

Jessica Elvira Torres

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Education

Purdue University <i>PhD Candidate in Chemical Engineering</i>	West Lafayette, IN Expected 2022
Massachusetts Institute of Technology (MIT) <i>BS in Chemical Biological Engineering</i>	Cambridge, MA May 2016

Research Experience

Purdue University <i>Graduate Researcher, Advisor: Dr. Julie Liu</i>	West Lafayette, IN Fall 2017-present
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- Designed elastin-like polypeptide formulations to function as a surgical sealant
- Performed burst pressure testing, compression testing, swelling, and rheology on hydrogels
- Created an *in vitro* tissue model of drug diffusion

U.S. Department of Energy – Oak Ridge National Laboratory <i>Post-Bachelor Researcher</i>	Oak Ridge, TN Fall 2016-Summer 2017
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- Built biomass fast pyrolysis reactor simulations in MFiX for optimization of bio-oil production
- Modeled residence time distributions and pressure drop of polydisperse materials in fast pyrolysis reactors using computational fluid dynamics discrete element model

Université Catholique de Louvain <i>Research Intern</i>	Louvain-la-Neuve, BE Summer 2016
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- Created a numerical simulation in C of a methane reforming catalytic reactor accounting for radial dispersion, heat transfer, and reaction kinetics
- Modeled the variable heat transfer component of a cross flow heat exchanging reactor

U.S. Department of Energy – National Energy Technology Laboratory <i>Mickey Leland Energy Fellow</i>	Morgantown, WV Summer 2015
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- Developed numerical gas-solid fluidized bed simulations of complex geometries and flow patterns using computational fluid dynamics in NETL's MFiX-DEM software
- Produced simulation animations that provide insight into behavior of millions of particles

Massachusetts Institute of Technology Langer Laboratory <i>Research Intern</i>	Cambridge, MA Spring 2015
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- Developed nanoparticles to target inflammation in the gastrointestinal tract for drug delivery
- Optimized conditions for nanoparticle production using BSA to attain quality nanoparticles via dialysis, weight measurements, and spectrophotometry
- Designed further experimentation to create nanoparticles for animal testing

Honors and Awards

Marilyn Forney Trailblazer Award (Purdue Chemical Engineering)	2021
American Institute of Chemical Engineers Women in Chemical Engineering Travel Award	2020
NSF Graduate Research Fellowship (National Science Foundation, 3-year fellowship)	2019
Leslie Bottorff Fellowship (Purdue University, 2-year fellowship)	2019
Best Overall Poster (Purdue Chemical Engineering Graduate Student Organization Symposium)	2019
Purdue Doctoral Fellowship (Purdue University, 4-year fellowship)	2017
Mickey Leland Energy Fellowship (U.S. Department of Energy, summer fellowship)	2015

Publications

- J. E. Torres**, S. Hollingshead, D. Boucher, J. C. Liu “Biomimetic Adhesives for Clinical Applications” in Biomimetic Protein Based Elastomers, RSC Biomaterials Science, (Accepted).
- Q. Xu, **J. Torres**, M. Hakim, P. M. Babiak, P. Pal, C. M. Battistoni, M. Nguyen, A. Panitch, L. Solorio, J. Liu “Collagen- and hyaluronic acid-based hydrogels and their biomedical applications” *Materials Science and Engineering R* 146 (2021).
- S. Hollingshead, **J. E. Torres**, J. C. Liu “Biomedical application of mussel- and elastin-inspired adhesives” (In Preparation)
- J. E. Torres**, S. Madduri, F. Meng, K. Buno, Y. Yeo, L. Solorio, J. C. Liu “In Vitro Tissue Modeling of Collagen and Aldehyde/Hydrazide-Modified Hyaluronic Acid Hydrogels” (In Preparation)

Presentations

- Oral Presentation:** J. E. Torres, J. C. Liu “Bioinspired Elastin-Based DOPA-Modified Protein Lung Sealants.” Society for Biomaterials Annual Meeting, April 2021, Chicago, IL.
- Oral Presentation:** J. E. Torres, F. Meng, K. Buno, Y. Yeo, L. Solorio, J. C. Liu “Collagen I and Modified Hyaluronic Acid Hydrogels for Tissue Engineering.” Society for Biomaterials Annual Meeting, April 2021, Chicago, IL.
- Oral Presentation:** J. E. Torres, J. C. Liu “Formulation Design of a Recombinant Protein-Based Lung Sealant.” International Conference on Biological and Biomimetic Adhesives, February 2021, Aveiro, Portugal.
- Oral Presentation:** J. E. Torres, J. C. Liu “Formulation Design of a Recombinant Protein-Based Lung Sealant.” American Institute of Chemical Engineers Annual Meeting, November 2020, San Francisco, CA.
- Oral Presentation:** J. E. Torres, F. Meng, K. Buno, Y. Yeo, L. Solorio, J. C. Liu “Collagen Type I and Aldehyde/Hydrazide-Modified Hyaluronic Acid Hydrogels for Tissue Engineering.” American Institute of Chemical Engineers Annual Meeting, November 2020, San Francisco, CA.
- Oral Presentation:** J. E. Torres, G. Wiggins, C. Finney "Simulating Biomass Fast Pyrolysis Reactors by Combining High and Low-order Computational Models." National Energy Technology Laboratory Workshop on Multiphase Flow Science, August 2017, Morgantown, WV.
- Oral Presentation:** J. E. Torres, J. De Wilde, S. Benyahia “Understanding Particulate Flow Physics by Means of Large Simulation Data Sets.” NETL Workshop on Multiphase Flow Science, August 2015, Morgantown, WV.

Leadership and Outreach

- Chemical Engineering Graduate Student Organization (GSO)** West Lafayette, IN
President/Diversity and Culture Club Leader/First Year Student Representative 2018-present
- Led 11 students to run professional and social events for chemical engineering graduate students
 - Led monthly discussions of primary sources and scientific articles to discuss the perspectives of underrepresented minorities in STEM and our society as a whole
 - Organized the annual industrial recruitment and fundraising event
 - Organized the first GSO voter registration event
- Introduce a Girl to Engineering Day (IGED)** West Lafayette, IN
Program Leader/Chemical Engineering Session Leader 2018-present
- Organized an event for 160 high school girls to creatively engineer solutions to different engineering challenges and led the program’s redesign and transition to a virtual format
 - Organized the IGED chemical engineering activity and created a presentation on chemical engineering and polymer science
- DynaMIT Nonprofit** Cambridge, MA
Director/Mentor/Operations and Curriculum Board Member 2013-2016
- Stimulated scientific interest of low-income middle school students through hands-on engineering and experimentation
 - Directed 16 board members in coordinating the activities and general operation of dynaMIT for the 2014 and 2015 program years

Teaching and Mentoring

- Graduate Teaching Assistant** West Lafayette, IN
Statistical Modeling and Quality Enhancement Course Spring 2020
Chemical Engineering Laboratory Course Fall 2018
- Graduate Student Mentor** 2018-present
- Mentored 3 chemical engineering women entering the PhD program
- Undergraduate/High School Student Research Mentor** 2018-present
- Mentored 7 undergraduate students in research and presentation/writing skills
 - Mentored 1 high school student in research and organized laboratory tours for her

Skills

- Laboratory Skills:** Bacterial fermentation, Recombinant protein production and purification, Confocal microscopy, Scanning electron cryomicroscopy, Immunofluorescence, Colorimetric assays
- Material Testing:** Compression testing, Burst pressure testing, Swelling, Adhesive testing, Rheology
- Programming:** MATLAB, Python, C, C++, SAS