vorst, G. Curtzwiler, R.C. Van Lehn, V.M. Zavala, and G.W. Huber (2023). **Recycling of a Post-Industrial Printed Multilayer Plastic Packaging Film containing Polyurethane Inks by Solvent-Targeted Recovery and Precipitation**. *Resources, Conservation and Recycling*, 197, 107086. [\[link\]](#)
- [3] **A.C. Munguia-Lopez**, D. Göreke, K.L. Sanchez-Rivera, H.A. Aguirre-Villegas, S. Avraamidou, G.W. Huber, and V.M. Zavala (2023). **Quantifying the Environmental Benefits of a Solvent-Based Separation Process for Multilayer Plastic Films**. *Green Chemistry*, 25(4):1611-25. [\[link\]](#)
- [4] R. Ochoa-Barragan, **A.C. Munguia-Lopez**, and J.M. Ponce-Ortega (2023). **A Hybrid Machine Learning-Mathematical Programming Optimization Approach for Municipal Solid Waste Management During the Pandemic**. *Environment, Development and Sustainability*, 1-20. [\[link\]](#)
- [5] R. Ochoa-Barragan, **A.C. Munguia-Lopez**, and J.M. Ponce-Ortega (2023). **Strategic Planning for the Optimal Distribution of COVID-19 Vaccines**. *Socio-Economic Planning Sciences*, 87, 101559. [\[link\]](#)
- [6] **A.C. Munguia-Lopez**, R. Ochoa-Barragan, and J.M. Ponce-Ortega (2022). **Optimal Waste Management during the COVID-19 Pandemic**. *Chemical Engineering and Processing - Process Intensification*, 176, 108942. *Selected as cover of the issue*. [\[link\]](#)
- [7] B. Cansino-Loeza, **A.C. Munguia-Lopez**, and J.M. Ponce-Ortega (2022). **A Water-Energy-Food Security Nexus Framework based on Optimal Resource Allocation**. *Environmental Science & Policy*, 133, 1-16. [\[link\]](#)

- [8] C. Ramirez-Marquez, **A.C. Munguia-Lopez**, M. Martin, J.G. Segovia-Hernandez, and J.M. Ponce-Ortega (2022). **Optimal Design of a Solar-Grade Silicon Refinery incorporating a Fairness Approach**. *Chemical Engineering Research and Design*, 186, 25-36. [\[link\]](#)
- [9] R. Ochoa-Barragan, **A.C. Munguia-Lopez**, and J.M. Ponce-Ortega (2021). **Use of Mathematical Approaches for Addressing COVID 19 Pandemic – A Critical Review**. *Process Integration and Optimization for Sustainability*, 5, 755–775. [\[link\]](#)
- [10] D.J. Cruz-Aviles, **A.C. Munguia-Lopez**, and J.M. Ponce-Ortega (2021). **Optimal Design of Water Networks in Eco-Industrial Parks Incorporating a Fairness Approach**. *Industrial & Engineering Chemistry Research*, 60(24), 8844–8860. [\[link\]](#)
- [11] **A.C. Munguia-Lopez**, A.F. Sanchez-Bautista, M.M. El-Halwagi, and J.M. Ponce-Ortega (2021). **Strategic Planning of an Integrated Fuel Production System with a Fair-Sustainable Approach**. *ACS Sustainable Chemistry & Engineering*, 9 (14), 5116-5127. [\[link\]](#)
- [12] **A.C. Munguia-Lopez** and J.M. Ponce-Ortega (2021). **Fair Allocation of Potential COVID-19 Vaccines Using an Optimization-Based Strategy**. *Process Integration and Optimization for Sustainability*, 5, 3–12. [\[link\]](#)
- [13] **A.C. Munguia-Lopez**, J.M. Nuñez-Lopez, and J.M. Ponce-Ortega (2020). **Identifying Fair Solutions in the Optimal Design of Integrated Residential Complexes**. *Chemical Engineering and Processing-Process Intensification*, 157, 108116. [\[link\]](#)
- [14] **A.C. Munguia-Lopez**, V.M. Zavala, J.E. Santibañez-Aguilar, and J.M. Ponce-Ortega (2020). **Optimization of Municipal Solid Waste Management using a Coordinated Framework**. *Waste Management*, 115, 15-24. [\[link\]](#)
- [15] M. Juarez-Garcia, **A.C. Munguia-Lopez**, and J.M. Ponce-Ortega (2020). **Optimization Approach to Identify Fair Solutions in the Synthesis of Carbon, Hydrogen, and Oxygen Symbiosis Networks**. *Industrial & Engineering Chemistry Research*, 59, 13, 5985-5995. [\[link\]](#)
- [16] **A.C. Munguia-Lopez**, A.M. Sampat, E. Rubio-Castro, J.M. Ponce-Ortega, and V.M. Zavala (2019). **Fairness-Guided Design of Water Distribution Networks for Agricultural Lands**. *Computers & Chemical Engineering*, 130, 106547. [\[link\]](#)
- [17] **A.C. Munguia-Lopez**, R. Gonzalez-Bravo, and J.M. Ponce-Ortega (2019). **Evaluation of Carbon and Water Policies in the Optimization of Water Distribution Networks involving Power-Desalination Plants**. *Applied Energy*, 236, 927-936. [\[link\]](#)
- [18] **A.C. Munguia-Lopez**, V. Rico-Ramirez, and J.M. Ponce-Ortega (2018). **Analysis of Carbon Policies in the Optimal Integration of Power Plants involving Chemical Looping Combustion with Algal Cultivation Systems**. *ACS Sustainable Chemistry & Engineering*, 6, 4, 5248-5264. [\[link\]](#)

## CONFERENCE PUBLICATIONS AND BOOK CHAPTERS (PEER-REVIEWED)

- [1] **A.C. Munguia-Lopez**, P. Zhou, U.M. Ikegwu, R.C. Van Lehn, and V.M. Zavala (2024). **A fast computational framework for the design of solvent-based plastic recycling processes**. In *Proceedings of FOAPD*.
- [2] P.A. Munoz Briones, **A.C. Munguia-Lopez**, K.L. Sánchez-Rivera, V.M. Zavala, G.W. Huber and S. Avraamidou (2024). **Optimal Design of Food Packaging Considering Waste Management Technologies to Achieve Circular Economy**. In *Proceedings of FOAPD*.
- [3] L. Gonzalez, C. Mills, **A.C. Munguia-Lopez**, and V.M. Zavala (2024). **Sustainable Production of Fertilizers Via the Photosynthetic Recovery of Nutrients in Livestock Waste**. In *Proceedings of FOAPD*.
- [4] **A.C. Munguia-Lopez**, V.M. Zavala, and J.M. Ponce-Ortega (2023). **Municipal Solid Waste Management Using a Coordinated Market Framework**. In *Proceedings of FOCAPO/CPC*. [\[link\]](#)
- [5] **A.C. Munguia-Lopez**, A.F. Sanchez-Bautista, M.M. El-Halwagi, and J.M. Ponce-Ortega (2022). **A Fair-Sustainable Approach for the Optimization of an Integrated Fuel Production System**. In *Computer Aided Chemical Engineering*. Vol. 51, pp. 1591-1596. Elsevier. [\[link\]](#)
- [6] B. Cansino-Loeza, **A.C. Munguia-Lopez**, and J.M. Ponce-Ortega (2022). **Optimizing the allocation of resources for the security of the water-energy-food nexus**. In *Computer Aided Chemical Engineering*. Vol. 51, pp. 1579-1584. Elsevier. [\[link\]](#)
- [7] **A.C. Munguia-Lopez**, V.M. Zavala, J.E. Santibañez-Aguilar, and J.M. Ponce-Ortega (2021). **A Coordinated Framework for the Optimization of Municipal Solid Waste Management**. In *Computer Aided Chemical Engineering*, Vol. 50, pp. 1409-1414. Elsevier. [\[link\]](#)
- [8] **A.C. Munguia-Lopez** and J.M. Ponce-Ortega (2020). **Carbon Policies for Reducing Emissions in Power Plants through an Optimization Framework**. In *Advances in Carbon Management Technologies*, pp. 119-131. CRC Press.

## SELECTED CONFERENCE PRESENTATIONS

- [1] **2023 AIChE Annual Meeting**, Orlando, FL, USA, November 2023. *“Achieving Social and Economic Justice Via Deployment of Plastic Waste Upcycling Technologies”*
- [2] **2023 AIChE Annual Meeting**, Orlando, FL, USA, November 2023. *“On the Interplay of Food Packaging Design and Food Supply Chain Sustainability”*
- [3] **FOCAPO/CPC 2023**, San Antonio, TX, USA, January 2023. *“Municipal Solid Waste Management Using a Coordinated Market Framework”*
- [4] **2022 AIChE Annual Meeting**, Phoenix, AZ, USA, November 2022. *“Environmental Benefits of the Solvent-Targeted Recovery and Precipitation (STRAP) Process for Multilayer Plastic Films Recycling”*
- [5] **2022 AIChE Annual Meeting**, Phoenix, AZ, USA, November 2022. *“Optimization of the Solvent-Targeted Recovery and Precipitation (STRAP) Process for Multilayer Plastic Recycling”*
- [6] **2022 AIChE Annual Meeting**, Phoenix, AZ, USA, November 2022. *“Recycling of Plastic Wastes By Solvent-Targeted Recovery and Precipitation”*
- [7] **UW–Madison Sustainability Symposium**, Madison, WI, USA, October 2022. *“Environmental Benefits of the STRAP Process for Multilayer Plastic Films”*
- [8] **Chemical Upcycling of Waste Plastics (CUWP) Annual Meeting**, Madison, WI, USA, June 2022. *“Environmental Benefits of the STRAP Process for Multilayer Plastic Films”*
- [9] **32nd European Symposium on Computer Aided Process Engineering (ESCAPE-32)**, Toulouse, France, June 2022. *“A Fair-Sustainable Approach for the Optimization of an Integrated Fuel Production System”*
- [10] **32nd European Symposium on Computer Aided Process Engineering (ESCAPE-32)**, Toulouse, France, June 2022. *“Optimizing the Allocation of Resources for the Security of the Water-Energy-Food Nexus”*
- [11] **2021 AIChE Annual Meeting**, USA, November 2021 (Virtually). *“A Fair-Sustainable Approach for the Optimal Planning of an Integrated Fuel Production System”*
- [12] **31st European Symposium on Computer Aided Process Engineering (ESCAPE-31)**, Istanbul, Turkey, June 2021 (Virtually). *“A Coordinated Framework for the Optimization of Municipal Solid Waste Management”*
- [13] **2020 AIChE Annual Meeting**, USA, November 2020 (Virtually). *“Fair Solutions for the Optimal Design of Integrated Residential Complexes”*
- [14] **2020 AIChE Annual Meeting**, USA, November 2020 (Virtually). *“Municipal Solid Waste Management Optimization through a Coordinated Market Framework”*
- [15] **2019 AIChE Annual Meeting**, Orlando, FL, USA, November 2019. *“Analysis of Carbon and Water Policies in the Optimal Design of Water Distribution Networks Involving Power-Desalination Plants”*
- [16] **2019 AIChE Annual Meeting**, Orlando, FL, USA, November 2019. *“Fairness-Guided Design of Water Distribution Systems for Agricultural Lands”*
- [17] **Wisconsin Workshop on Organic Waste (WWOW)**, Madison, WI, USA, May 2019. *“Fair Allocations of Wealth in Agricultural Systems”*
- [18] **2018 AIChE Annual Meeting**, Pittsburgh, PA, USA, November 2018. *“A Mathematical Programming Model for the Integration of Power Plants Involving Chemical Looping Combustion with Algal Systems under Carbon Policies Analysis”*

## INVITED TALKS

- **Systems Engineering Approaches for Sustainable Plastic Management.** At the “Great Lakes Process Systems Engineering Student Workshop” Hosted at the University at Buffalo, The State University of New York. USA, April 2024.
- **Exploring the Economic and Environmental Benefits of Solvent-Based Recycling Processes of Multi-Layer Plastic Films.** At the “Spring 2023 Seminar Series” of the Department of Chemical and Biological Engineering at University at Buffalo. USA, April 2023.
- **Systems Engineering Tools for the Separation and Recycling of Multi-Layer Plastic Films.** At the “National ChemE Future Faculty Seminar Series” jointly hosted by University of Pennsylvania, Texas Tech and the University of Michigan (Virtually). USA, October 2022.

- **Environmental Analysis of the Solvent-Targeted Recovery and Precipitation (STRAP) Process for the Recycling of Multilayer Plastic Films.** At the “Wisconsin Computing in Engineering Forum 2022” Organized by the College of Engineering at UW-Madison (Virtually). USA, September 2022.
- **Process Optimization: Applications including Carbon Policies, Fairness Approaches, and Coordinated Schemes.** At the “I Symposium of Applied Optimization to the Chemical Engineering”. Mexico, June 2021.
- **Fair and Optimum Allocation of COVID-19 Vaccines.** At the “Seminar Series” of the Department of Chemical Engineering at University of Michoacan. Mexico, April 2021.

## TEACHING EXPERIENCE

### Guest Lecturer

- CE 452: Petroleum Engineering. At the Department of Chemical and Biological Engineering at the University at Buffalo.
- CBE 562: Technology for Plastic Recycling. At the Department of Chemical and Biological Engineering at the University of Wisconsin-Madison.
- CBE 750: Advanced Chemical Process Synthesis and Optimization. At the Department of Chemical and Biological Engineering at the University of Wisconsin-Madison.

## PROPOSAL EXPERIENCE

- “Solvent Targeted Recovery and Precipitation (STRAP) For Recovery of Biogenic Materials and Plastics from Municipal Solid Waste (MSW)”. *Participated in proposal writing*

## PROFESSIONAL SERVICES

### • Academic Services

Session Co-Chair AIChE Annual Meeting, 2024 (Computing & Systems Technology Division); Session Co-Chair AIChE Annual Meeting, 2024 (Environmental Division); Poster session judge for AIChE Annual Meeting, 2023 (undergraduate); Session Co-Chair AIChE Annual Meeting, 2023 (Environmental Division); Poster session judge for AIChE Annual Meeting, 2022 (undergraduate)

### • Peer Review

ACS Sustainable Chemistry & Engineering (American Chemical Society), Environmental Science and Policy (Elsevier), Environmental Management (Springer), Sustainable Production and Consumption (Elsevier), Risk Analysis (Wiley), Latin American Applied Research, Frontiers in Digital Health (Frontiers), Environment, Development and Sustainability (Springer), Chemical Engineering and Processing - Process Intensification, Process Integration and Optimization for Sustainability

## RESEARCH MENTORING

- **Grace Lebron** (REU Program), Summer 2024
- **Celeste Mills** (REU Program), Summer 2023
- **Saul Herrera-Ovando** (PhD visiting research scholar), January 2023 - December 2023
- **Virginia Lilly** (URS Program), September 2022 - Present
- **Shreyanshu Dekate** (URS Program), September 2022 - Present
- **Rogelio Ochoa-Barragan** (Award for outstanding M.Sc. Thesis at University of Michoacan), 2020 - 2022

## OUTREACH

- **Rethinking Recycling: Hard-to-Recycle Plastics and the Path Forward Panel Participant**, Wisconsin Energy Institute, January 2024. [\[link\]](#)
- **Co-authored Fact Sheet about Solvent-Based Recycling of Plastic films**, April 2023. [\[link\]](#)
- **Women in Power Career Panel and Podcast Participant**, Wisconsin Energy Institute, April 2023. [\[link A\]](#)[\[link B\]](#)
- **Engineering EXPO Volunteer and Exhibit Organizer**, University of Wisconsin–Madison, April 2023
- **Badger Buddies Senior Mentoring Program**, University of Wisconsin-Madison, March 2023 - Present
- **Engineering EXPO Volunteer**, University of Wisconsin–Madison, April 2022
- **Diversity Officer of Scalable Systems Laboratory**, University of Wisconsin–Madison, January 2022 - Present
- **Head of Student Association**, Technical Institute of Celaya, August 2011 - August 2013

## SELECTED AWARDS

- **2023 Minority Affairs Community's Janice Lumpkin Travel Award**, AIChE 2023. USA, Nov 2023.
- **Young Researcher Travel Grant Award**, FOCAPO/CPC 2023. USA, Jan 2023.
- **Best Poster Presentation Award**, CUWP Annual Meeting. USA, May 2022.
- **Medalla Dr. Ignacio Chavez Sanchez: Award for outstanding doctoral thesis**, Universidad Michoacana de San Nicolas de Hidalgo. Mexico, December 2021.
- **Best Presentation Award**, Simposio de Optimización Aplicada a la Ingeniería Química. Mexico, June 2021.
- **Best GPA Award: M.Sc. in Chemical Engineering**, Instituto Tecnológico de Celaya. Mexico, June 2017.
- **Best GPA Award: B.Sc. in Chemical Engineering**, Instituto Tecnológico de Celaya. Mexico, December 2014.
- **English as a Second Language (ESL) Certificate**, Texas International Education Consortium. USA, December 2014.

## SELECTED WORKSHOPS AND COURSES

- **Entering Mentoring & Culturally Aware Mentoring**, University of Wisconsin-Madison, January 2024.
- **Preparing Future Faculty Workshop**, Auburn University (Virtually), September 2022.
- **New England Future Faculty Workshop**, Northeastern University (Virtually), June 2022.
- **Introduction to Statistics: From Data to Knowledge to Decisions**, University of Guanajuato, Mexico (Virtually), January 2021.
- **Master Workshop: How to Successfully Publish in High Impact Factor Journals**, University of Guanajuato, Mexico (Virtually), October 2021.
- **Stochastic Programming Workshop: Formulations, Algorithms, and Applications**, University of Wisconsin-Madison, USA, August 2018.